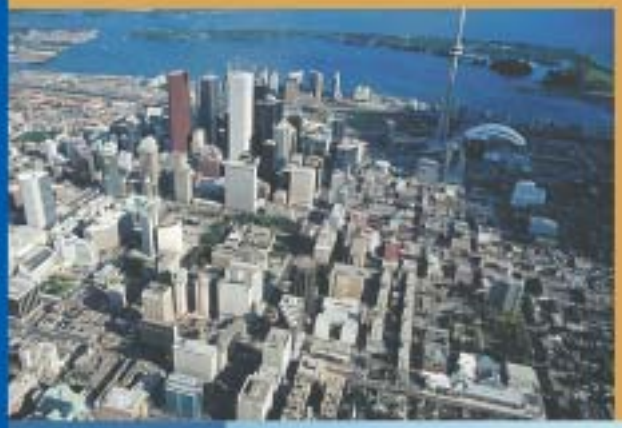
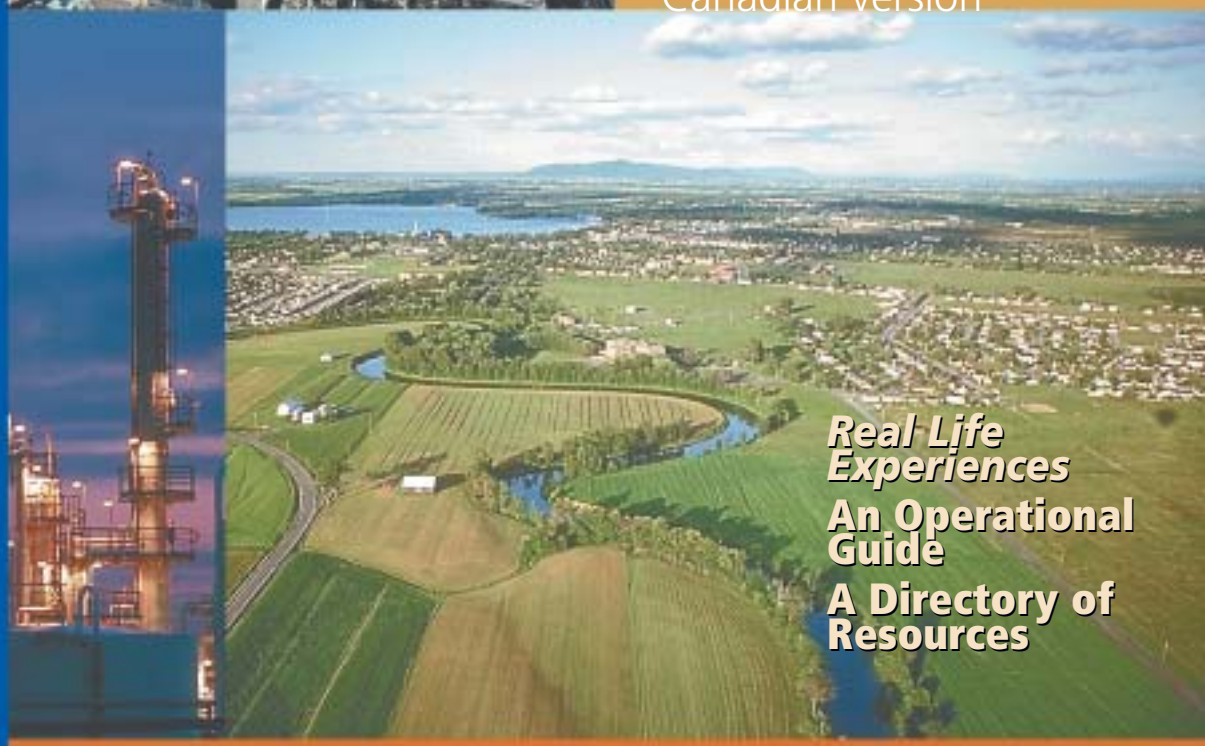
WASTE MANAGEMENT Guide



FOR SMALL AND MEDIUM ENTERPRISES

Canadian version



Real Life Experiences

An Operational Guide

A Directory of Resources

Éditions Ruffec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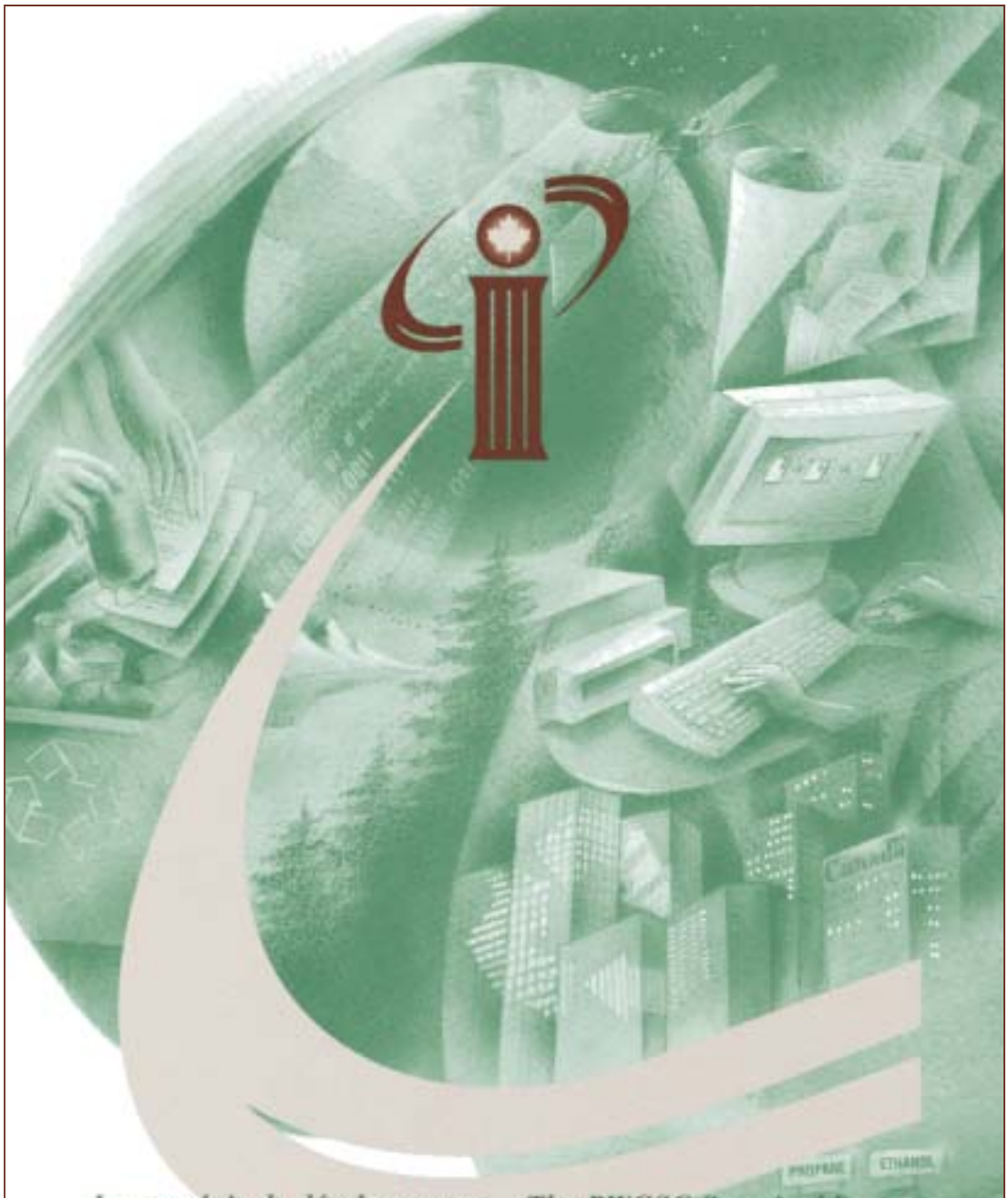

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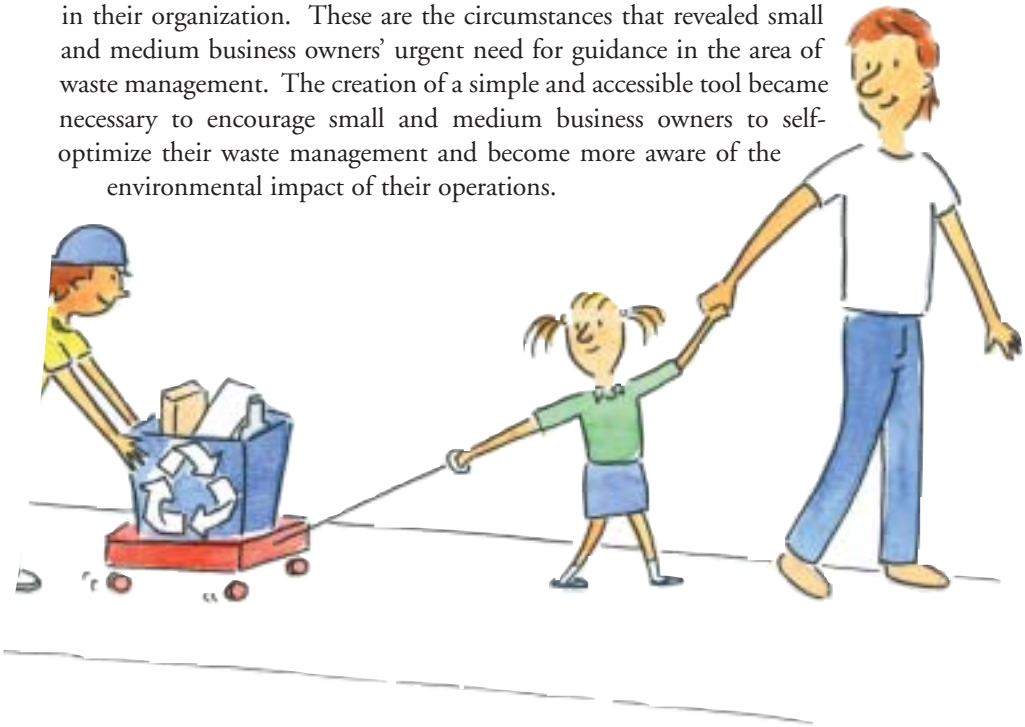
As my children and I take the recycling bin to the curb, I realize the true greatness of environmental awareness and of the collective efforts that it has inspired. Normally, the children would take advantage of this time with me to ask a million and one questions about recovered materials. "Dad, what do they make out of these old plastic bottles? Can glass be recycled indefinitely? Tell me dad, why isn't paper mixed in with the rest of the materials?" At this very moment, I realize that my children are asking as many questions as there are materials in our recycling bins...

The various types of waste generated as a result of our lifestyles, are unquestionably cumbersome and expensive to deal with for our society, and they be managed diligently to minimize their impact. The materials that we recover are intimately linked to the manufacturing and transportation processes of everyday commodities. Over-packaging of these commodities is one of the causes of Canada's growing waste management crisis. Companies big and small must come to realize the important role that they play in the global waste reduction challenge. The significance of their contribution is made only more important by the fact that they themselves generate more than 50% of the country's waste.

This makes me realize how important it is to publish the « Waste Management Guide For Small and Medium Enterprises» published in the province of Quebec in 2001.

The Guide began to take form while I was carrying out waste management mandates for my clients. I quickly understood that most small and medium business owners do not have the logistics, the know-how or the resources required to hire a consultant, and maybe even lack the interest altogether to implement a waste reduction program in their organization. These are the circumstances that revealed small and medium business owners' urgent need for guidance in the area of waste management. The creation of a simple and accessible tool became necessary to encourage small and medium business owners to self-optimize their waste management and become more aware of the environmental impact of their operations.



A Word from the Publisher

I was happy to see that the publication of the first guide piqued the interest of the 5,000 small and medium Quebec businesses to whom it was distributed free of charge. The experience made me realize the importance of offering accessible information to business managers, but never to the point of wanting to relive this wonderful experience immediately and produce a second Guide containing more than 260 pages, this time in a Canadian version, print it and distribute it free of charge to over 7,000 small and medium business managers from every Canadian province and territory. I didn't think that it would one day be possible for me to take part in such a challenge once again. Well today, its mission has been accomplished, thanks to the energy and determination exhibited by Mr. Gérard Chiasson of Industry Canada, who convinced me to edit a Canadian version of the original Guide. Mr. Chiasson encouraged me through the tough times, got the financial partners together and displayed great enthusiasm in motivating them to contribute to the production of this Guide. He truly made brought a crucial contribution to the production of this new tool and was for myself, as well as for the entire team, a constant source of inspiration.

From the start, my collaborators wasted no time believing in the benefits of the project, which just goes to show how well adapted the process really is. Their relentless support was key in motivating the troops and producing a unique, precise and concise Guide.

Particularly for their contribution to the Canadian version of the Guide, I wish to thank Mr. Georges Mezzetta form Public Works and Government Services Canada, MM. Gérald Girouard and Alain David from Environment Canada, Mr. Philippe Châtillon from the Société des alcools du Québec, Mr. Claude Cardin of Cascades inc., Recovery Division, and Mr. Michel Desjardins from the Business Development Bank of Canada. I thank them for their support from the very beginning, their open mindedness and their constant commitment to waste management initiatives.

Finally, I especially wish to express my deepest recognition to MM. Benoit Proulx and Bernard Caron, who assisted me throughout the entire process, and to everyone who contributed to the realization of this Guide.

Frederik Richard
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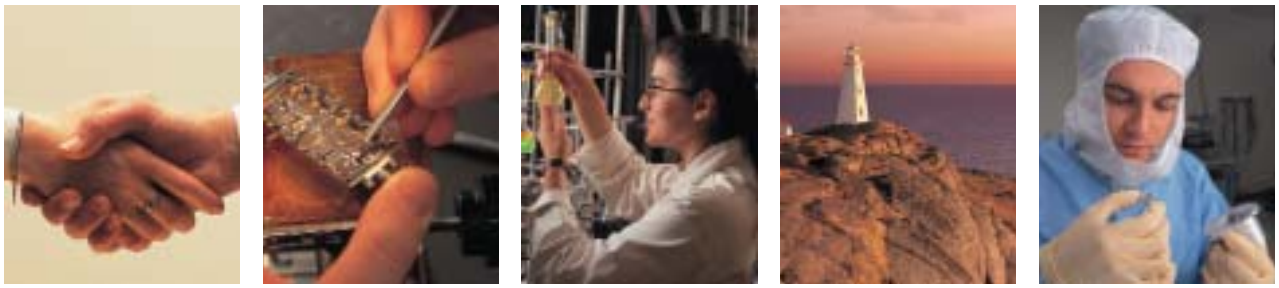

Sustainable Development

The Atlantic Canada Opportunities Agency (ACOA) is a Government of Canada agency whose mission is to work in partnership with the people of Atlantic Canada to improve the economy of our communities through the development of businesses and job opportunities.

At ACOA, we believe that a healthy environment is essential to the development of a strong, growing and sustainable economy. We are committed to protecting the environment of this region by promoting sustainable businesses and communities in Atlantic Canada and by setting an example in the environmental management of ACOA's own operations.

For information on how to become an eco-efficient business, visit the ACOA web site at
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À l'APECA, nous croyons qu'un environnement sain est essentiel au développement d'une économie durable, forte et croissante. Nous voulons protéger l'environnement de la région en faisant la promotion des entreprises et des communautés durables au Canada atlantique et en donnant l'exemple par la gestion écologique des activités mêmes de l'APECA.

Pour d'autres renseignements sur comment devenir une entreprise écoefficace, visiter le site Web de l'APECA à l'adresse :
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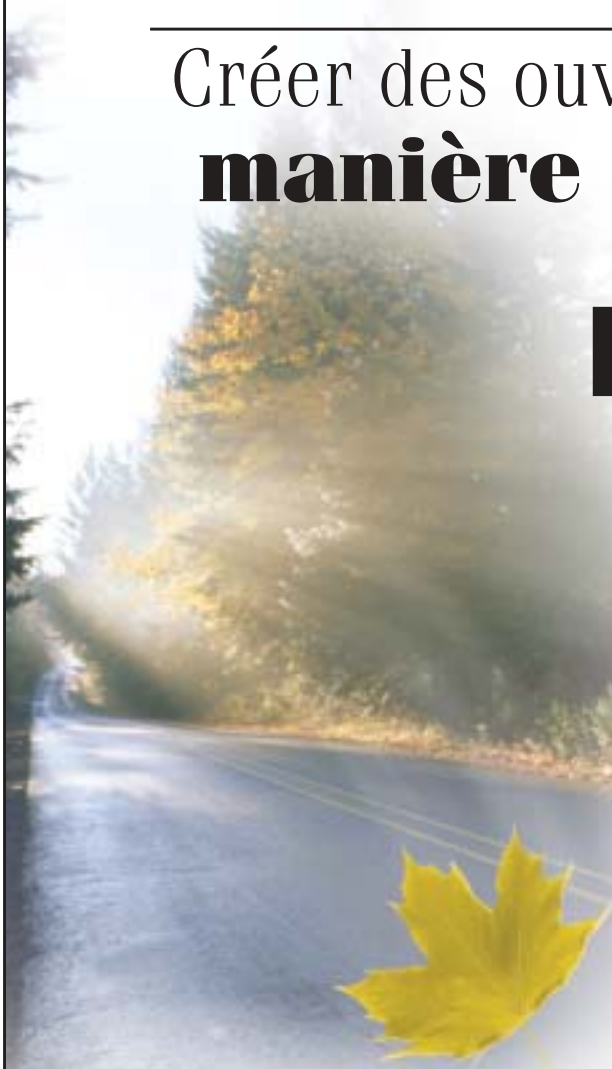

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Preface

This practical, realistic guide is intended to raise awareness among small and mid-sized firms regarding the cost effectiveness of sound waste management, while better equipping them to prevent wastage.

Alcoa aspires to be the best company in the world. It goes without saying that a key element to achieving this goal is an environmental strategic framework to guide our actions over the coming years. Among our mid and long term objectives: 20% and 50% reduction of wastes to landfill by 2003 and 2007 respectively, achieving 0 process water discharge, significant reduction of atmospheric emissions and interact with suppliers, clients, government and environmental organizations to reduce our environmental impact.

Although it is becoming increasingly common for large scale organizations to set ambitious environmental targets, the same cannot be said of SMB's (small and medium size businesses). While scarcity of resources and unfamiliarity with available tools partially explain this situation, the primary reason is absence of models. To develop the determination to tackle the problem seriously, companies irrespective of size, must first believe that such a thing is possible, useful and profitable.

Learning through example is the underlying principle of this guide. Accounts of actual past experiences of various organizations should inspire SME's to implement improvements for waste management. Tools are also offered that will provide suggestions for measures and approaches they can adopt.

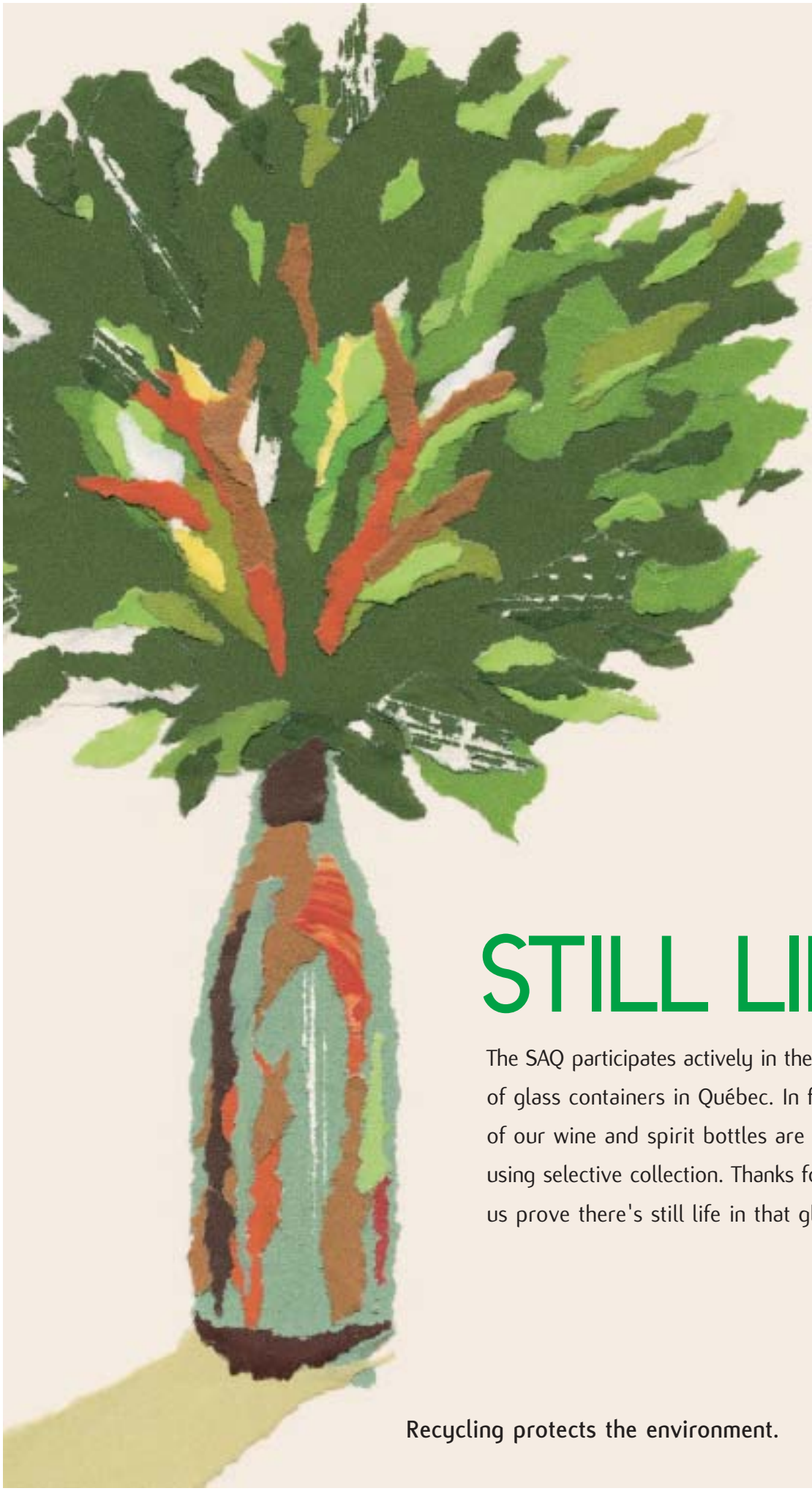
When a company sets objectives that appear difficult to attain, it is important they seek out others with common goals, as well as constructive resources. Therefore, a directory of resources (such as the one contained in this guide) could prove very useful. New models are also currently being developed. To this end the *Réseau des ressourceries, Norme Internationale Environnement,*, publisher of this guide, as well as the *Centre de transfert technologique en écologie industrielle de Sorel-Tracy,* have chosen to pool their expertise and study the possibility of creating an *Industrial By-product Valorization Center* at Bécancour to serve both SME's and large organizations in the Bécancour Industrial Park. We support this outstanding effort that may we hope, materialize in 2003.

Another interesting idea is EnviroClub - an Environment Canada initiative intended for SME's to improve their environmental performance while enhancing cost effectiveness through better environmental efficiency. We expect responsible environmental conduct from our suppliers and offer financial support for launching EnvironClubs in communities where we operate: Portneuf in 2003, Bécancour in 2004 and Baie-Comeau in 2005.

As SME's will develop more and more confidence in their ability to achieve success in environment as they do in business, better will be our environment and our economy.

ALCOA

Jean-Pierre Gilardeau, President, Alcoa
Primary Metals, Canada



STILL LIFE

The SAQ participates actively in the recycling of glass containers in Québec. In fact, most of our wine and spirit bottles are recycled using selective collection. Thanks for helping us prove there's still life in that glass.

Recycling protects the environment.

SAQ

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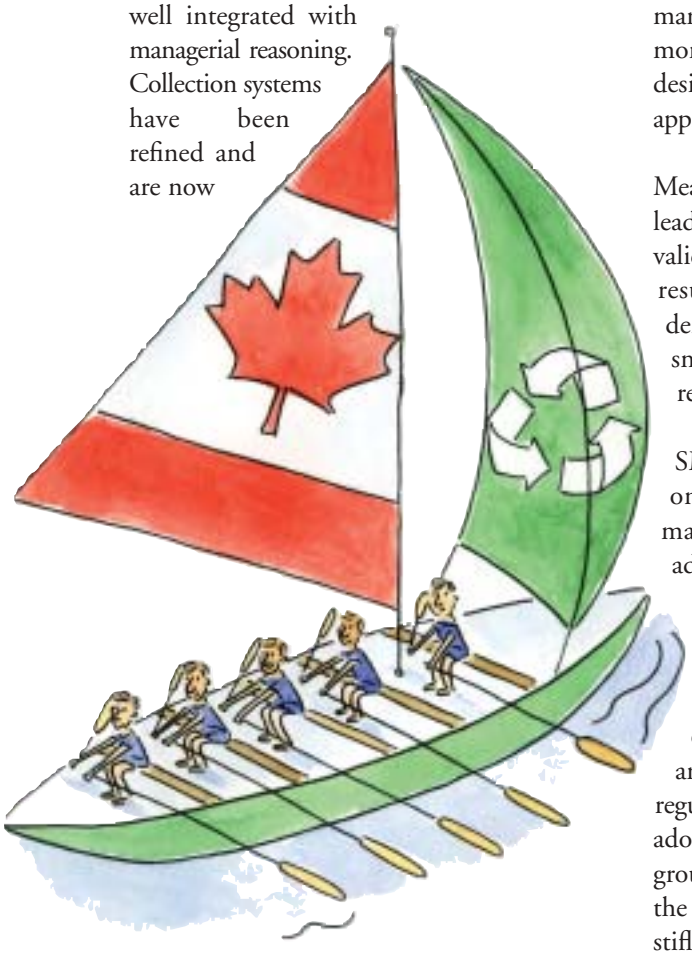
Waste management practices have greatly evolved over the years. Initially, industrial and domestic waste management was essentially limited to two steps**,** essentially due to public health concerns. The first step was the planning and execution of waste collection. The second was their transportation to remote areas and in the worst case scenario, stockpiling them in an abandoned area, or in the best case scenario, "eliminating" them through land-filling or incineration.

Awakening to the limits imposed by these practices and to the risks they represented for ecosystems and populations, was at the source of new attitudes, regulatory requirements and procedures here and abroad.

Disorganized and irresponsible practices have now been widely replaced by systems that are well integrated with managerial reasoning. Collection systems have been refined and are now complemented by networks of specialized companies and organizations.



It was under these circumstances that the business community was first approached. They were both responsible for the large quantity and variety of waste materials produced and acted as participants in the reduction and treatment processes.

For large organizations, this challenge was quite easily met. Because they possessed extensive resources and benefited from savings of scale, almost all of them have developed systems that are often highly effective.

The actions taken daily by these organizations in the area of environmental protection are revolutionizing the way that production, transformation and consumer markets operate. Managers are increasingly more committed and openly express their desire to see the principle of due diligence applied throughout the organization.

Meanwhile, more and more big business leaders are recognizing and accepting the validity of the *polluter pays' principle*. As a result, they are becoming even more demanding with their suppliers, mainly small and medium enterprises (SMEs), regarding environmental issues.

SMEs are in a unique situation. On the one hand, many have adopted waste material management practices that are adapted to their operations. On the other, sometimes out of laziness or thoughtlessness, and sometimes as a result of ignorance or a lack of understanding for the basic principles of effective waste material management, many are content with meeting the minimum regulatory requirements, or restricting the adoption of such practices, only to a sub-group of their waste materials. There is also the case of management's good will being stifled by complex problems and the barriers imposed by limited resources.

In the business world, pollution is often synonymous with inefficiency. Resource over-consumption and waste represent important losses of time and money. For economist E. Porter, pollution is generally associated with resource waste, under utilisation of raw materials or energy losses.[1]

Along the same train of thought, excess purchases of raw materials and supplies, generate costs that later add to the already ballooning expenses incurred for eliminating the waste generated by their operations. The increasing number of discharges appearing within the manufacturing process can also be considered sources of inefficiency that ought to be managed more effectively and more economically. The systematic analysis of energy use often reveals economically and environmentally unjustifiable wastes.

For these reasons, SME owners and managers must learn how to overcome the challenge that the adoption of a waste management program represents.

This guide is a management tool that was specifically designed to assist managers in developing and implementing a customized waste management program that is tailored to their needs.

As such, it is directed toward business people, SME owners and executives who wish to effectively manage the wastes produced by the organization's operations and processes, as well as those resulting from customer and supplier transactions.

In order to meet each organization's specific needs, the approach used includes four parts. The first part explores real life experiences and presents ten accounts of situations observed inside various organizations. The second paints a general portrait of the current waste management situation in Canada and provincial government projects. The third part offers an operational guide to the five-step implementation of a waste management program. The fourth part is a compendium of resources that can help support the realization of the third part.

Learning to manage waste materials provides oneself with the tools for rationalizing processes and work methods. It prepares oneself to produce a documented and reassuring environmental report for financial backers and insurers. It also involves reassessing each product's environmental impacts, and enables one to provide the basics for the life cycle analysis of the products that go to market.

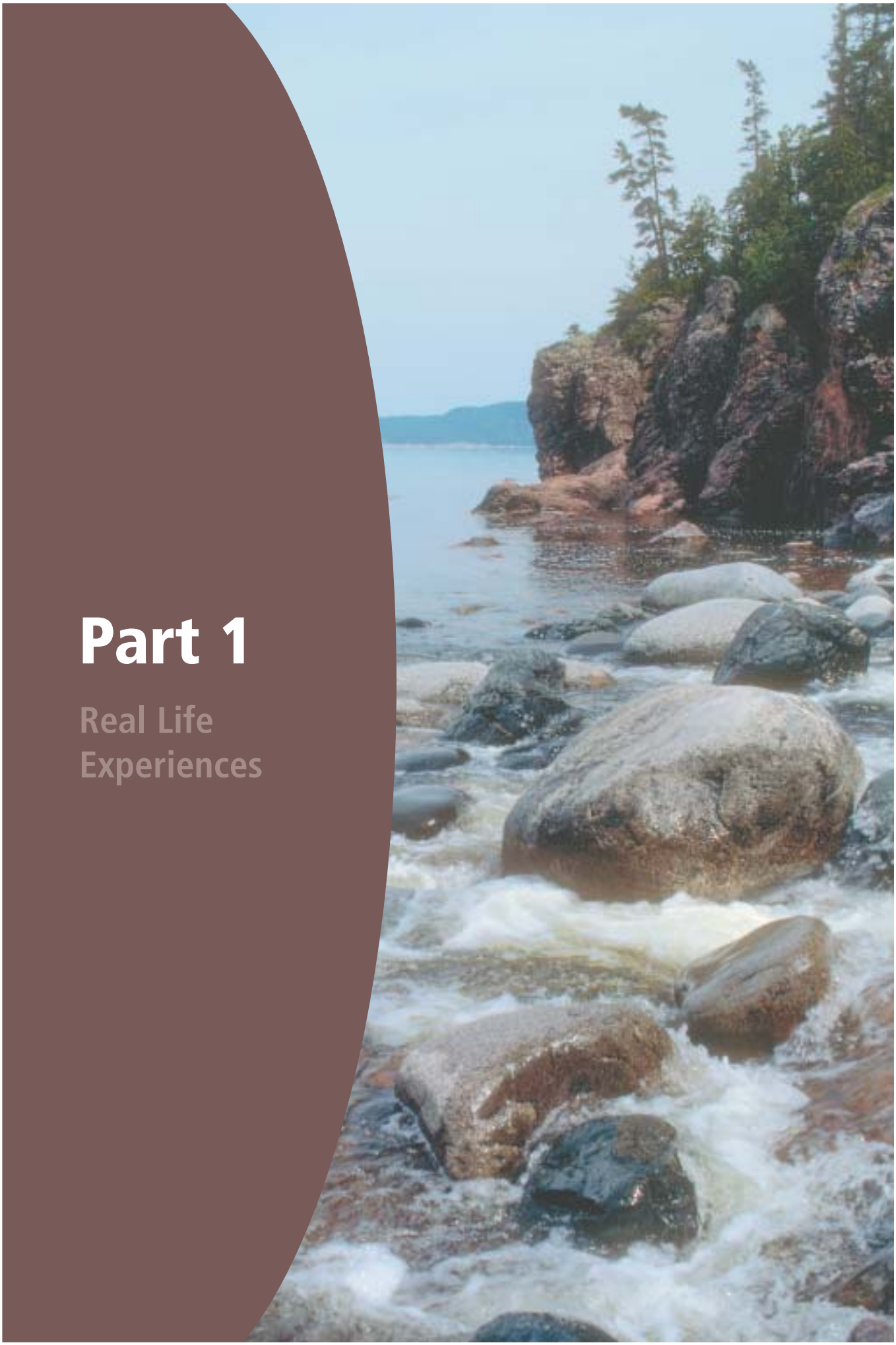
The needs are tremendous, and waste management represents a first step in the process of organizations expressing their commitment to environmental protection, energy savings and the responsible management of externalities.

Generally speaking, waste management also represents a step likely to lead to the implementation of an environmental management system (EMS).

This guide focuses specifically on waste management, which includes source reduction, reuse, recycling, recovery and waste disposal. In so doing, it favours management practices often identical to the ones observed in more complex systems, such as EMSs and quality management systems. In the case at hand though, the guide concentrates on waste management and in no way aims to implement an EMS or any other ISO-type standard.

Although this document could be useful to all business leaders, it is particularly aimed at everyone who up to now, never had the time, the energy nor the opportunity to use and benefit from this management tool.

[1] Porter, M. E., "America's Green Strategy", *Scientific American*, April 1991, p. 168.



Part 1

Real Life Experiences

Part 1

For business managers unfamiliar with this area, implementing a waste management program can seem like quite a challenge. In the case of small and medium sized businesses in particular, this challenge may appear to be insurmountable given the limits and constraints that these organizations must deal with.

This part of the guide was designed and developed to address these fears and allow managers to better evaluate the extent of the task at hand. This is achieved by presenting real situations experienced by entrepreneurs and administrators who adopted waste management programs. This section presents the accounts of ten real life experiences that occurred or are presently underway in businesses from each Canadian province.

It's the cases that focus on typical SMEs that stand out by the originality of the actions put forth, as well as by the objectives of their programs. Some of these cases deal with very large organizations: a general hospital and one federal department. These cases present more complex situations but also and essentially, solutions and approaches that are imaginative and original.

Mountain Equipment Co-op, British Columbia

Environmental management will most easily fit into commercial operations when it becomes part of a business philosophy right from the beginning. Mountain Equipment Coop exemplifies this situation. This coop can count on 1.8 million members and covers most of Canada. All aspects of the sustainable development concept are applied – economy, environment and community always go hand in hand. In this case, it also includes green building conception, where material use is brought down to its minimum and where choices are based on energy conservation and environmental protection.

Sterling Pulp Chemicals, Saskatchewan

The presence of chemical facilities in proximity to communities, may be a cause for worry in the population living nearby. Sterling Pulp Chemicals understands the importance of being well integrated in the community. They have adopted a responsible environmental management policy including waste management programs and a transparent emergency plan easily accessible by the population. One of their best achievements, is their impact in energy savings, consequently reducing greenhouse gases.

Public Works and Government Services Canada (PWGSC) – Quebec Region, Quebec

This public sector organization stands out by its breadth of operations and the sizeable challenge posed by the management of its waste. Management is meeting this challenge with an ambitious set of objectives. The chosen approach, structured around a detailed action plan made up of 18 steps, has allowed management to reach impressive results.

Cajun Attic Restaurant and Bar, Ontario

Composting can substantially reduce the amount of waste going to landfill, while generating a product environmentally beneficial. The owners of Cajun Attic Restaurant and Bar were conscious of this fact as soon as the early 90's. After a pilot project was run for a year, they equipped their downtown Ottawa location with a large scale vermi composter. Combined with the city's curbside collection for recyclables, the restaurant achieves a 99% reduction of waste going to landfill.

Banff Fairmont Hotel, Alberta

In the hotel trade, if one wants the customers – whom are onsite only a few days – to take part in environmental management, awareness raising must be swift and indications on how to participate must be clearly understood. This way of thinking paved the way to the greening of operations at Banff Fairmont Hotel, in the early 90's. By careful planning, the hotel can now proudly count on a comprehensive waste management and recycling program. From an Intranet system that gives rise to staff involvement, to an *Eco-meeting* formula offered to customers, resource conservation is behind every aspect of the hotel's operations.

Centre for Indigenous Environmental Resources, Manitoba

This small consulting firm, created by proactive native leaders, has integrated notions of environmental protection in all domains of their activities. Propelled by a need to create new office space, they considered ways to minimize the environmental impacts of their modifications on an existing building. This has resulted in surprising initiatives. Source reduction and green purchasing are the main framework of their waste management philosophy.

Department of the Environment, Provincial Government Offices, Newfoundland

As in many office buildings, paper products always represent a huge amount of the total waste generated, and it is now evident to all that recycling paper, cardboard and beverage containers in most offices is a necessity. The Department of the Environment's experience reminds us of how simple, accessible and user friendly recycling programs need to be. Reinforced by a clear and persistent communications effort, the recycling program has reached an excellent rate of participation and waste diversion. Since the Government of Newfoundland and Labrador have adopted an aggressive waste diversion program for the province, people from the Department of the Environment have taken it upon themselves to show the example.

Jolly Farmer Inc., New Brunswick

Is it possible to mix safe waste management practices and farming operations? Yes, and Jolly Farmer Products Inc. stands as living proof. Established as a New Brunswick Christian community, the business culture is based on Christianity, which promotes sustainability among other things. This translates into the wise use of energy and resources, and spontaneous participation of all members of the community in environmental initiatives. In particular, initiatives are aimed at a conscious consumption of energy in greenhouses and construction of an on site composting facility.

Scotcor Construction Ltd, PEI

The construction industry produces a large amount of solid waste, given that materials used are generally heavy and heterogeneous. This explains that at first hand, it seems difficult to implement initiatives aimed at protecting the environment. The reality is completely the opposite at Scotcor Construction, a company that specializes in home building and renovation. Their experience clearly shows that simple measures, combined with dynamic staff involvement, result in a significant reduction in the quantity of waste sent to landfill, with little or no extra costs for the company.

Dartmouth General Hospital, Nova Scotia

A healthy environment helps to attain better community health management. This is why it is only logical that a health facility seeks ways to improve its environmental management. This hospital, located in the Halifax Regional Municipality, is a success story in implementing initiatives that greatly improved its solid waste management. Most astonishing is the ease with which the initiatives were implemented. And all aspects of the ongoing program, which addresses not only recyclable wastes, but also organic material, have not increased hospital's waste management costs whatsoever. Talk about a winning strategy!

Mountain Equipment Co-op, British Columbia

Mountain Equipment Co-op (MEC) is a Canadian household name for all manner of outdoor gear for self propelled outdoor activities. The company, owned by its members, currently has a membership of 1.8 million. A one-time purchase of a membership prior to their first purchase of goods, is good for a lifetime.

The Organization

The company, started in Vancouver, British Columbia, was hatched on the side of mountain in 1970 by a group of interested individuals and incorporated in 1971 by the original six members.

The business initially focused on the selling of good quality equipment for mountaineering, rock climbing, ski mountaineering and touring and hiking. This later was expanded to include paddling and bicycle touring equipment.

Today, the company has stores in 7 retail locations across the country and a head office.

The focus of this case study is on their Vancouver head office and Vancouver retail outlet.

MEC has a strong philosophy of developing green office and retail spaces. This is typified via their Vancouver Head Office and retail and locations.

Their head office (140 employees) is located at 149 West 4th Avenue in Vancouver and exemplifies their green building program.

The Vancouver store (160 employees) first opened its doors in 1971. This landmark has changed locations five times and is a testament to the evolution of MEC; from a store that was open Wednesday through Friday evenings, to one that is now open seven days a week. The millionth share was sold at this store on May 17, 1997. The present location, on West Broadway, has been a significant presence for the outdoor community on the West Coast. This retail location exemplifies their commitment to reducing and recycling solid wastes.

Environmental Commitment

MEC has a very pronounced and thorough sustainability policy – one that has been developed since the co-op's inception.

Key Aspects of their philosophy focus on three interdependent principles:

- the planet has a limited carrying capacity and we are all dependent on a healthy, functioning biosphere;
- individuals can best meet their needs in caring and vibrant communities; and
- a just economy is dependant on an equitable society and a healthy planet.

In general MEC has defined their role as:

- encouraging and supporting their members to enjoy self-propelled wilderness recreation, lead healthy, active lives and be stewards of the natural environment;

- promoting wilderness conservation and responsible use of the outdoors;
- improving the social and environmental impacts of our products, services and business operations;
- providing leadership in the community and working with others to pursue collective social and environmental goals; and
- empowering members to be active participants in our co-op and other co operative endeavors.

Goals

As part of the sustainable strategy that MEC has developed, they have made the following commitments:

Business Operations Sustainability

- to demonstrate sustainable business practices and lead by example, in particular with respect to energy, water and material use;
- to provide a safe and respectful workplace where employees are highly valued, treated fairly and encouraged to make a difference.

Product Sustainability

- to pursue design and product innovations to minimize or eliminate negative impacts and enhance positive impacts of their products and packaging;
- to design products to be durable, long lasting and repairable;
- to follow sourcing practices that ensure a safe and healthy workplace for the people that make their products, where human and civil rights are respected.

Sustainable Consumption

- to promote conscious consumption by educating their members to make well informed decisions and provide them with products and services that contribute to a higher quality of life, and a healthier society and environment;
- to provide their members with alternatives to the consumption of new outdoor gear.

MEC in the Community

- to promote co-operatives as a means to meet collective needs and empower consumers to participate in their local economy;
- to be an advocate in the community for issues which align with their beliefs and strategic priorities; and
- to nurture meaningful partnerships with non-profit and community based organizations to protect and enhance the places where they work and where they play.

Means to achieve goals

Process and Implementation

- MEC's *Sustainability Strategy Report* (available on their Web site) provides the framework for implementing their policy;
- MEC's *Social and Environmental Management System* are designed, to provide operational policies, procedures, targets and measures for each of their commitments;
- the following criteria are used to guide their business decisions and strategies. Using the precautionary principle, they focus on issues:
  - which relate to their business, their core purpose and their member needs;
  - which have the largest impacts on natural, social and economic systems;
  - where MEC has influence or control over the impact;
  - where solutions are technically and economically viable;
  - where there are opportunities to collaborate with other organizations.

Accountability And Reporting

MEC assumes responsibility for their goals and accountability for their actions by adhering to the following governing principles:

- provide staff and partners with the support and resources to follow through on their commitments;
- measure and monitor progress towards meeting stated commitments;

- report on social and environmental performance in publicly available reports;
- engage staff, members, vendors and community stakeholders in meaningful dialogue to continually improve efforts; and
- the Board of Directors reviews their Sustainability Policy every 3 years.

Program Design

MEC's efforts to reduce wastes focuses on building design and facility operations.

MEC's Green Building Program

MEC has had a building "greening" program since 1997. The focus is through making design, materials, and construction decisions based on environmental considerations.

The "green" building focuses on meeting the needs of users and one that enhances its environment. On a day-to-day level this "green design" must address home and work environments, and in MEC's case - the retail environment.

MEC has developed and adopted a 4 "Rs" of Construction to govern the construction of its buildings.

1. Reduce - Avoid using unnecessary materials.
2. Reuse - Incorporate existing materials.
3. Recycle - Incorporate existing materials in new ways.
4. Rethink - Look for new and better building solutions.

When building MEC asks themselves the following questions:

- Can they do without it?
- Does it have less embodied energy (the energy required to manufacture and transport a product)?
- Does it have less embodied pollution (the quantity of pollutants created in the manufacture and transportation)?
- Is it more energy efficient?
- Is it locally manufactured (contributes to the local economy and reduces embodied energy and pollution)?
- Does it have a longer life cycle (longer lasting products reduce consumption)?
- Can it be recycled and does it contain recycled content?
- Does it reduce the amount of waste destined for a landfill?
- Is the product a naturally occurring, renewable, and sustainable resource?
- Does it raise awareness of environmental issues?

Solid Waste Management Initiatives

MEC undertakes a number of measures to reduce the amount of wastes generated. Their goal is to move towards Zero waste.

At the Vancouver retail outlet, there is a recycling program for recyclable wastes and organic wastes, focusing on packaging wastes and wastes generated by staff. There are also in-store recycling containers for their customers.

In general, the aim is to recycle packaging materials that arrive at a store as well as divert any recyclables and compostables generated by staff and patrons at the store.

Program Implementation and Results

The Green Building Program

The 4Rs of construction were used in the development of their head office. The Tables below describe some of the measures taken and the reasons why these measures were taken.

MEC recently completed development of a new Vancouver Head Office.

The head office features inventive designs and lots of open spaces, meeting places and an emphasis on the connection between people and nature. MEC staff is encouraged to feel part of a larger community.

The office was built using a very open concept, not only in terms of the use of space but also the use of building materials. Very little is hidden. The use of finishing materials

were minimized to reduce the amount of embodied energy (i.e. the energy it took to grow and manufacture building materials) and to remind MEC staff of the mechanisms built to provide comfort. As a result the building is a collection of old, new, unconventional, and funky. It's a calm place, easy to live in. Above all, it shows a careful balancing of the needs of staff, members, and nature.

The design features and their predicted impact are presented in Table 1.

Table 1:

REDUCE	**Avoid using unnecessary materials**
1. CFC-free refrigerant used in conditioning system.	Reduced pollution, 0% ozone depletion and minimal greenhouse gas emission.
2. Argon gas filled double paned windows with low emissivity coatings; skylights employ high performance glazing.	Minimizes heating and cooling loads by reducing winter heat loss and summer solar gain.
3. Air conditioning system designed to a higher set point during the cooling months.	Mechanical cooling loads cut by almost 50%.
4. Water based glues, low volatile organic compound (VOC) paints, formaldehyde-free medite (MDF) millwork, wool carpeting and natural ventilation through operable windows.	Reduced release and circulation of volatile organic compounds. VOCs are the primary cause of "sick building syndrome."
5. New windows and skylights punched into the exterior of the building, complimented by light reflectors that bounce daylight deep into the building core.	Reduced need for artificial lighting (even on overcast days.)
6. Enclosed spaces are located inboard.	Reduced demand for artificial lighting by maximizing shared natural light (without compromising acoustic performance or privacy).
7. Bare aluminum fluorescent light fixtures fitted with daylight sensors.	Reduced energy consumption and use of paint.
8. Washroom lighting is controlled by occupancy sensors.	Reduced energy consumption through automation of switching.
9. Low flow plumbing fixtures.	Reduced water consumption.
10. Exposed concrete floors (no carpet or raised floor), ductwork and cable trays (no drywall enclosure), and ceiling (no suspended tiling).	Reduced use of interior finishing materials.
11. Clear galvanized corrugated metal siding and clear anodized aluminum window frames provide a durable exterior finish and reflect light away.	Reduced use of external finishings.
12. Local sourcing of light reflectors, fluorescent fixtures, and furniture.	Reduced embodied energy and pollution in transport of materials.
REUSE	**Incorporate existing materials.**
1. Conversion of the building from an auto parts warehouse into an office space.	Adaptive reuse of a structure provides the greatest conservation of embodied energy, and keeps the maximum amount of material out of the landfills.
2. Paging system, telephones, dishwashers and refrigerators reconditioned and transferred from old Head Office.	Keeps material out of a landfill.

3. Drywalling	Where possible, drywall contains recycled content.
4. Stair handrail, slat wall, doors, exit signs, fire alarm bells, fire pull-stations, fluorescent light fixtures, sprinkler system, and venetian blinds.	All salvaged from existing building.
4. Used lumber employed in rough carpentry and on bike room walls.	Wood products diverted from landfill.
5. Sourced used cutlery and dishes for staff lunch rooms and used plastic chairs for training room.	Products diverted from landfill.
RECYCLE	**Incorporate existing materials in new ways.**
1. Reconditioned workstation dividers.	Divider frames salvaged and reupholstered using 100% recycled fabric.
2. Reception floor built of tongue and groove fir salvaged from the roof of a demolished warehouse.	Potential waste diverted from landfill, planks bolted directly to concrete (less material).
3. Outdoor furniture constructed from salvaged telephone poles.	Potential waste diverted from landfill.
4. Meeting room chair upholstery has 30% recycled content, 1950s and 60s vintage chairs and lamps refurbished and used as resource area furniture.	Potential waste diverted from landfill.
5. Recycled glass terrazzo countertop.	Potential waste diverted from landfill.
RETHINK	**Miscellaneous Environmental Initiatives.**
1. Landscaping.	Increased urban green area, native plants require less water and pesticides and only require irrigation in drought conditions.
2. Secure bike room, and shower facilities.	Encourages "green" commuting by staff.
3. Ample meeting rooms.	Reduced need for travel to off-site meetings.
4. Organic "fair trade" coffee provided for staff.	No pesticides used in growing coffee, social impact of fair trade for coffee producing regions.
5. Farmed maple highlights used in stairway.	Raises awareness of ecologically and socio-economically sustainable harvesting methods.
6. Filtered drinking water.	Increased occupant comfort.
7. On-site compost program.	Reduced solid waste production.
8. Indoor plants.	Increased air quality.
9. Staff demolition salvage.	Employees were given the opportunity to salvage parts from the old building.

Solid Waste Management Initiatives

At MEC recycling and composting of wastes are a distinct part of their culture. The Vancouver store has an in-store recycling program since its inception. It has grown over the years.

In the Vancouver retail outlet the following wastes are recycled:

- Shrink wrap
- Film Plastic
- Paper streams
- PET, HDPE, #5 plastic
- Beverage containers
- Organic wastes

A considerable amount of the wastes generated at this location are packaging wastes and consist of shrink wrap, film plastics and paper-based wastes such as cardboard. The materials received are recycled.

Courtesy of Mountain Equipment Co-op

An interior shot of the building is shown.

An important part of MEC's strategy to minimize its waste focuses on "upstream reduction" or recycling of wastes. If the wastes are not generated they do not come to the retail outlet. On its own branded goods, packaging has been significantly reduced. MEC communicates with their vendors and asks them to reduce the amount of packaging materials. For instance, in 2002, MEC prepared a fact sheet on methods to reduce wastes associated with footwear packaging and distributed it to all of their footwear vendors. MEC makes personal contact with these vendors, working with them to reduce the amount of packaging.

The reduction of packaging of incoming goods also presents another very important benefit – labour efficiency. Individually packaged items take longer to remove from their packaging and place on shelves for presentation to customers.

Staff and customer wastes include beverage containers, food packaging and some organic wastes. Bins have been set up to collect these wastes. Organic wastes are collected and sent to an off-site centralized composting facility.

Staff have access to recycling bins in office areas and in the canteen. Customers have access to recycling containers which are located (inside) and close to the main exit.

Many initiatives are staff driven. An example of a recent staff initiative is the recycling of batteries. A pilot program was initiated in the Vancouver store (and is now rolled out across the country). It allows members of the public to bring in batteries (e.g. AA). When there is a sufficient quantity these batteries are sent off for recycling. Although MEC incurs a cost to recycle these batteries they are happy to recycle them because it fits in very well with their environmental commitment.

New staff are trained in terms of recycling and composting initiatives by a "Sustainability Representative" (i.e. a staff member). A quick and informal course helps train new employees.

The results of their recycling and composting program has been considerable In 2001 approximately 91% of wastes were recycled at the Vancouver retail outlet. On average, waste costs $154/tonne to dispose and recyclables $35/tonne (because MEC receives rebates for some recyclables such as cardboard). Through recycling and composting MEC has been able to save $22,000 at the Vancouver retail outlet in 2001.

Lessons Learned

As Denise Taschereau, Social and Environmental Responsibility Coordinator points out, there have been three main and critical reasons for the success of environmental programs

i. The culture of MEC is to live in harmony with the environment. Through time they have been able to infuse the principles of sustainability into all of their activities in an integrated fashion. By looking at each of their activities, whether it be designing a retail outlet or recycling their wastes, as part of a larger management system they been able to identify and implement continuous improvement. In more recent years this has also come to mean collecting data (baseline where possible) so there is something to measure against in the future. For instance, waste audits are now completed on a bi-annual basis. The Vancouver retail outlet will be auditing their wastes in 2003.

ii. New initiatives are piloted where possible. This reduces the downside while a particular system is being developed. For instance, the battery return program was piloted in the Vancouver store and now can be found at other retail outlets.

iii. Working in close cooperation with their supply chain. This involves having staff buyers liaising with other staff members, such as the people at the loading dock, to gain an appreciation of packaging wastes as they arrive. This information can then be relayed to their vendors.

SSI SCHAEFER

WASTE TECHNOLOGY AND RECYCLING

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Sterling Pulp Chemicals,

A division of Superior Propane Inc., Saskatchewan

Sterling Pulp Chemicals (SPC), a division of Superior Propane Inc. is the worldwide leader in elemental chlorine-free bleaching technology and one of the world's largest producers of sodium chlorate, which is used mainly in the generation of chlorine dioxide for the bleaching of wood pulp. The use of chlorine dioxide technology has a good environmental track record and yields environmentally friendly white paper products of high quality. The company engineers and licenses large scale generators used on-site by pulp mills producing chlorine dioxide for the elemental chlorine free bleaching process. This process provides the pulp and paper industry with an option for reducing pollution.

The Organization

SPC is also a leading North American producer of sodium chlorate used to generate chlorine dioxide for medical disinfection, water treatment, food processing and the treatment of effluents for environmental control.

Figure 1:
An overview of SPC's ClO_2 business objectives

Sterling Pulp Chemicals has a number of manufacturing facilities including the ISO 9002 registered facility in Saskatoon, Saskatchewan. This facility was purchased by Sterling in 1997. Presently this location has approximately 120 employees.

This case study focuses on production based initiatives as well as solid waste management initiatives.

Environmental Commitment

As a manufacturer and supplier of chemicals, technology and services, Sterling Pulp Chemicals recognizes their responsibility to achieve the sustained growth of their business with the long term objective of zero environmental impact.

At the Saskatoon facility SPC is committed to the highest of environmental standards. Employees, customers, governments and the public are all included in this commitment, and clear communication of the company's values is a priority. Regularly conducted reviews and a stringent environmental management system provide the organizational structure for making environmental responsibility practical.

To formalize their emphasis on environmentally responsible business, SPC has developed the following goals:

- we will conduct our business in an environmentally responsible manner;
- we will develop, practice and audit sound environmental procedures;
- we will require all employees to comply with applicable environmental laws and regulations;
- we will expect sound environmental practices from all those who provide goods and services to us;
- we will provide guidance and assistance to our shippers, carriers and customers in the safe use, handling and disposal of our chemical products;
- we will work proactively with the communities in which we operate to ensure that management and employees are sensitive and responsive to public environmental concerns; and
- we will review our policy periodically.

Program Design, Implementation and Results

Sterling Pulp Chemicals' goal is to have no adverse impact on the environment or its community. The site's Environmental Management System (EMS), launched with the plant's purchase in 1997, is an important tool in achieving this goal. The EMS insures the site complies with or exceeds existing environmental regulation, and is used to continually raise the bar, focusing on specific areas that improve the plant's performance while lowering its total environmental impact.

Today everyone at SPC is involved in the company's environmental commitment at some level. One technical manager per plant is designated responsible for the environmental program, and all employees receive annual training emphasizing due diligence, company environmental policies and effective procedures. In-house programs for waste reduction are made as accessible and user-friendly as possible.

Percy Wright, the current environmental technical manager for SPC Saskatoon, stresses that the plant's environmental program is "a work in progress" with new or improved facets being implemented on a regular basis. To maximize the benefits of their combined experience, Wright and his fellow environmental managers from the other SPC locations connect over the phone on a monthly basis, and schedule regular in person sessions. This ongoing interaction addresses environmental issues and challenges, providing a broad base of support to each of the separate locations.

Process based initiatives

Like all of the Canadian SPC production sites, the Saskatoon plant participates in the Canadian Chemical Producers' Association (CCPA) *Responsible Care®* Code of Practice. This initiative requires them to identify and minimize adverse impacts their products or operations may have on human health, the environment or the surrounding community. This continuous performance improvement effort is key to SPC's corporate culture and an important foundation for the company's credibility in the industry.

The *Responsible Care®* program commitment requires a full plant audit every 3 years. This involves representatives from the CCPA and a member selected from the local community. These audits provide a "report card" on the plant's performance and enables them to identify areas where operations might be improved. Progress on identified areas of improvement is reviewed during the next audit cycle.

A recent initiative at the SPC Saskatoon facility was the company's move towards using a byproduct of their manufacturing process, hydrogen, to produce energy. The use of this "clean green" fuel is expected to reduce the plant's consumption of natural gas by 30%. Sterling Pulp Chemicals has invested approximately $1 million in this infrastructure refit, which is scheduled to be operational in March 2003. This initiative, recently lauded by Saskatchewan's Minister of the Environment, is expected to make a marked reduction in the

amount of greenhouse gases released by Sterling Pulp chemicals' manufacturing processes – an important contribution to mitigating climate change and protecting the environment in the province.

Bill Compton, the plant manager, recently pointed out that "profitability and environmental protection are not mutually exclusive concepts. In this case, it makes so much sense to take a byproduct and use it for something productive."

Solid Waste Initiatives

In addition to enhancing their manufacturing process Sterling Pulp Chemicals has made a commitment to reducing the amount of solid wastes that it produces. A variety of material is already being captured for recycling:

- wood;
- paper;
- oil filters;
- fluorescent light bulbs;
- cardboard; and
- steel and other metals.

Like many industries in Saskatchewan striving for excellence in environmental performance, SPC has found themselves challenged to reach their full potential in the recycling arena. Saskatchewan's endless fields and forests combined with a relatively small human population have meant that the growth of the recycling industry has been slower than in some other Canadian provinces. For Sterling, this has meant adding to their own list of in-plant recyclables as programs and markets for the materials have become available.

SPC Saskatoon is considering conducting a waste characterization audit to determine whether there are still more materials in the waste stream that could be candidates for recycling rather than landfilling.

Employee Awareness and Community Outreach

In implementing and maintaining the current EMS approach, employee awareness is a primary focus, requiring a considerable commitment of both time and resources. Today Sterling Pulp Chemicals workers have access to annual training and to reports tracking their plant's yearly accomplishments. Wright reports that they feel satisfied and proud of the SPC Saskatoon's performance and environmental responsibility.

SPC is committed to contributing to the community in which they exist in relevant and concrete ways. To introduce themselves and their initiatives to their neighbours, SPC Saskatoon conducted a mail-out to residents in nearby communities. The mail-out included information on "Shelter in Place" and an invitation to an Open House. The open house, conducted jointly with a neighboring chemical company and the communities' emergency response organizations, gave the public an opportunity to meet Sterling's staff and to observe first hand the processes and safety programs in place.

Sterling Pulp Chemicals recently held a "Sterling Night" as part of a fundraiser for the city's junior football team, the two time Canadian Champion Saskatoon Huskies. On the same night the company supported a street dance in their closest community neighborhood. The goal of these initiatives has been to establish and maintain ties with the local community – to keep the lines of communication open.

This plant has also worked with the city's Emergency Measures Organization, Fire Department, Saskatoon Industrial Mutual Assistance Committee and local school districts to promote public education on industry-approved safe procedures (e.g. "Shelter in Place") when faced with possible plant emergencies, such as accidental gas releases. These practices apply to any situation where chemicals are used, sold,

or transported in our society, not just to Sterling's chemicals and plant.

Program Costs

The process-related initiatives, as part of SPC Saskatoon's main business, are closely tracked, and the hydrogen refit is expected to reduce not only environmental impact but process costs as well. On the other hand, the main motivation for the in-house solid waste recycling program is that "it is the right thing to do"– since cost cutting was not a stated priority in this area, no comparisons have been tracked.

Lessons Learned

Keys to a successful environmental program, according to Wright, include:

- AWARENESS: continual focus on and training for all employees in in house environmental initiatives, policies, and procedures
- EDUCATION of employees, customers, suppliers, and neighbours.
- CONVENIENCE for workers – if it is relatively easy to separate materials for recycling or other environmentally friendly practices, they will do it!

For industries planning to launch an improved in house environmental plan, Wright has the following suggestion: "Start small and add to your program – if you try to change everything at once, people get confused and nothing is done very well. Starting small and simple – like separating office paper for recycling – can get your environmental program off to a successful start".

Illustration : Nadège Féat

Public Works and Government Services Canada, Quebec

Large Scale Waste Material Management!

The Supply Operations Service Branch (SOSB) of Public Works and Government Services Canada (PWGSC) purchases approximately 17,000 categories of goods and services for Federal departments and organizations. As the largest purchasing organization in Canada, PWGSC manages 58,000 contracts worth 10.5 billion dollars a year and provides a place to work for 187,000 civil servants scattered throughout 2,500 different locations in Canada. In 2002, each office worker was producing 125 kg of solid waste a year. The Canadian government's overall objective was to reduce by 50% the amount of waste being sent to landfills, which translated into a reduction from 190 kg to 95 kg per employee per year based on data from base year 1988.

The Organization

PWGSC provides common services to the Canadian government. This supplier:

- employs over 14,000 people;
- provides workplaces and runs programs in a variety of offices located in Canada, the United States and Europe;
- manages a real estate portfolio worth 6.8 billion dollars (approximately 30% of the Canadian government's real estate);
- houses over 187,000 civil servants across Canada; and
- administers some 2,000 leases representing 500 million dollars in annual rent payments[1].

PWGSC must manage various environmental issues as part of its real estate management activities. Some of the specific issues include the management of waste materials, hazardous waste, PCBs, asbestos, storage tanks and soil remediation.

The Commitment

The waste material management program is part of PWGSC's broader environmental policy.

Commitment to Sustainable Development

By way of our Sustainable Development Strategy 2000, we outlined three goals for ourselves, which are the greening of :

- operations as a custodian and provider of facilities and common use office space to federal departments and agencies;
- services it provides to federal departments and agencies, in its role as a common service agent; and
- internal operations.

[1] Source: Public Works and Government Services Canada Web site, January 2003.

Since tabling its first SDS in 1997, PWGSC has been engaged in a process of continuous learning and improvement. Data collection systems have been developed and modified. The initial SDS targets were refined to enhance measurability of performance. Reporting mechanisms have been adjusted to better align with existing frameworks. At the heart of this ongoing effort is the attainment of the following aims:

- to integrate a comprehensive Environmental Management System (EMS) into PWGSC's overall management framework and ensure environmental performance is achieved and sustained according to established objectives;
- to green PWGSC's operations, using a pollution prevention approach to meet or exceed requirements of applicable environmental regulations and policies;
- to green PWGSC's daily activities by practising Green Citizenship; and
- to assist clients in their initiatives to green operations wherever feasible and purchase environmentally responsible goods and services.

Whether it concerns water, hazardous or solid waste, PWGSC can proactively contribute to reduction, reuse, recycling, and, if need be, waste elimination as part of a wide variety of federal government activities. Waste management is an important activity that allows all levels of PWGSC employees to contribute to sustainable development.

Waste Material Management

In our Sustainable Development Strategy 2000, our general objectives concerning waste material management, to which are related specific targets and an action plan, consist of :

- responsible management of hazardous waste;
- responsible management of tenant office waste;
- application of construction, renovation and demolition waste management practices;
- reduced paper consumption in services provided to client departments;
- reduced paper consumption in PWGSC.

The Program

The waste material management program, called New and Improved Recycling Program, was developed and implemented in 1997 by PWGSC in the Quebec region. It is inspired in part by the National Five Phases Solid Waste Management Protocol. But a new, more global approach, similar to that prescribed by the ISO 14 000 standard, has provided the program with a few elements that should guarantee its success.

The program is far reaching, aimed at over 22,000 employees from 24 federal departments and agencies in Quebec. Real estate managers, client department managers, equipment, contractors, contracts and communications are all elements of waste material management that are covered by the program.

The Objectives

In the beginning, PWGSC's Quebec Region team in charge of implementing the program had set some ambitious objectives for itself, namely an 80% waste reduction rate by the year 2000. This plan was only made more ambitious by the fact that back in 1997, there was no real overall waste management in the Montreal region. At that time, recycling was essentially limited to paper, cardboard and bottles.

Implementation

The program's implementation strategy includes 18 steps. Here they are, taken from the document entitled Implementation of the Multi-Material Recycling Program in PWGSC Buildings, May 1999. These very specific steps are applicable with or without some minor modifications in any real estate environment where waste material management must be carried out in partnership with various parties, users or tenants.

Implementation Steps

1. Meeting between the PWGSC – Environment team and the real estate manager to present the program and decide on the plan to be presented to the managing tenants.
2. Meeting between the PWGSC – Environment team and the managers of the tenant departments or organizations to settle on the final plan and select Environmental Improvement Agents (EIAs).
3. EIA selection.
4. Meeting between the PWGSC – Environment team and the EIAs to explain their role, their involvement and what is expected of them within the program. Analysis of building-specific problems and wastes. The final plan is then fine tuned to make sure that it is relevant to the environment where it will be implemented.
5. Meeting between the PWGSC – Environment team and the maintenance team to make sure the system is operating smoothly, review costs and educate them as to the importance of their role within the program.
6. Purchase of recycling stations and related equipment: signs, billboards and pictograms.
7. Purchase of trash bins and miniature trash bins.
8. Development of advertising material: posters, flyers and local information flyers.
9. Development and availability of the booth and related material.
10. Development and availability of the mascot.
11. Amendment of the cleaning contract.
12. Amendment of the current salvager's contract or drawing up of a new contract.
13. Assessment of the trash compaction rate.
14. Amendment of the waste disposal contract.
15. Set up of the recycling stations, billboards and posters during the week preceding the launch of the program.
16. Pre-launch activities: e-mail, special posters, etc., one day prior to the launch.

17. Launching day:
    - set up of the information booth;
    - involvement and partnership of local management and EIAs through a special activity inside the building;
    - information sessions given in small groups by the PWGSC implementation team – distribution of miniature trash bins and flyers, mascot's visit with pictures, user questions and answers;
    - meeting with local management and EIAs for a debriefing on the launch; communications adjustment if required; and
    - answers to questions and complaints by the PWGSC implementation team.
18. Post-Launch Activities:
    - articles in the departmental paper communication; and
    - billboards inside the building.

Available Resources

PWGSC's Quebec region team is supported by the EIAs of each department present in the building. These agents volunteer to ensure the monitoring of the program. They are responsible for raising employee awareness regarding waste material management and

Photographer: Martin Paquette

Individual paper collection bin equipped with a miniature 4-litre bin for trash collection.

preparing the visit by the people in charge of implementing and managing the program. When no one volunteers to do this job, a generic e-mail is sent out that explains the government's objectives and defines the materials that can and cannot be recycled.

Equipment

All workstations are equipped with two different bins: a small 4-litre bin for the trash, suspended from a larger bin for paper waste. In most cases, the old trash bin is converted into a recycling bin and labelled with a pictogram in order to demonstrate coherence with the reuse principle and make maximum use of existing resources.

A sorting centre called a multi-material recycling station is set up in strategic locations, near washrooms or cafeterias and lounges. This sorting centre is equipped with signs that clearly indicate the types of materials that can be disposed of: returnable cans, glass, plastics, polystyrene, paper and waste. Other equipment, such as 360-litre rolling paper collection bins or plastic or metal cages, is essentially used for the temporary storage of collected material between pick ups and is usually supplied by the salvager. Storage areas vary widely from one building to the next, the salvager is the person best qualified to assess the particular needs of each site.

Photographer: Martin Paquette

Multi-material recycling station
Note: The most current model is a six-opening bin equipped with a billboard.

Information and Awareness

The first step is to inform and raise the awareness of employees regarding the program's objectives and implementation process by stirring up feelings of curiosity and commitment. Additional information sessions are offered to employees through Reflex, the Environment Service's racoon like mascot. During the awareness raising day hosted by this mascot, a fifteen-minute presentation serves to draw employee attention to the subject and answer questions regarding the implementation.

To stimulate and encourage participation, the program relies on highlighting the contribution of deserving employees through official recognition (photos published in the monthly in-house bulletin) and the distribution of symbolic prizes (certificates, environmental marketing merchandise, etc.).

Expertise and Support

For federal departments and organizations that express interest, the program team can provide the necessary free advice, training and information. In fact, Reflex the mascot can make the trip upon request to participate in awareness raising and training activities that make recycling come across as easy and fun. The New and Improved Recycling Program was designed to stimulate the participation of all users and participants.

Photographer: Martin Paquette

Reflex the mascot "A mascot brings out the simplicity, trust and tenderness that lies deep inside each of us. Add this to a dose of joy and happiness and you can see why the use of a mascot in a behavior modification setting is a winning formula." Source: Implementation of the Multi-Material Recycling Program in PWGSC Buildings, PWGSC – Environment, Quebec region, May 1999.

Results Achieved

Five years following program implementation, the efforts have been hugely successful. The average waste material diversion rate currently sits at 75.6% for the buildings in the Quebec region.

Paper and Cardboard: a Record Level?

For paper and cardboard, the success rate is nearly 95%: that's hard to beat!

Plastics, Glass and Metals: Room for Improvement

On the subject of plastic, glass and metal recycling, the results are a lot less encouraging, the program managing only 15 % to 20% of its potential.

Disposal: 50% Cost Reduction

For example, the waste disposal costs for the Guy-Favreau Complex used to be $50,000 annually. Following program implementation, waste disposal contracts were revised and the four monthly pick ups were reduced to a single pick up. Two areas were more closely examined during contract revision: the trash compaction rate and the number of pick-ups for each category of waste. Today's costs are in the order of $22,000 to $23,000, a greater than 50% reduction.

Salvaging: Increased Profitability

When the program was implemented, waste salvaging costs were rather high, and revenues rather low. Then, the markets first went up before decreasing gradually. Annual revenues tied to waste salvaging reached $13,400 for the Quebec region for the 2001-2002 fiscal year.

Organic Waste

Organic waste salvaging and composting are not profitable activities and therefore were set aside for the first years of the program. Nonetheless, the Montreal program team kept a close eye on organic material management experiments at the Bell Canada and National Bank of Canada headquarters in downtown Montreal, in addition to conducting their own studies. This resulted in the implementation of an organic waste salvaging pilot project in a Sherbrooke, Quebec, federal building. Starting from 2003-2004, the lessons learned from this project will be used to extend organic waste salvaging to other buildings.

Other waste

There is no current market for salvaged wood pallets and this product is being landfilled. Salvaging is also difficult to implement for composite materials such as CD-ROMs, diskettes, etc.

On Going Activities

Other projects originated from the waste material management program, such as the rebate attributed by the cafeteria to the use of a durable mug, the creation of a "styrofoam" committee and a reflection on composting implementation.

In addition, the setting up of recycling bins on the restaurant level of the main entrance

of the Guy-Favreau Complex became to reality, and so did the mandatory salvaging program for construction and demolition waste.

At the Guy-Favreau Complex, PWGSC has initiated the recycling of computer packaging and the systematic return of foam packaging to suppliers. In addition, PWGSC now requires that the recycling bins it purchases be made from recycled materials.

PWGSC is also involved in the management of the waste material produced at Americana, a biannual environmental technology trade show.

Agreement among new partners, a pragmatic approach and a logical and all encompassing solution are now integral parts of the PWGSC culture[2].

Future Evolution of the Recycling Program

The performance level attained for material recycling is more than satisfying. Nonetheless, the New and Improved Recycling Program stands at a turning point of its short existence. First of all, salvaging of polystyrene will be abandoned, since no local market exists at the moment.

Second, the program will enter a new phase as it will address the first two Rs of the 3Rs hierarchy: reduction and reuse. PWGSC's experience shows that source reduction is the best environmental and financial investment one can do. By way of awareness raising efforts, employees will be invited to reduce their consumption and to reuse as much waste as possible.

Advice to SMEs

Communication is undeniably the key for success. The implementation of sound waste material management methods requires essentially a lot of discussion and consideration toward employees. Raising awareness on the subject of salvaging must be done smoothly and without ruffling any feathers. Employees only need to understand that recycling is easy and fun. In fact, the interpersonal relations that must be developed in this type of operation are far more important than the know-how.

To successfully implement such a program, SMEs must pay particular attention to waste disposal or recycling contracts and see to it that sorting is carried out by the employees themselves to the best of their ability. This will only help to reduce the costs though, the main concern being the achievement of a critical amount of waste to rationalize pick ups and reduce transportation costs.

[2] Source: PWGSC – Quebec region, *Implementation of the Multi-Material Recycling Program in PWGSC Buildings* (1999).

VERMI COMPOSTING AT THE CAJUN ATTIC RESTAURANT, Ontario

John St. Aubin is a pioneer in vermi-composting in the restaurant industry. For five years he and his staff successfully operated an on-site vermi composting system at the Cajun Attic Restaurant, in Ottawa, Ontario. With vermi composting and multi material recycling, they diverted from landfill over 99% of the waste that the Cajun Attic produced, and saved money.

Company Profile

The Cajun Attic serves amazing dishes in the Cajun tradition. A favourite for many local residents, it is a 107-seat restaurant and bar that has a friendly comfortable atmosphere, provides live entertainment, and displays a large playful chicken wire and fiberglass alligator on its exterior wall. The restaurant is located in a restored two-story 2,700 square foot house, on a 50' x 150' lot in downtown Ottawa, in Ontario.

John St. Aubin established the Cajun Attic in 1984. He managed the restaurant for 18 years, until 2001. During this time, he also worked as a carpenter/cabinetmaker and distributor for smoked salmon. He loved managing his restaurant but, at 53 years of age, decided to semi-retire and sold the restaurant.

Robert Davitt, is the new owner and manager of the Cajun Attic. He is an experienced restaurateur and composter. Robert has been working in the restaurant business for 30 years. For three of these years, he used a backyard composting system to divert food waste produced by the Cables End guesthouse and restaurant in his native country, Ireland. He is aware of the financial and environmental benefits of composting and is planning to build on the Cajun Attic's past successes.

Need to Reduce Operating Costs

When asked about his motivation for implementing a composting program at the Cajun Attic, John answered, "I started composting to save money." He was pleased to implement an initiative that helped the environment, but his main objective was to reduce his operating costs.

In 1990, when the GST was introduced, business dropped and John needed to find ways to reduce the Cajun Attic's operating costs. This was a common problem for many restaurant owners in the region at the time.

John refused to increase the menu prices or compromise the food quality. In fact, he increased the variety and quality of the dishes that he served. Instead he looked to his garbage for inspiration.

Implementation of a Pilot On-Site Vermi Composting System

In 1990, the Cajun Attic had one 4-cubic yard dumpster that was emptied once per week at a cost of $3,600 per year. An examination of the waste the restaurant sent to landfill revealed that almost all of it was either recyclable or compostable.

At this time, the City of Ottawa operated a residential curbside blue box collection program for recyclable glass, metals, and corrugated cardboard boxes. Since the Cajun Attic was located in a mixed use neighbourhood, where homes were serviced by the curbside recycling program, John approached the city and asked if the restaurant could use the program for its recyclable waste. Although the City of Ottawa now accepts blue box materials from small businesses, the answer at the time was "no".

John was not deterred. He considered recycling and composting as viable options. He contracted a private company to collect the restaurant's recyclable metal, glass, and cardboard, and another company to collect the compostable organic waste. There were costs associated with these initiatives, but they enabled the restaurant to get rid of the dumpster, divert waste from landfill, and most importantly for John, to save money.

Unfortunately, this situation did not last very long. Without notice, the composting service provider stopped collecting the organic waste and would not return any telephone calls. John believes that the service provider had been operating without the appropriate permits and got caught. The organic waste, which the restaurant staff continued to separate in the hopes that the service would be resumed, was starting to pile up.

Again, John was not deterred. He considered the potential of on site composting with worms, a process called vermi composting. He contacted the "Worm Factory" in Perth, Ontario, a company that sells vermi composting equipment, and developed a pilot vermi composting system.

In order to set up the pilot system, John purchased the following:

- one 3' x 3' x 3' cedar composting bin that he lined with styrofoam and some eaves-trough heating wire that was used when the outside temperature dropped below –30^{0}C;
- a couple of shovels of dirt and some mulched leaves; and
- 5 lbs. of red wriggler worms.

He placed the composting bin outside, on the restaurant property and operated the pilot system for approximately one year. During this time, he monitored the composting bin temperature, moisture, and acidity; and recorded his observations. He also audited the wet waste that the restaurant produced.

The pilot system worked very well. It enabled the Cajun Attic to divert approximately 15% of the organic waste by

volume that it produced. John "did the math" and came to the conclusion that the system should be expanded to a full-scale on-site vermi-composting system.

Expansion to a Full-Scale On-Site Vermi-Composting System

In order to turn the pilot system into a full-scale system, John purchased seven more cedar bins like the first one, some compost starter, and enough red wriggler worms to populate the bins. He also installed a garberator in one of the restaurant's kitchen sinks.

Operating the System

The Cajun Attic staff worked as a team to operate the composting system.

When clearing tables, the servers separated the compostable and recyclable materials from the dishes and cutlery. They placed the recyclables into curbside recycling type blue box containers, and the compostables into 10-litre plastic buckets, which were salvaged from the restaurant's trash.

John had eliminated the use of all condiment packaging that was not compostable or recyclable. For example, he eliminated the use of single serving creamers that were packaged in plastic and implemented the use of glass "sidecars" for cream and milk. He kept using items such as sugar in paper packets because the packets were compostable. The only "garbage" that was left consisted of the occasional broken plate or glass.

At the end of each evening shift, the dishwashers used the garberator to puree the organic waste, put the puree in a bucket that had a screen bottom instead of a solid bottom, and left the bucket in the sink so that the excess liquid could drip down into the sink drain. At the beginning of each day shift, the dishwashers placed the pureed and drained organic waste in the composting bins, on a rotating basis. For example, the Monday day dishwasher placed the pureed organic material collected on Sunday in bin number 1, the Tuesday day dishwasher placed the pureed organic material collected on Monday in bin number 2, and so on.

At this time, the dishwashers also measured and recorded the bins' temperature, moisture, and acidity. John indicated that "a composting bin that is working well does not have a bad odour, it simply smells like earth." The dishwashers, therefore, also recorded their observations about the bins and their contents, such as unusual odours. This ensured that the system was operated in a well-coordinated manner and problems could be addressed before they became significant.

Harvesting the Compost

Once per year, usually on a sunny autumn day, John harvested the rich compost that was "an excellent soil amendment, five times better than any fertilizer". In order to complete this task, he spread a large tarp in the area adjacent to the composting bins, dumped the contents of the bins, and raked off the compost. John explained that "the worms move towards the middle of the pile, away from the sun, so you just keep raking material off until you are left with a mass of worms and some compost".

When the harvest was complete, John divided up the remaining worms and compost and approximately 12" of mulched leaves, back into the composting bins, and the process started again. John estimated that the Cajun Attic produced 50 cubic feet of rich compost per year. He bagged the compost and gave it away to family and friends and to select regular clients at no cost.

Expansion of the City of Ottawa Curbside Recycling Program to Include Small Businesses

In 1997, approximately two years after John implemented the full scale on site vermi composting system, the City of Ottawa expanded its curbside blue box recycling program to include small businesses such as

the Cajun Attic. At this time, the City's recycling program accepted not only metal, glass, and corrugated cardboard, but also plastic film and all rigid plastics with the Society of Plastics Industry numbers 1 to 7.

Since there was no charge for participating in the program, John terminated his recycling contract with the private company and switched to the City of Ottawa curbside blue box recycling program. This was another opportunity to reduce his operating costs.

Successes and Lessons Learned

John and his staff successfully operated the full scale on site vermi composting system at the Cajun Attic for about five years. The composting system enabled the Cajun Attic to divert approximately 190 kg (4 cubic meters) of organic waste from landfill per week. The combined composting and recycling system enabled the Cajun Attic to divert over 99% of its waste from landfill.

When asked how well the system worked, John emphatically stated:

> "Th system was phenomenal! I really loved he cess. I loved those babies (the worms). The worms ate everything: vegetab m dairy products, paper, and even spicy od."

The Cajun Attic won an achievement award from the City of Ottawa for implementing the vermi-composting system.

Start Up and Operating Costs

Before John implemented the composting and recycling systems, the annual dumpster and waste haulage costs for the Cajun Attic were $3,600 per year.

The capital cost for starting up the full scale on site vermi composting system was estimated at only $1,500, including the cedar bins, starter, worms, and garberator. The operating costs for the vermi composting system were negligible. This means that the cost recovery period for a vermi composting system like the one used by the Cajun Attic, is less than six months, if recycling services are provided at no cost.

The specific costs and savings for the set up and operation of the pilot composting system are not available. Nor are the costs and savings for the operation of the full scale composting system when the Cajun Attic paid for recycling its glass, metal, and cardboard. However, John indicated that the restaurant saved money with both of these systems also.

Staff Costs

John was aware that staff time and costs must be considered in order to fully calculate the savings achieved with the vermi composting system. Therefore, he compared the amount of time that staff used to dispose of waste the "traditional way" and with the vermi composting and recycling system.

The results from this assessment revealed that there was no significant difference in staff time. There was no significant additional time required for staff training. They were very willing to participate and staff really liked the system.

The servers did not use any extra time to separate the materials when clearing their tables. In fact, they really liked doing away with the individually packaged creamers since they are often messy to clean up.

The dishwashers used time to puree the organic waste, measure the temperature, moisture, and acidity of the bins, and record their observations. However, with the traditional waste disposal system, the dishwashers had to wash the garbage containers throughout the restaurant and sometimes the 4 cubic yard dumster. The composting and recycling system enabled the dishwashers to replace the garbage containers throughout the restaurant with 10 litre pails and to use the dishwashing machine to clean the pails. This process was easier and less time consuming.

Lessons Learned

John indicated, "Vermi composting is a natural process and nature is a little variable at times. Therefore, vermi composting is not an exact science."

The system worked really well, but sometimes, the composting bins required a little fine-tuning. For example, sometimes the worms would migrate from their "home" bin (the bins have no bottom) and move to another bin, which caused their "home" bin to start smelling "sour".

Fortunately, most of the problems could be solved by adding leaves and not placing organic material in the bin until the bin's moisture, acidity, temperature and especially smell were back to normal. John obtained the leaves from friends and neighbours in the fall, mulched them, and stored them in a small shed on the restaurant property.

John was quick to indicate that smell was never a real problem. In fact, he had occasionally received complaints about the smell of the dumpster that he used before implementing the composting system, but never received complaints about the smell of the composting bins. He said, "The compost just smells like earth when working well."

Red wriggler worm populations regulate themselves, so there was no need to add or remove worms at any time. The worms reproduce when there is potential for mortality. John observed that there were many small/baby worms in the spring and speculated that the adults must lay many eggs when winter starts and their survival is at risk.

The Future of Vermi-Composting at the Cajun Attic

The future of vermi composting at the Cajun Attic is a little uncertain but very promising. This winter, at the time when John was selling the restaurant to Robert, vandals stole the lids from the composting bins and the worms died because of the cold. The heating system was not able to provide enough heat without the insulated lids.

Robert has disassembled the vermi composting bins and has stored them for now. But, has indicated that he intends to build on the Cajun Attic's past waste diversion successes with composting. He believes that he will have to add more bins to the new system in order to manage an increase in the amount of organic waste produced and find a way to deter vandals.

But, he indicated that composting is very common in Ireland and that the system he operated at the Cable's End guesthouse and restaurant there was very successful and saved a lot of money. It is expected that he will also be very successful at the Cajun Attic.

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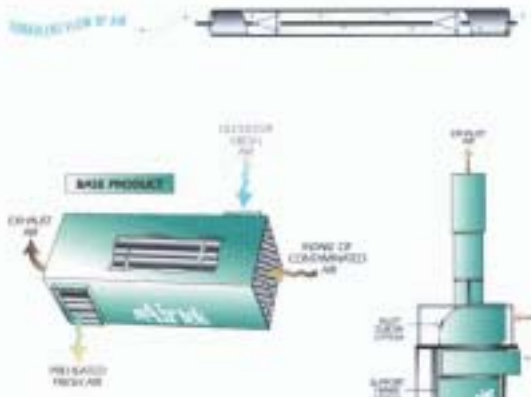

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The Banff Fairmont Hotel, Alberta

Located in Banff National Park, Canada's very first national park (1885), the Banff Fairmont hotel is an icon of the worldwide tourism and hotel industry. The hotel's history is closely tied to the construction of Canada's transcontinental railway. The Canadian Pacific Company initiated the establishment's construction, whose first phase was completed within two years (1887-1888).

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In 1928, extensive work turns the Banff Fairmont into the establishment we know today: the hotel looks like a castle emerging from the depths of Douglas Pine-covered mountains, on land located along the Bow River.

From the day it opened, this luxury class hotel, with its Tudor inspired interior, enjoyed immediate success with tourists.

Over the years, the growing number of guests staying at the Banff Fairmont has generated a colossal environmental challenge: how can one reconcile nature's integrity with the ever growing influx of patrons and visitors?

The adoption of voluntary environmental measures has proven a very beneficial strategy that has also spurred a « green » emulation within the industry.

Let us look more specifically at waste material management measures at the Banff Fairmont.

Context

When contemplating the implementation of a waste material management infrastructure, a good analysis of the operational context is crucial in order to achieve better planning.

The Banff Fairmont is located in Canada's most frequented National Park (4.5 million visitors per year). The alpine ecosystem is a sensitive environment whose regenerative speed is low and regenerative capacity limited.

Photographer: Claire Garon

Rocky mountains view from the balcony.

In urban areas, hotels and convention centres can usually, once a deal has been made, rely on municipal services to dispose of part of their main residual materials, such as paper, glass and aluminium.

In Banff Fairmont's case, it can only partially rely on municipal services.

On one hand, the volume of waste material generated by the hotel is considerable and diversified. The Banff Fairmont totals 828 rooms that can accommodate 1750 guests; 13 conference rooms and 66 suites are also present. The convention centre adjacent to the hotel covers 150,000 ft., contains 29 suites and can accommodate up to 1600 attendees.

On the other hand, the city of Banff is at once a service point for the Park, its visitors and the more than 7000 residents within the city limits. Municipal infrastructures are mainly geared toward servicing these three clienteles.

Municipal authorities put a lot of effort into maintaining a balance point between the increase in the number of tourists and the conservation of the ecosystem's integrity.

Since 1969, the Banff Fairmont is open year-round rather than seasonally. A critical mass of patrons must be maintained to cover operating expenses and a vigorous marketing program has been put together to advertise the establishment's attractions.

Finally, the region's population is highly sensitive to environmental matters and the Banff Fairmont's initiatives in this area are likely to be vigilantly scrutinized on an on-going basis.

Hotel Operation and Environment

The hotel industry is well known for using vast amounts of resources in the course of its operations.

Abundant lighting, patron controlled heating and cooling levels, house cleaning, kitchen operation, recreational equipment, hosting of conventions and receptions, are all elements that can contribute significantly to the production of waste materials.

The higher the number of patrons, the larger the increase in the mass of residual materials. In order to reduce volume, reduction and reuse strategies must be combined.

Corporate Commitment

Aside from the high degree of customer care offered by the Banff Fairmont, it is the exceptional character of its location amidst the Rocky Mountains that constitutes this establishment's main asset.

The Banff Fairmont is not the only Fairmont resort to benefit from these two elements to position itself on the market: the Lake Louise Fairmont and Jasper Fairmont are located mere kilometres away. The Château Whistler Fairmont, located in British Columbia, also enjoys the benefits of an alpine environment.

In consideration of all these elements, the waste management system must live up to the Fairmont chain's marketing efforts. In addition to routine hotel operations, it must be able to adapt to a large influx of guests and visitors.

The Fairmont's management has grasped the proportions that this issue could take. At the end of the 1980's, it was decided that waste management would be addressed as part of a more global approach to the environmental management of the hotel, « Greening Your Hotel ».
It is from that point on that the expression « green hotel » and its tangible effects in terms of environmental management truly became part of the Fairmont chain's operations.

Photographer: Claire Garon

Meeting rooms with recycling equipment (paper, glass, cans, batteries)

The general objective of the Fairmont chain's green hotel program comprises two components: to develop the highest possible standards of responsible environmental management and to become industry leaders.

A corporate environmental affairs directorate has been created to support Canada's 18 Fairmont resorts and hotels as they strive to achieve their environmental objectives.

Methods Used

From the beginning, the Fairmont chain's administrators clearly understood that environmental management is achieved by people. The appropriate means were taken to instill, maintain and reward employee motivation and initiatives, as well as make the relevant information available to each of the chain's establishments thanks to the GreenWeb intranet site.

Green committees were set up at each hotel; employee contributions and vision were combined with the results of professional studies to elaborate and implement a two-phase Corporate Environmental Action Plan.

Phase I , which dates back to the early 1990s, focused on compiling current practices in all hotel departments and exploring possible improvements to the environmental management of four areas. Waste management hinges on this phase.

In 1997, as part of Phase II of the Action plan, the Fairmont chain performed an internal environmental assessment of each of its establishments. Following this, the Fairmont chain was able to offer its clients the Green-meeting package. This involves organizing and hosting meetings in a way that was specifically designed to minimize environmental impacts; waste management is one of the cornerstones of this approach.

Studying Waste Flow

In order to draw a portrait of the current situation and to assess the waste management potential, a waste flow study and a solid waste audit were performed for each of the hotel's main operating units:

- building maintenance;
- laundry service;
- general management;
- recreational vehicles and sites;

- housecleaning;
- procurement; and
- kitchens, dining rooms and cafeterias.

Objectives were set for 2002: increase the landfill diversion rate to 50% and reduce the amount of paper going to landfill by 30%.

With regards to surplus food, it is known that the industry standard usually calls for a 10% surplus to accommodate any last minute guests. Because composting is forbidden in a National Park, surplus food is made available to hotel staff.

The materials collected from guest rooms, convention halls and recreational areas are: all paper types, aluminium, glass and plastic containers, batteries and aerosol cans.

For event organizers that include environmental considerations in the choice of a venue, the Banff Fairmont offers the possibility of performing a mini audit of the waste materials collected.

Waste materials collected in relation with hotel operations include: packaging, metals, waste oil, printer cartridges and batteries.

The Banff Fairmont's administrators had to make arrangements with recyclers from Canmore, Exshaw and Calgary in order to fulfil collection needs.

Source Separation and Storage Equipment are Strategically Located

In terms of infrastructure, collection bins are located in guest rooms, the self-serve cafeteria, convention halls and recreational equipment rooms. Employees collect the bin contents as part of the regular housecleaning schedule. The materials are routed toward intermediate transfer centres, then to the main transfer centre, located next to the building maintenance department's loading dock.

Controlling the Quality of Collected Materials

The contamination of materials collected in a public setting remains a concern. It must not be forgotten that patrons are asked to participate in a program based on voluntary measures. Guests can place many types of materials in the recycling bins in the belief that everything is recyclable and will be recycled.

Photographer: Claire Garon

Solid waste recycling center next to meeting room

Hotel administrators have been advised that the recyclers can refuse a load of material that is too contaminated, potentially making the entire load fit for disposal. Other than the monetary value of the recyclable materials thus lost, it is the very credibility of the waste waste management system that is undermined under such a deplorable scenario.

To prevent this type of situation from arising, an innovative source separation process for collected materials was implemented at the Banff Fairmont's transfer centre. The separation of materials occurs right before the containers are hauled off.

Greener Procurement

In the area of procurement, a source reduction strategy targeting all hotel supplies has been developed and is continually reviewed. This is a way to control the input

Photographer: Claire Garon

Banff fairmont's Congress Center

of materials and avoid things such as Styrofoam and excess packaging, and it also publicizes the hotel's financial interest in products designed to generate less waste materials.

Effective Waste Material Management Program Communication

Guest communications are the main factor in reducing waste material production. In addition to positioning recycling bins strategically, the hotel asks event organizers to designate someone that will remind delegates of the recycling program. In guest rooms, multiple notes encourage guests to reduce their consumption and inform them of the reasons why they should do it.

The Guest Book explains the waste material management program as well as the Fairmont group of establishments' environmental management program in great detail.

Staff Training

The Banff Fairmont's recycling program is rooted in the interest and motivation of its staff. Each staff member receives training on current environmental practices and has the possibility of sitting on the hotel's environmental committee. Staff input is always welcome.

Twice yearly, all staff members participate in a large scale cleaning operation of the Banff Fairmont grounds.

To maintain a high level of motivation, every year, the Fairmont group offers free stays in its establishments to staff members who implement environmental initiatives.

Conclusion

All these initiatives have not only convinced many suppliers and competitors to follow suit, they have also raised the bar in the area of community relations and residents' perceptions of the hotel's environmental impacts. Convincing results and innovations can be applied at other Fairmont establishments and provide an important advantage in competitive markets. An on going concern for environmental issues can provide advantages similar to that of a well targeted marketing campaign. The hotel customers can probably assess an establishment's performances and corporate image quite rapidly. When an organization goes public, good environmental management will attract a certain type of investor.

Despite numerous changes in ownership at the Fairmont chain since the early 1990s, the administrators have never dropped their commitment to environmental management, as has often been the case for businesses with an even greater dependence on the environment for their operations. The administrators of the Banff Fairmont recognize the advantages of adequate environmental management for their business and wish to pursue the program's improvement as well as ensure their on going commitment to environmental protection.

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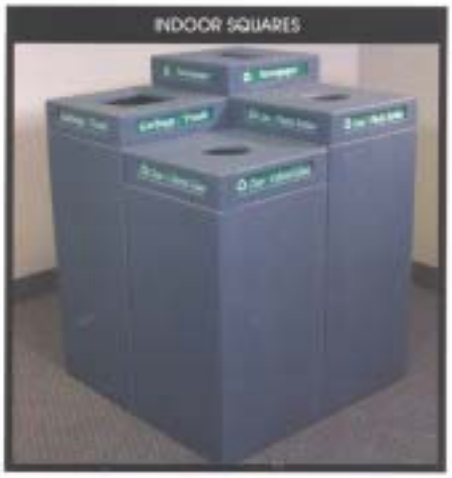

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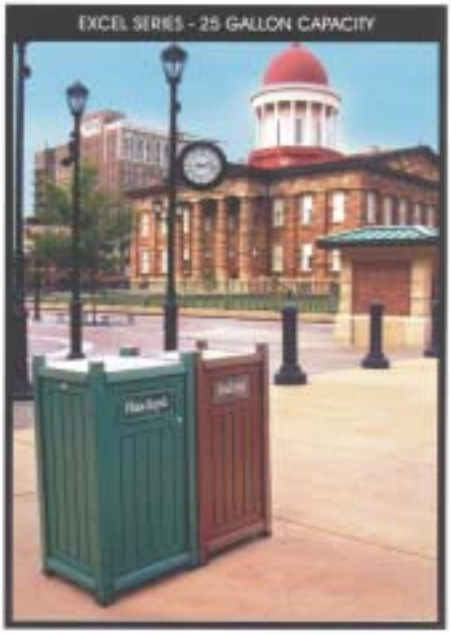

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Centre for Indigenous Environmental Resources Inc., Manitoba

The Centre for Indigenous Environmental Resources (CIER), is a First Nation owned and controlled environmental education, research and consulting firm. CIER is not affiliated with any First Nation political or quasi-political institution, but rather was created by a small group of First Nation leaders who felt it was critical for First Nations to have access to a technical environmental organization that is able to address environmental matters using an integrated approach; one that combines multiple perspectives and relies on the development of collaborative relationships. At present, they have 12 staff members, although this ebbs and flows somewhat.

The Organization

CIER's mandate is as follows:

CIER's primary mandate is to build the environmental capacity of First Nations and undertake environmental work with and for First Nations. CIER is committed to the development of the education, research and technical resources needed for communities to acquire a greater ability to meet and deal with the environmental issues and initiatives they face. Secondarily, CIER's mandate includes working with or for non First Nation entities on projects that will directly benefit First Nations. At a third level, CIER engages in environmental projects that are of indirect benefit to First Nations or projects that allow the firm to exercise its commitment in this area.

When working with First Nations, or on a project that may affect First Nations, CIER works to create an opportunity for First Nations to provide meaningful input, on not only issues related to their rights and needs, but also related to the project itself in all its complexity.

Key activities include

- **Education and Training**
  CIER develops and implements community based and client focused environmental training;

- **Research and Policy**
  CIER is engaged in research and analysis of contemporary and emerging First Nation and environmental issues; and

- **Environmental Consulting**
  CIER provides environmental consulting, project management, and technical services to First Nation governments and organizations, and non First Nation governments, private sector and academic institutions.

This case study focuses on an initiative, which is not really an initiative as it pertains to their service delivery, but rather a method to articulate and demonstrate the firm's environmental commitment.

The organization planned to move offices in 2000. As part of this move and to reflect and echo their environmental commitment, a concerted office selection and renovation and design of the selected office was undertaken. In concert with more conventional recycling, and some not so conventional composting, CIER has assumed the position where other businesses and organizations come to them to ask questions and learn.

Environmental Commitment

CIER's motto pretty clearly describes their environmental commitment:

> "Dedicated to the Protection, Preservation and Renewal of Mother Earth."

At their offices they have strived to develop a working environment that minimizes its impact on the environment.

In their day-to-day operations they have committed to recycling solid wastes to the extent possible.

Given the company's mandate, the people that work there are already very committed, making "buy-in" to the organizations environmental goals relatively easy.

Program Design and Implementation

Prior to undertaking the green building program, CIER established the following seven questions to guide in the selection of building products and technologies:

1. Is the product necessary?
2. Can the product be obtained and used?
3. What is the product made of?
4. How is it made?
5. Where is it made?
6. How long will it last?
7. What are the disposal options at the end of its life (can it be recycled)?

Green Building Program

When CIER was planning their office move (1999), they decided to put their principles into action. They elected to move into an historic building, the long underused and largely empty Kay Building, in Winnipeg's historic Exchange District. CIER believes that First Nations have an important role to play in the revitalization of this district - designated a national historic site. Notwithstanding, this is an excellent example of re-use.

Courtesy of CIER

The Kay Building, Winnipeg, Manitoba

Their offices are on the third and fourth floors of this building. To be used as an office, this space required considerable renovation. The goal was to renovate and design this office space to minimize its impact on the environment.

The office design incorporated environmentally friendly design aspects including recyclable carpet tiles, cupboards constructed of strawboard, among other ecologically conscious aspects. Table 1 provides some detail of these design aspects.

After extensive renovations CIER moved into its present home in January 2000.

Given their occupation of a previously vacant building and the unique nature of the office design, the new office and staff efforts were featured during a grand opening. This part of the program was further publicized through a

Table 1:
Summary of Design Aspects

Reception Area	CIER used a latex paint, certified as environmentally friendly by Canada's Environmental Choice Program, made in Winnipeg by Northern Paint Canada.
Administration	This area houses research, consulting and admin. offices.
	To the extent possible, existing features were incorporated into these office spaces (e.g. wood floors).
	Carpet tiles with recycled content were used. As they wear, the tiles can be removed and replaced with new tiles.
	Dividers are used to separate work areas. These dividers are capped with a "Strawboard" product made from straw fibres and non toxic resins at a plant in Manitoba. "Strawboard" was used for all millwork including the reception desk, door trim, cupboards, and baseboards.
Boardroom	Low energy halogen lights and long lasting compact fluorescent lighting (used throughout office) were used to efficiently light the office.
Kitchen and eating area	These cupboards are another example of the use of "Strawboard".
	A resilient textile floor product called Solenium was used. This product uses 35% less material per square meter, lasts twice as long as conventional carpet and can be 100% remanufactured into identical product.
Washroom	The most unique environmental features of the office are composting toilets (4). The waterless toilets are connected to composters on the floor immediately below.
	Ceramic tile flooring in the washrooms was manufactured with 58% recycled glass content.
	There is also a shower to encourage staff to cycle or jog to the office.

number of articles in the local press. CIER continues to promote its mandate and its own environmental commitment via its well-crafted Web page. On-line tours of the facility are available at www.cier.ca./office

Solid Waste Management Initiatives

CIER has undertaken to reduce its solid wastes since its inception in 1994.

As an office, their solid wastes are confined mostly to paper, some packaging materials and wastes emanating from staff lunches. As a result, their solid waste recycling program is relatively straightforward.

Employees have office sized blue boxes by their work areas. They are able to recycle all paper grades. Soft drink cans and plastic bottles are also recycled. Recyclables are gathered weekly and removed by a private sector service provider. This service provider does not collect glass bottles. Employees are asked to take glass bottles home with them, where they can be included in their residential waste recyclables collection program.

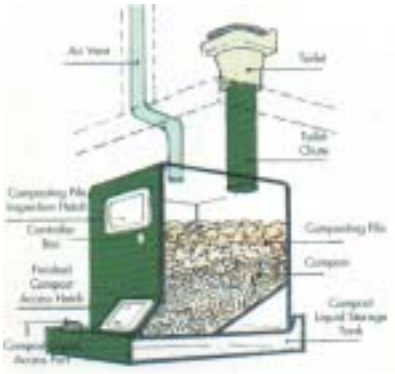

Diagram of Composting Toilet

CIER receives a limited amount of packaging materials. These are also recycled as part of their recycling program.

The recycling program does not extend to compostable organic wastes generated by staff. There was some thought about using the composting toilets for these wastes, however, it was decided not to use them because of the generation of fruit flies in and around the toilets.

CIER has an informal green procurement policy. All paper products (from computer paper to paper towels) contain some level of recycled content (from 30% to 100%), they purchase remanufactured toner cartridges, pens made from corn, and binders made from recycled pop bottled. As Rodney McDonald, CIER Sustainability Strategist points out, they want to practice on a daily basis activities that reflect aspects of their mandate.

Results of the Program

Key results of their green building program include:

- reuse of building space;
- use of recycled content building materials
- reduction of solid and liquid wastes and production of compost;
- reduction of water use;
- office layout makes maximum use of natural daylight;
- energy savings with compact fluorescent lighting; and
- increased profile and recognition for firm.

The *piece de resistance* of all of their efforts was the installation and use of composting toilets into their office. Theirs is the first office in Canada to do so in an historic building. Use of the toilets has been mostly positive and staff have acclimated to the use of these toilets.

It is estimated that the average person flushes 1 month's volume of drinking water every two days by flushing a conventional toilet. CIER estimates that in the five years it will take (i.e. to 2005) the composting toilets to produce harvestable compost, they will have reduced water use by 1,000,000 litres.

Another unexpected bonus has been that the City of Winnipeg has been able to harvest compost tea from the composting units and use it in local flowerbeds.

Over and above the obvious environmental benefits, the office has become a show piece. In the last three years, over 2,500 people have toured the office and other organizations and individuals planning "green offices" visit or call CIER to see to seek advice.

The composting toilets have proven to be the most popular among those seeking information. And although this is a very positive and environmentally friendly step, there has to be at least a small amount of humour in that they have so many guests making dedicated tours to come look at their toilets.

They have had visitors examine their office to help them with their office design. As an example, when Mountain Equipment Co-ops was preparing to develop its Winnipeg location, they toured CIER's offices. They have installed composting toilets in their new retail location.

More so for their building initiatives as opposed to their solid waste recycling initiatives, they have received considerable positive publicity.

Recyclable wastes are collected weekly from their office. In terms of recyclable wastes, the results are more quantitative than qualitative. They have not conducted any waste audits to verify results. This has more to do with being buffeted by the pressures of day-to-day demands and commitments than not wanting to.

Program Costs

The office renovations cost in the order of $300,000.00. The composting toilets each cost $7,000. They purchased four units. The recycling program costs CIER $320.00 per year.

Lessons Learned

As McDonald points out, all of these initiatives were a great way to "walk-the-talk on a day-to-day" basis. They expose people to CIER and their mandate who might not otherwise hear of this organization.

The keys to success have been staff dedication and commitment to CIER's environmental commitment. All aspects of the program are simple and easy to use.

Overall CIER is quite pleased with the results of their efforts. They have an office that quite clearly and effectively demonstrates their environmental commitment and that has become a bit of a show piece.

Recently they have acquired a heritage building in the downtown core (they rent their present location). They will be incorporating many of the design features of their present location into the new location.

They will consider adding a further feature to allow them to capture and recycle water used by staff. They will also consider improvements to the composting toilets system to facilitate easier harvest of the compost tea (it is quite awkward at the moment).

To facilitate the better use of paper and reducing the number of printers required, CIER would like to eventually move to using a networkable photocopier.

As well, they will consider undertaking a facility audit and waste audit to see what is working and what doesn't, infusing possible improvements into their existing facility and transferring them and any new ideas to their next location.

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The Department of Environment, Provincial Government Offices, Newfoundland

The Government of Newfoundland and Labrador has a centralized complex (Confederation Building) that houses many government departments (ca. 20), in St. Johns. Approximately 3,000 people work in this complex.

The Organization

There was a government wide directive in 1992 that encouraged general recycling in all office activities, at all locations, where practical. The Department of Environment(DOE) has taken a strong interest in waste minimization at all of its offices including the Confederation complex. Most other departments have not established a position on waste minimization.

The Department, consisting of approximately 75 employees, is split into three main divisions: Pollution Prevention, Water Resources and Environmental Assessment. As might be expected, this department's mandate is to maintain the environment as is described below:

To protect, conserve and enhance the Province's environment through the management of water resources, the environmental assessment of undertakings and the control and management of substances and activities that may pollute the environment.

To address the government directive encouraging recycling in office activities, the Department initiated the Department of Environment Green Committee, in 1993. The Green Committee has 10-12 voluntary members who meet on a regular basis. Most of its members come from the Confederation Complex although

members are also drawn from DOE offices in Grand Falls - Windsor and Corner Brook.

The goal of the Green Committee is to identify, advance and promote strategies, policies and practices within the Department's operations aimed at minimizing negative environmental impact and maximizing benefits to the environment.

Most simply, they make recommendations regarding the greening of Departmental Operations and promote environmentally friendly alternatives in the workplace.

A member of the Green Committee also sits on the InterDepartmental Recycling Committee (consists of one voluntary member from each department in the Confederation Complex). The purpose of the InterDepartmental Recycling Committee is to organize and promote the recycling programs at these facilities and to look at the possibilities for promotion to other government areas.

This case study will focus on the DOE Green Committee and in particular, its contribution to the larger recycling initiatives overseen by the InterDepartmental Recycling Committee.

Environmental Commitment

The government has set itself on a path to improve the management of solid wastes in the Province. A provincial waste management strategy was developed and initiated in 2002. General provincial goals for waste management are aggressive, with a 50% diversion target and a significant reduction in the number of waste disposal sites by 2010. As well, open burning, incineration, and the use of unlined landfill sites will be phased out. The government is committed to achieving these goals. It will be accomplished through increasing waste diversion, establishing waste management regions, developing modern standards and technology, maximizing the economic and employment opportunities, and public education.

The DOE needs to continually ensure that it sets a suitable example in its own day-to-day operations and strives to manage its own waste in a reasonable and responsible manner.

The Department's Green Committee plays a strong internal facilitative role to ensure the design and implementation of the most effective recycling programs. Their work is bolstered by a strong employee commitment to develop and participate in recycling programs.

The Green Committee shares and disseminates relevant information, as well as encourages other departments to set up recycling programs. They play a strong external role as part of the InterDepartmental Recycling Committee, often providing a driving and catalyst function to get new programs off the ground.

Program Design and Implementation

Recycling Projects

Since 1993 the Department, in conjunction with the Green Committee, has developed and promoted a number of recycling programs including:

- paper, cardboard recycling;
- beverage container recycling;
- toner cartridge recycling;
- recyclable battery recycling; and
- appropriate spent fluorescent tube disposal.

Recycling programs, starting with various paper streams were initiated in 1993. All workstations and common areas have their own blue boxes for recycling. The committee attempts to place a blue box everywhere that there is a garbage pail for non recyclable waste. There are larger wheeled bins for white bond and mixed paper at recycling stations throughout the Department (one for every 35-40 staff). The smaller office boxes cost - $7-10 and the larger blue bins cost $150-200 each.

Recycling programs were promoted to staff via e-mails, word of mouth, and through new employee orientation information packages. The unique aspect of this recycling program is that weights of some recyclables are tracked and revenues generated as a result of their sale raised for future donation. These results are advertised through press releases and press events.

In general, the various recycling programs launched by the Department have been well received by staff.

The recycled wastes are collected by local firms such as Nova Recycling, from which they are processed and sent to final recycling facilities.

At present, the Department has an unofficial green procurement program and strives to purchase recycled copy paper, recycled toner cartridges, environmental choice envelopes, etc.). Officials are moving forward on an *Environmental Code of Practice for Government Operations* which would address green procurement.

Other Related Projects

Other related projects include Green Checks (compliance audits) and waste audits. Waste audits were completed from 1993 and 1997. Summaries of these are presented in the table 1.

The Department has also developed various relevant documents, including the *Environmental Guide for Conference Room Users* and a *Policy on Catering* at the Department).

The Department further promotes recycling and composting thorough Environment Week promotional activities.

Results of Program

The Department has, in the past, conducted regular waste audits. The results of the waste audits are described in Table 1 (i.e. 1993-1997). It should be noted that the higher values for 1996 are anomalous because there was an extensive office clean-up during this time.

A waste audit is planned for the first quarter of 2003. It is expected that the waste

Table 1:
Waste audit results demonstrate that the diversion rate is between 65%-73%

Kg/person/Year	May, 1993	June, 1994	Oct, 1994	June, 1996	Feb, 1997
Total Waste Material	68.5	60.2	59.1	105.9	65.3
Garbage	23.8	20.8	19.0	28.5	19.7
Recyclables	44.2	39.8	39.8	77.38	47.0
(% of total waste stream)					
Bond paper	52.1	51.0	53.7	55.7	61.5
Glass	na	na	na	1.0	2.3
Newsprint	3.4	5.8	5.9	7.6	0.7
Cardboard	3.4	7.7	7.3	8.2	3.0
Aluminum	9.1	0.7	0.6	0.5	2.3
Tetra Paks	0.5	0.5	0.2	0.1	0.2
% of recyclables (in all categories) in total waste stream	65	68	67	73	70

composition will be similar to previous audits as the office function and processes have not changed markedly during the intervening period of time.

In terms of overall quantities, approximately 135,000 kg of waste paper and 32,000 beverage containers are diverted each year from across the Confederation Complex.

What makes the work of the Green Committee and Interdepartmental Recycling Committee unique is that any revenues generated as a result of recycling activities is directed to local service groups.

This generation of revenue and its subsequent donation is heralded by a press event each year. In December 2002, Kevin Aylward, Minister of Environment, represented the Government of Newfoundland and Labrador when donations were presented to ten local service groups.

For 2001 - 2002, $7,000 was raised through the Confederation complex paper recycling program and ten local charities each received a donation in the amount of $700. The charities are - Canadian Cancer Society (Newfoundland and Labrador Division), Community Food Sharing Association, Iris Kirby House, Juvenile Diabetes Research Foundation, Rabbittown Learners Program, St. John's School Lunch Association, St. John's Therapeutic Riding Association (Rainbow Riders), The Gathering Place, The Salvation Army and the VOCM Cares Foundation.

Since 1993, a total of $35,000 has been directed to charities from this effort. For the past eight years, funds have been raised through the sale of recycled products to Nova Recycling and more recently Boland's Security Services. Each year, the Interdepartmental Recycling Committee, together with the Minister of Works, Services and Transportation or the Minister of Environment have made presentations to organizations on behalf of the employees of Confederation Building and other buildings in the City who have participated in the recycling programs.

Lessons Learned

One of the keys to success has been that management and employees alike have supported the recycling programs. The raising and donating of funds is an added incentive for the participants.

Other important factors in the success of the program include:

- remove barriers to recycling and make it as easy as possible;
- conveniently locating recycling bins
- clear and persistent communication with employees through regular newsletters or special events; and
- clear lines of communications with support staff and waste collectors to identify problems.

Waste audits will help determine future initiatives. It may be useful to target particular parts of the waste stream. For instance, it may be useful to further encourage good one sided printing and double sided photocopying to minimize paper usage.

The Green Committee will be assisting in the further promotion of recycling programs through the development of a Web page.

Jolly Farmer Products Inc.,
New Brunswick

Located in the St. John river valley in Northampton, New Brunswick the Jolly Farmer Products operates a complex of greenhouses and other related business operations.

The Organization

Approximately 60 shareholders, who live with their families adjacent to their business operations as part of a Christian community, own the company. Their Christianity has governed the shareholders and how they operate their business. This has inspired their motto of "Integrity, Quality and Reliable Service" which has been part of their operations for the last 35 years.

The focus of the Jolly Farmer is a wholesale producer of greenhouse products including plugs, cuttings, annuals, hangers, chrysanthemums and more. Year round production service markets nationwide in the U.S. and parts of Canada. The Jolly Farmer Products is committed to producing quality products at reasonable prices with excellent customer service. All material is sold "in-house" rather than through brokers, providing the customer with unique GROWER-TO-GROWER service and quality.

Other products include:

- seasonally greenhouse grown produce (e.g. tomatoes, herbs, strawberries and English cucumbers);
- certified organic products including compost, potting soil, seedling mixes, worm castings;
- vermiculture producing worm castings, compost tea and worms for vermiculture and bait;
- honey bees and honey; and
- agricultural products such as dairy, beef and pork from their 200 acres of farmland.

A related company, which also operated as The Jolly Farmer was established in 1967 in New Hampshire, USA. This operation, similar in nature to the present New Brunswick operation, included greenhouse and farming operations. This operation was

phased out in the late 90s. Many of the members of the US company immigrated to New Brunswick to establish this similar operation.

Ground was broken at their present site in 1996 and they have been operating there since that time. The present site includes 7.5 acres of greenhouses, a compost site, product storage area (e.g. bark mulch for potting soils) and housing.

Courtesy of Jolly Farmer

Greenhouse and composting yard

At present, the Jolly Farmer has about 200 employees. This can fluctuate as high as 260 during the peak season. Employees include about 60 shareholders with the remainder made up of the local population or "neighbours" as they like to call them.

The Jolly Farmer strives for self-sufficiency and vertically integrate, where possible. This includes bringing in waste products to assist in their processes and then reclaiming waste materials generated from their own processes. They have striven to maximize resource use through re use and recycling. This has been exemplified through some recent building projects and solid waste initiatives.

Environmental Commitment

The Jolly Farmer's environmental commitment is driven by a more fundamental spiritual commitment. Robert English, the company's vice president, notes that all that they do is driven by their primary goal to "keep the commandments of Jesus Christ".

And while many may find it easy to discount using Christianity as a corporate culture, their philosophies and beliefs have helped them to develop a comprehensive suite of environmental initiatives.

Although the company does not have a formal environmental policy, English points out the Jolly Farmer operates using a number of key principles including frugality. They have been accustomed to making due with the resources they have.

Long before recycling and composting became in vogue as a means to control society's wastefulness, some recognized that all of the resources that were being used might be resources that were not available yesterday and perhaps would not be available tomorrow.

This "waste not want not" attitude means that they regularly look at how they are using their resources and look for improvement.

Ultimately, this philosophy and attitude ensures the wise use of resources and profoundly affects the bottom line, making the business more sustainable.

Another philosophy that promotes environmental initiative is the company ethic for cleanliness. The staff of cleaners is involved in keeping the facilities very clean and making sure wastes end up in the right place.

There is no formal environmental committee at Jolly Farmer, but English says there is no need for one because it is a way of thinking and operating for them. Shareholders and employee ideas and suggestions make up part of their environmental initiatives.

Program Design, Implementation and Results

Environmental initiatives can be split along the lines of building initiatives and solid waste initiatives.

Building Initiatives

Greenhouse Heating

The operation of a greenhouse requires a significant amount of energy. The Jolly Farmer has taken a number of steps to manage its energy usage.

The critical time of the year is obviously during the winter. Simple steps to reduce the loss of heat from the greenhouses include thermal blankets, which are typically drawn down in the late afternoon.

Greenhouses were provided supplemental heat generated from wood burning and oil burning boilers. Sawmill waste is the primary fuel source for the wood boiler. There is a considerable amount of sawmill wood waste in this region so its use in this fashion allows the energy to be extracted and put to good use. In 2003, the Jolly Farmer entered into an agreement with a local transfer station to accept wood that it is separating out of incoming waste streams. This wood, which until recently was going to landfill, is now being used as a source of fuel.

Courtesy of Jolly Farmer

The operation of a 7.5 greenhouse requires a significant amount of energy

The heat generated from wood was supplemented by heat generated from oil during peak heating time at night. Oil was used to provide supplemental heat at night. Obviously this has a considerable cost implication. Recently the Jolly Farmer wanted to reduce, if not eliminate oil usage.

The Jolly Farmer re used an existing storage tank on the site by retrofitting and turned it into a "major thermal storage tank". Excess heat that is generated during the day from the wood boiler is used to heat the water. This heated water is used to provide supplemental heat at night. It is expected that in 2003 there will be an 90% reduction in oil use. By 2004, it is expected that there will be a 100% reduction in oil use.

This represents replacing a non renewable resource use with renewable resource use and capturing a greater amount of the energy from that renewable resource.

Composting

The Jolly Farmer built a composting facility in 2000 to help it produce compost that is used in their various potting soil mixes. Manures from their farm and other sources are mixed with hay straw and wood wastes to produce these products. The site features an asphalt pad (ca. 0.54 ha, 1.35 acre) and an adjoining unpaved pad for compost curing. They produce compost strictly for use as a soil amendment in their greenhouse growing operation (i.e. their main line of business) and for sale. In the last year, they brought in approximately 2,500 yards of materials (manures, bark waste) for composting.

Organic waste generated from greenhouse operations are managed through composting. A number of worm propagators and castings production units have been built in the greenhouse complex. The products include worm castings, compost teas and worms that are used in other vermi composters and bait. The compost tea is made through the careful blending of various organic materials including compost and castings, which are vigorously aerated for 24 hours. This results in the production of huge quantities of beneficial bacteria, fungi and protozoa. This has been carefully and scientifically developed. All of these products are marketed and sold.

Compost not used for their own greenhouse production or sold is applied to their farm land.

Solid Waste Initiatives

In 1999-2001 the Jolly Farmer undertook a number of informal waste audits to review what was being wasted and determined what could be re used or recycled. At the time of the review, they had a large roll-off container that was removed weekly, as well as a number of smaller containers (6-8 cu. yd) for wastes.

During the audit they identified a number of waste streams that they could re use or recycle including: cardboard, office paper, plastics, metals and wood waste.

They identified a number of places in which they could re use wastes. Cardboard has been shredded and used in the vermi composters and for animal bedding. Office paper is shredded and also used for animal bedding. Wooden shipping pallets are re used and repaired to the extent possible and otherwise used as fuel. Wood wastes generated are shredded and used as fuel in the boiler.

The Jolly Farmer purchased a baler for cardboard and other recyclable wastes. Staff identified markets for cardboard, paper and various grades of plastic. For the most part they have been able to generate markets, which generate them some amount of revenue. Of note is that all of the processing and the development of markets have been completed internally with minimal external assistance.

The various waste streams that are recycled have designated bins or containers at the complex. Part of staff training involves learning to identify and how to recycle various wastes.

Their waste management programs have allowed them to divert an impressive 60-80% of their waste through re use or recycling activities.

Program Costs

Although no specific costs were available for the construction of the "major thermal storage tank", it is expected that the payback period for this investment is in the range of two years.

The composting facility has allowed them to produce all their own potting mixes and reduced the reliance on outside sources of material.

Similarly there are no specific costs available for the separation and subsequent reuse and recycling of solid wastes. The largest cost identified was the staff time to develop markets. This has been far outweighed by the reduction in waste collection and tipping costs. Where previously a large roll-off container was removed weekly, now only a 8 cu yd container is removed weekly. The cost savings from reduced collection and tipping fees has been used to defray the purchase of the baler as well as developing other recycling initiatives.

Lessons Learned

The Jolly Farmer strives to maximize its use of its resources. This has driven all the environmental initiatives. In fact, many of the environmental initiatives are not environmental initiatives per se. They are initiatives that help to streamline their operations and manage costs.

This resource conservation ethic has been most clearly displayed by a strong re use ethic and then recycling what could not be re-used. Garbage is a last resort.

English concludes that in terms of maximizing success, ease of use has been the best way forward. Providing designated areas for all wastes as well as staff training makes it easy.

Scotcor Construction Ltd.,
Prince Edward Island

Scotcor Construction Ltd. was founded in 1995 when Scott and Corinna Costain moved from British Columbia back home to Prince Edward Island. From their office in Summerside, this firm works hard to help people create their dream homes. Specializing in new home construction, they are also pleased to tackle renovations and additions to existing homes. Choosing to run a single full time crew, rather than the more usual multiple crews of seasonal workers, allows them to be absolutely consistent in the quality they deliver, a standard their customers have come to value very highly. So highly, in fact, that Scotcor has found more than minimal advertisement unnecessary: referrals from satisfied clients keep this team of six busy year round.

The Company

Scotcor works closely with clients, striving to provide them with a pleasurable building experience. They are members of the Atlantic Home Warranty Program, which guarantees new homes built by reputable firms for up to seven years after construction. Personable service, no matter what the size of the project, has had Corinna helping clients shop for materials, choose colours – and run yard sales to dispose of reclaimed building materials salvaged during renovations.

Environmental Commitment

This firm's aim to avoid landfilling whenever possible, has lead to a common-sense approach to waste management that integrates well with their overall philosophy. Customers aren't the only ones who have noticed Scotcor's approach. In December of 1998, the provincial government's Island Waste Watch program presented them with a Recognition Award in appreciation of their solid waste management efforts. When local newspapers chose to profile their waste management activities, Scotcor staff was surprised at the attention: from their perspective, they were just doing the best they could, and hadn't thought of that as something especially noteworthy. After all, says Corinna, their own two small children provide powerful incentive every day – doing everything possible to provide a safe and healthy environment and to protect PEI's natural beauty for the next generation is a personal commitment everyone can share.

Island Waste Management Corporation agrees. IWMC, the department of the provincial government responsible for managing the Island's solid waste, has been instituting their "made in PEI" program in various business sectors and geographical regions over the past

eight years, with full province wide launch in 2002. In mapping out the most effective system to service the residents and businesses of PEI, IWMC has developed the Island Waste Watch System based on the following principles (http://www.iwmc.pe.ca/intro.htm):

Responsibility:
each of us is responsible for the management of our own waste.

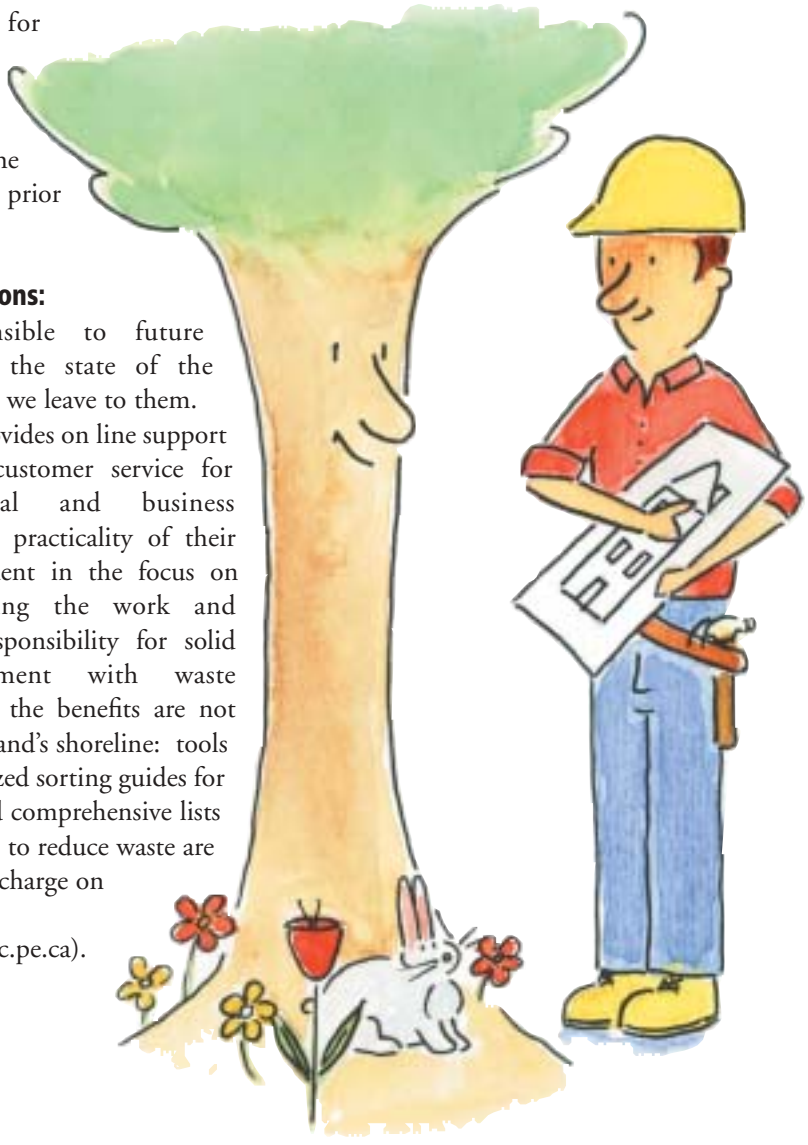
Resources:
most materials we used to call "garbage" are actually "resources" (i.e. materials that we can reduce, reuse or recycle).

Source Separation:
is the least expensive and more precise option for managing and separating waste (i.e. waste is separated in the home or business prior to collection).

Future Generations:
we are responsible to future generations for the state of the environment that we leave to them.

This program provides on line support and prioritizes customer service for both residential and business customers. The practicality of their approach is evident in the focus on effectively sharing the work and therefore the responsibility for solid waste management with waste producers. And the benefits are not limited by the Island's shoreline: tools to create customized sorting guides for your business and comprehensive lists of suggested ways to reduce waste are accessible free-of-charge on their website (http://www.iwmc.pe.ca).

The provincial government's waste management initiatives have found strong support in Islanders' growing commitment to protecting their natural heritage. Individual business people like the Costains, provide positive examples of the amount of influence personal choices can have. Prince Edward Island is Canada's smallest province, and still retains much of its natural beauty. A population of under 140,000 in an area smaller than Metropolitan Toronto provides Islanders with a unique sense of the profound effects their own actions and choices can have on their communities, the Island's resources, and their own future.



Program Design

When Scotcor was launched in 1995, the Island Waste Watch program already required all businesses to separate waste materials into three streams: recyclables, compostables, and waste. To further reduce the total sent to landfill, all of Scotcor's employees work to maximize the amount of materials recovered for recycling or reuse. This involves the usual recycling of office paper, metal and cardboard and another more personalized initiative: finding "new homes" for salvaged building materials.

Courtesy of Scotcor

Home building project

When renovating an existing home, doors, windows, and other building materials are often removed. Rather than see these sent to landfill, Scotcor's staff works first with the homeowner/client and then with their own sources to offer these articles to others in the community. Some examples of this approach have included:

- saving scraps of wood for the client's children's building projects;
- offering wood ends to neighbours who heat with wood stoves;
- helping clients host Yard Sales to offer construction surplus along with personal goods to weekend bargain hunters; and
- "putting the word out" among friends and acquaintances that doors or windows from a recent project are available to anyone who can use them.

This approach has become so popular in the area that the office staff now maintains a list of people who have called in to check for available "reusable" building materials—again, word-of-mouth has made any paid advertising of this recycling service unnecessary.

Scotcor's approach to waste management has grown naturally out of their basic philosophy of responsible, personable service and building for the future. Combined with the flexibility possible with a small staff, this has meant that their waste management program is always open to improvement and expansion. Passing on the same environment-saving options to their clients is a priority-staff is always on the lookout for new products or practices that would allow their customers to build responsibility into their plans. Recently, this has included alternative insulation materials which save on construction requirements, decking choices that in the long run, are safer for both humans and the environment, and heating systems which do not rely on either gas or oil, but tap into geothermal energy, heating the home using the warmth of the earth itself.

Scott Costain's background as a licensed carpenter and his 17 years' experience in the home building business, helps him to keep project ordering tight to minimize waste.

Program Implementation and Results

Scotcor Construction's waste management philosophy has grown up with their company. New practices have been added as the staff has become aware of opportunities to reduce the amount of waste headed for landfill. Working in an industry that requires regular trips to the local landfill site, can have a profound effect on personal convictions! "You just take a look around you at the dump and think, what are we [as a society] doing?!? says Corinna." At this time, they estimate that they find new uses for 25% of their salvaged and excess construction material, and at least 75% of their wood waste, the main components still finding their way to the dumpster are drywall and shingles.

Public and provincial recognition of their commitment to responsible waste management has come in spite of the fact that Scotcor does not publicize or advertise their own initiatives in this area.

Program Costs

The Costain's estimate that Scotcor's commitment to environmental responsibility has cost the company little or nothing. They and their staff do expend time and effort spent checking for new applications for salvaged material, or loading up doors or wood scraps to be dropped off to a neighbour who can use them, but they have also saved both hauling time and tipping fees that they would otherwise have been charged at the local landfill if they were sending all of the allowable solid waste there.

Lessons Learned

The key to Scotcor Construction's success in waste management they feel, has been their consistency: they are always learning, always looking for ways to improve, and always on the alert for new products or systems they can incorporate into their projects or offer their clients. They consider these initiatives "money well spent", and are committed to educating their customers in the benefits of environmentally sound alternatives.

Drywall and shingles are still a challenge for this firm. Though these materials are being recycled at other locations in Canada - drywall into new drywall, farmland amendments and compost additives, shingles into asphalt - the local industry in Prince Edward Island may not yet be large enough to sustain initiatives to reclaim these specific resources. Until such programs become available, Scotcor is on the lookout for other ways to redirect these articles away from landfill and towards someone else's positive use.

To other small businesses looking for ways to reduce what they send to landfill, Corinna Costain has this advice: "Look at the discarded material you are throwing away: who could reuse it, recycle it, benefit from it?" Scotcor has set a stellar example of taking the initiative to set up reuse opportunities - rather than waiting for an outside recycling program to be started, staff have picked up the telephone and called to offer others the chance to profit from their used materials and construction scraps. These private. arrangements are the business equivalent of source separation in homes: the least expensive, most effective way to ensure that one industry's waste material directly reaches others who can incorporate and benefit from the input. In addition, says Corinna, "Don't give up - little things and individual projects do add up!"

Photographer: Bernard Caron

Dartmouth General Hospital, Nova Scotia

There is a new spirit of health management at the Dartmouth General Hospital in the Halifax Regional Municipality. This new spirit looks beyond the normal realms of human health and recovery and includes maintaining a healthy environment as part of its overall health management. This spirit has also empowered hospital employees to feel proud of their efforts and has led to some surprising and encouraging results, both socially and economically.

Success

The focal point of the hospital's new spirit began with solid waste. Through careful management, the hospital has managed to take its approximately $25,000 yearly non hazardous solid waste disposal bill and, without any extra cost to the hospital, transform a one-way system of waste, to multiple streams of recovery, at no extra cost to the hospital. Waste is no longer considered waste. It is a resource, with multiple uses and multiple ways it can be reduced, reused, recycled and composted. What is even more surprising when looking back, is the ease in which the new system was put in place.

The Organization

The Dartmouth General Hospital provides routine services to approximately 120,000 people in Dartmouth and surrounding areas. Dartmouth, part of the amalgamated Halifax Regional Municipality, sits across the harbour from the old city of Halifax.

The hospital has 140 beds with services including 24-hour emergency care, inpatient medical and surgical care and critical care. It has a surgery program including general surgery, urology, gynaecology, ear nose and throat, orthopaedics, plastics, oral maxillo-facial, ophthalmology, vascular and dentistry.

The hospital has always been an environmentally conscious facility. As a health facility, its workers have easily adopted environmental health practices, knowing that attention to environmental health is important to overall health management. But one area of environmental health that had been neglected over the years had been in waste management. Solid waste grew over the years, becoming more difficult to control and largely uncoordinated at the Dartmouth General Hospital.

Solid Waste Management Initiatives

In the late 80s and early 90s in Halifax, there was essentially only one stream of non-hazardous solid waste for most institutions, businesses and residences. Virtually all

municipal solid waste was disposed directly in the landfill. But Halifax was in a solid waste crisis. Its landfill was filling up, tipping fees were skyrocketing and the anxiety level was rising. Responding to this in 1995, both the province and the Halifax Regional Municipality announced new rules for solid waste. Recyclable and compostable materials were going to be banned from disposal, forcing residents, businesses and institutions alike to source separate these materials and send them to new markets. What that meant to the Dartmouth General Hospital was that it needed to examine its entire waste stream in order to meet the new rules.

Fortunately, the hospital was no stranger to new developments in solid waste. In the Spring of 1994, after considerable planning, the hospital launched a food recovery program with the Metro Food Bank Society. Later that year, it launched a new program aimed at recovering paper, corrugated cardboard, beverage containers and other containers for recycling.

But the new rules for solid waste moved everything to a much higher level. First, recyclable materials were actually banned from disposal. Secondly, separating all organic materials for composting was almost unheard of in North America.

Team Players

The Dartmouth General Hospital's solid waste resource management program was developed in three main stages:

Spring 1994
implementing the Metro Meals Food Recovery program;

Fall 1994
implementing full paper, bottle and container recycling programs; and

February 1999
implementing the full organic material recovery program.

While the recycling program was developed with few difficulties, it was the organic diversion program that gave the most anxiety. But it was also the prime motivator to make something happen. An in house committee was therefore developed.

The committee was led by E. Jane Pryor, Director of food services for the hospital. Always a team player, Jane knew that she couldn't develop the program on her own. She knew that a program that relied on everyone's participation needed everyone's input. She therefore enlisted the help of support staff from all departments including housekeeping, laboratory, pharmacy, stores, and nurses. Everyone needed to participate.

Planning

The waste management team's plan was to achieve in house source separation of organics in accordance with the schedule of disposal bans. But because solid waste had been largely uncoordinated, they were faced with some challenging questions: How much material is generated? Where is it supposed to go? Who would take the material and how could they actually do it?

Photographer: Barry Friesen

The dishwasher separates all compostables organic material into a separate container

Waste auditing was important. Obviously, they enlisted the help of their waste hauler to find out what kind of waste they were

producing. They also sought answers from the waste hauler for all the unanswered questions. This, however, proved to be frustrating. The waste hauler with whom they had their existing contract for years, wasn't cooperating. He was offering services that didn't fit what the municipality and the province were saying must be done. Despite these inconsistencies, Jane and her team pressed forward.

They gathered data on how much waste they thought they generated and made estimates about how much material would go to each stream. Throughout this time, the compostable organics disposal ban was looming ever closer.

Compostable organics included everything that is compostable in a centralized composting facility – vegetables, meat, fish, bones, non recyclable paper products. Separating these materials brought seven main issues that had to be addressed:

- Containers – what type of containers would be required?
- Odour – would there be an odour issue?
- Sanitation – how to keep all the putrescible organics sanitized?
- Garberators – what about the existing infrastructure?
- Contamination – how to avoid contaminating the organics with non compostable items like plastic and metal?
- Higher costs – what will this do to the hospital's budget?
- Extra workers – how many more workers will be needed?

Separating organics required separate containers throughout the hospital. That was no big deal. Fortunately there were plenty of containers available through local sources to purchase and use.

The garborator issue also turned out to be a non issue. The hospital had originally been outfitted with garborators. Most leftover organics were simply washed into the

garborators and flushed into the sewer. But this wasn't necessarily a good thing. Halifax, even to this day, does not have a sewage treatment plant. That means that anything dumped in the sanitary sewer goes straight into the harbour. But because the hospital's staff was environmentally conscious, the planning team was pleased that they would now be able to divert waste away from the harbour. A composting facility would produce compost for beneficial use.

What was a big deal was that the program meant extra work for the dishwashers. When an extra sorting container was suggested to the full time dishwasher, it was met with immediate disdain. In fact, the dishwasher suggested that, instead of just one dishwasher, three would be needed to do the work. So a trial was completed. On a given day, the dishwasher was asked to separate all compostable organic material into a separate container. His work took twice the time. While better than having to hire two new people, it still wasn't good. But, interestingly enough, when the day came that all organics had to be diverted, he took the same amount of time as he always did. To this day, no extra staff is required.

The issue of contamination proved to be a red herring as well. The dishwasher did such a good job that contamination levels are very low. The composting facilities typically want 5% or less contamination (non-compostable materials) in their feedstock. The hospital has never exceeded that amount and often achieves levels far below that limit.

The biggest issues that remained were odour, sanitation and costs. Because of the inconsistent information from the waste hauler (the hauler had stated to its customers that they didn't need to separate their waste), these issues couldn't be addressed.

But something came along that did address this issue. It came in the form of another waste hauler who had prepared for the waste disposal ban. Green Waste Systems Ltd., a local waste hauler, had invested in a new program aimed specifically at the organic diversion market.

Green Waste offered a "cart swap" program. Customers would receive any number of clean, empty green carts in which they could put all of their organic waste. The carts are collected by Green Waste when they full. Empty, clean carts are left in their place. Green Waste takes the carts to the composting facility, empties and cleans them, only to repeat the cycle. The customer paid a flat rate for the collection of each full green cart. This then, was the missing link for the hospital.

Education and Awareness

It is common knowledge that any program such as this cannot simply survive on its own. Its ultimate success relies on continuing education and awareness. The hospital's solid waste team knew that they needed to inform the entire staff of the requirements for source separation. They looked for all the support they could find in implementing the program and in educating staff on what to do.

There were some things already on the hospital's side. The city had launched its recycling and composting program to all residents. Every household in the municipality were each given a 64 gallon green cart, kitchen container, and educational materials on how to use the system. Thus, every householder, in single-family homes and apartments up to six units, were automatically brought online with the source separation system. The municipal program included fanfare and educational tools. As such, workers were often already educated in the methods for separating recyclable and compostable materials.

Provincially, there were more resources available. RRFB Nova Scotia, an organization created by provincial legislation, was responsible for province wide education and awareness programs related to solid waste resource management. Together, the municipal and provincial programs were a resource that today, helps residences and businesses maintain their programs.

RRFB Nova Scotia had another resource available. One of its programs provides start-up funding for businesses and institutions in implementing new source separation programs. The hospital applied for funding to help purchase new carts and other equipment for its program.

Going Live with Organic Diversion – the Results and the Rewards

The hospital went live with its new organic program in February 1999. Garborators were turned off for the last time. All floors had recycling containers and organic containers. The organic containers were emptied into larger carts for organics, located on the 1st floor. And as was happily discovered, staff diverted organic material for composting with no extra requirement for staff or overtime. The dishwasher, who was

probably the most negative towards the program at the outset, took it upon himself to make sure the program succeeded.

The results are impressive. A look at their numbers from 2001 provides the following results:

Item	Weight Kg	Percentage of Total
Paper	8,520	5
Corrugated cardboard	13,000	8
Newspaper	1,580	1
Mixed paper	5,080	3
Fryer fat	534	0.3
Compostable organics	27,560	17
Food recovery program	2,410	2
Waste (estimated - not actual)	99,050	63
TOTAL	**157,700**	**100**

What ultimately won the support of the hospital's administration was the additional cost – there was no extra cost. Tipping fees at the compost facilities are less than the tipping fees at the landfill. However, haulers charged for their services. It was feared that the Dartmouth General would be faced with extremely high costs as a result of the extra pick ups required. However, this wasn't the case. A check of their waste stream costs actually showed a slight savings when the organics program came on line.

Then came the awards. In 2001, the Dartmouth General Hospital won an RRFB Nova Scotia award as Institution of the Year. Jane is very proud of the award. But she is also very humble, giving credit to others. In fact, she sent the dishwasher to the Awards Ceremony to accept the award. Jane said, "This was probably the biggest thing we ever did and it was staff who made it a success." Jane goes on to say that if the Dartmouth General Hospital can implement this program "any business can do it!".

Food Recovery Program – SIDE BAR

The Metro Food Bank Society Nova Scotia delivers 13,000 kgs of food every week requires at least 40% of its food to be dinners, ready to eat. This is because many of its recipients are school children and residents in women's shelters where nutrition is very important. Canned goods are welcome, but prepared food is also a necessity.

Dianne Swinemar, Executive Director of the Metro Food Bank since 1992, had worked in a soup kitchen for a number of years. She knew first hand that there was a lot of leftover food in the institutional and business community and was determined to find a solution.

She enlisted the help of stakeholders from the following organizations:

- dept of Health – Food safety inspectors;
- hospital food service managers;
- end use agencies – soup kitchen managers;
- food bank staff; and
- a Volunteer Facilitator.

The stakeholders developed a safe protocol to collect and store all leftover food at each institution. The Metro Food Bank simply collects the food in a refrigerated truck once per day and delivers it directly to the agency requiring the food. The Dartmouth General Hospital went live with the program in March 1994 and continues to participate.

Today, the Food Bank receives leftover food from four Metro hospitals. The Dartmouth General Hospital, in 2001, contributed 2,400 kgs of food towards the program. What Dianne finds most pleasing is the reaction of others. Generally, taxpayers hate seeing tax dollars going to waste. So when they learn of the Food Recovery Program, most people are very happy to see their tax dollars going to a worthy cause. "People feel they are now part of the program" says Dianne. And getting people to be part of the program is one more step in being part of the solution.

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Big Problem or Big Opportunity?
Different strategies to recycle or reuse old computer equipment

Addressing the growing amount of used and discarded information technology and telecommunication equipment ("IT waste") in the province and across the country is going to be a major challenge for the coming years.

The problem - and the opportunity - is huge. Between 1992 and 2000, Canadians disposed of enough personal computers and monitors to fill approximately 1,000 Olympic size swimming pools, but only about 10 per cent was recycled or refurbished for reuse.

In 1999, the estimated quantity for disposal of this equipment was about 37,000 tonnes. The amount of computers generated and disposed is expected to almost double over five years, to an estimated 72,000 tonnes in 2005.
There are no easy solutions. IT equipment waste presents a number of processing challenges, including hazardous materials such as lead, cadmium, mercury, brominated flame retardants, and polyvinyl chlorides. Processing of this waste stream also raises labour exploitation and toxic exposure issues, especially when it's exported to developing countries. When dismantling, it's imperative that proper protective gear is worn and safety protocols are in place. In addition, precious metals such as gold and copper need to be recovered properly in order to optimize their values.

Composition of Personal Computer and Monitor

Component	% Composition
Silica/glass	25%
Ferrous metal	20%
Plastics	23%
Aluminum	14%
Copper	7%
Lead	6%
Zinc	2%
Various precious metals*	3%
Total	100%

* Precious metals include nickel, manganese, coblat, barium, tin, silver, antimony, chromium, cadmiun, selenium, mercury, gold and arsenic.

Source: *Electronics Industry Environmental Roadmap, Microelectronics Computer Technology Corporation*.

According to a report prepared by the Canadian Environment Industry Association (CEIA), an estimated five per cent of a computer's original sale value can be regained through the sale of secondary materials, which means computer recycling can be more profitable than automobile recycling. Also, due to the decreased cost of extraction, the precious metals in computers are approximately three times more valuable than metal ore.

"The potential is very large - this is a big business opportunity," says Colin Isaacs, co-author of the report and chair of CEIA.

IT equipment waste presents a number of processing challenges. This waste stream includes hazardous materials such as lead, cadmium, mercury, brominated flame retardants, and polyvinyl chlorides. In addition, precious metals such as gold and copper need to be recovered properly in order to optimize their values.

Lack of specific laws

In Ontario, private companies decide what they will do with their IT waste on an individual basis. Regulation 347 requires a company generating waste for disposal, i.e., anything not recyclable, to obtain a Certificate of Approval (C of A), and to be registered as a generator of waste.

The law contains a definition of recycled materials such as products wholly used at a site, reused with no combustion, or promptly packaged for retail sales. This means those that reuse computers and parts at the retail level are exempt from being waste generators for these products.

Generally, computer waste is regarded as recyclable and would not require a C of A. Activities of electronics recyclers, such as shredding the IT waste material and sending precious metals to a foundry or extracting circuit boards for refineries, are considered recycling.

Keep an eye on ITAC

With the current lack of comprehensive provincial systems, the early bird may once again catch the worm. A recently proposed national IT equipment recycling strategy that may start as soon as this year would significantly alter the way Canadians dispose of computers.

Estimates indicate that by 2007, the program could divert about two million units of IT equipment (just under 50 per cent of total units available), representing 21,939 tonnes of waste. The report, conducted by EnvirosRIS for the Information Technology Association of Canada (ITAC), *The Industry Roadmap - Overview of a National Action Plan for Management of End of Life IT and Telecom Equipment in Canada*, was released in March 2002.

Together with its partner organizations, ITAC represents 1,300 companies in the computing and telecommunications hardware, software, services, and electronic content sectors. This network of companies accounts for more than 70 per cent of the 542,000 jobs, $132.6-billion in revenue, $5.3-billion in R&D expenditure and $44-billion in exports.

ITAC's proposed program will cost a mere $14 million, plus $800,000 for start up. The program would use a "shared responsibility" model, with municipalities and consumers taking operational and financial responsibility for collection of IT and telecom equipment. The program, to be rolled out over a five-year period, would be financed through a front end fee applied to IT equipment sold through

retail outlets. According to David Betts, Vice-President of programs at ITAC, the front end fee would be somewhere in the neighbourhood of $25 for a typical computer.

Critics of this proposed program say that it's an attempt to get municipalities to cover costs that should instead be covered by extended producer responsibility mechanisms, and that the proposed strategy overlooks important issues, such as the collection infrastructure, exact municipal cost requirements, and some environmental issues.

"I have some issues with the proposed ITAC national strategy," says Mr. Isaacs. "Its primary purpose is to raise money with recycling, while it doesn't necessarily take into account environmental considerations, such as hazardous waste."

Provincial programs

Some argue that provincial governments (not just industry or municipalities) could mandate computer and telecom equipment recycling. Albertans have a high average for PC ownership compared to other provinces. Alberta was the first province to launch an initiative to recycle obsolete computers, aiming to recycle 75 per cent of IC&I computer waste by 2005.

Meanwhile Nova Scotia has its own vision for a computer recycling program. Bob Kenney, solid waste resource coordinator with Nova Scotia's Department of Environment and Labour, points out that the province already has an Enviro Depot system (for beverage containers) in place that would be well suited for computer recycling. About 90 per cent of Nova Scotians live within 20 km of one.

Similarly in Manitoba, industry brand owners take responsibility for waste, and Manitoba's Guideline for Household Hazardous Waste will apply to the sale of all consumer electrical and electronic equipment. The province suggests that return-to-retail be considered for the return of electronics waste.

Karen Asp, director of policy and communication with the Recycling Council of British Columbia says, "In B.C. we support a principle of *full* industry responsibility. We already have an established private sector depot system and we'd like to use a model similar to our paint waste stewardship program."

Recently, the Greater Vancouver Regional District Solid Waste Committee, passed motions to support the Federation of Canadian Municipalities' concerns regarding municipal responsibility for collection, and to request that the provincial government develop an industry financed and industry managed program for IT waste.

Ontario

With Ontario's recently passed waste diversion legislation, the *Waste Diversion Act*, some say it's only a matter of time before computer waste becomes a designated waste. (visit: www.stewardshipontario.ca.) Ontario's new Act and the governing body, Waste Diversion Ontario (WDO), requires all companies that introduce packaging and

printed paper into the Ontario consumer marketplace ("Stewards") to share in the funding of 50 per cent of Ontario's municipal Blue Box waste diversion programs. Companies can register with Stewardship Ontario to discharge this obligation, or seek approval from WDO to implement a program to recover their waste products.
But certain Ontario municipalities have already taken matters into their own hands. The City of Barrie offers a service to bring old computers and electronics to the household hazardous depots.

Barrie is also the headquarters of leading electronics recycling company Cable Recycling Inc. (CRI). The company boasts a state-of-the-art recycling and recovery operation - one of the largest in North America - for telecommunications electronics and cable and more recently, office equipment.

Says Alfred Hambsch, president and founder of CRI, "We believe that recycling electronic waste is the responsible alternative."

The company currently serves both the Canadian and U.S. metal manufacturing industries, as well as international communications, power and cable companies.

The CRI system - which can shred all types of circuit boards, chop all cables and dismantle remaining ferrous and non ferrous electronic components - consists of three sorting and chopping lines, a Mosey baler (250 horsepower), a ShredTech shredder (400 hp), and de-reeling areas equipped with hydraulic cablecutters and various shears. A specialized Redomo chopping line is used to process paper covered copper conductors.

Using an "air shaker" table and the sophisticated Hamos Recycling Technix system for electro static separation, equipment granules are separated into clean streams of base materials.
While the system operates at a very high throughput capacity - up to 2 million kilograms (about 4.5 million lbs.) per month - it is mostly automated and only requires two employees per line.

Over 30 classes of materials, including copper, steel, aluminum, plastics, zinc and brass are sorted for various clients into individual bins, bags or boxes.

How other countries compute the challenge

A recent report confirms that industry run electronics programs backed by strong legislative support, are not only less expensive for taxpayers, but also achieve higher recovery rates. *Electronics Recycling: What to Expect from Global Mandates*, a report from U.S. based Raymond Communications, concludes that while most programs for both consumer and commercially generated equipment include visible fees, the government run programs recovered less, versus systems in which the money is provided directly from manufacturers to collection organizations.

The Netherlands recovers the most electronics waste - approximately 60 per cent overall. In the Netherlands, industry and consumers "go Dutch" and share the cost to collect and

process electronics waste in an environmentally responsible way.

The European Union is poised to enact two new waste electronics directives that will require industry financed collection systems for computers and other electronic wastes.

Pilot studies in the U.S. also indicate that collection systems run with retailers are the least expensive. However, according to Michele Raymond, publisher of the report, retailers are the least cooperative and manufacturers do not want to offend the retailers. If U.S. industry does not come up with a viable system soon, a patchwork of government run solutions under the national voluntary agreement (NEPSI) is in the process of being resolved anyway.

Surfing for a solution

As Canada looks to Europe and the U.S. for viable, safe models of various government run and industry run programs, it's interesting to discuss the groundbreaking ideas.

A system that would be economically competitive as well as environmentally aware, backed by legislation and enforced targets with the support of an education campaign to foster cooperation, seems like the best bet.
In the meantime, consumers can check with equipment brand owners for their product take back policies and programs, donate old computers to charitable organizations such as Computers for Schools (visit http://cfs-ope.ic.gc.ca), find out about refurbishing organizations, or ask local computer stores and municipalities about options.

Connie Vitello is editor of *Solid Waste & Recycling* and *Hazardous Materials Management* magazines, based in Toronto, Ontario. Connie can be reached at cvitello@businessinformationgroup.ca.

Our company sees green!
The SAQ, a major stakeholder in the recuperation and recycling of glass

The Société des alcools du Québec has been playing years an important part in the environmental sector for several years. It is essentially in the recuperation and recycling fields that it focuses its interventions, in order to ensure the recuperation, but also the recycling, of the glass containers that it sheds on the market.

Photographer: Danyel Thibeault

The SAQ has been operating in this manner for quite a long time. The company introduced selective collection and gives great importance to this recuperation method. Over 90 million wine and spirit glass bottles (2001-2002) are being sold each year in branches and grocery stores. Without the recuperation and selective collection process, they would normally end up in landfill sites.

The SAQ has been contributing financially for over a decade, to the promotion of recuperation and recycling activities in cities and towns in Quebec. Year after year, it invests several millions of dollars in the environmental sector. These amounts are dedicated almost exclusively to three types of partnership:

- The first one, involving cities, towns and regional county municipalities, consists in implementing recyclable material recuperation and collection systems. Grants of several hundreds thousands of dollars are invested into this sector.

- The second type of partnership involves the glass conditioning and recycling industry that works at finding outlets for this glass. The SAQ dedicates over one million dollars in addition to financially helping the industry through assistance programs that it creates.

- Finally, the last partnership implies cities, non profit making organizations and other entities that help promote recuperation and recycling, or that perform similar projects and activities. The SAQ lends its support to several organizations in their awareness and promotional activities regarding sustainable development. It initiates or takes part in pilot projects dealing with the recuperation and conversion of glass and the company tries to help and the elaboration of realistic and durable solutions in the glass recuperation and recycling problem.

The SAQ has created an assistance program to help recycling plants sort glass according to colors and then forwards it to recycling centers. This assistance will allow the restructuring and development of the recycled glass market.

THE ENVIRONMENTAL POLICY AT THE SAQ

In order to heighten the importance of its commitment to the environment, the SAQ has created the position of environment and social responsibility Vice President, who will be responsible for the environmental policy and its implementation.

This policy is based on a series of specific actions and commitments in five different fields of activity :

- Recuperation and recycling, especially through selective collection, of its alcoholic beverage containers and recuperation of cardboard, paper and plastic packaging, as well as of its office paper.
- Assistance in the development and consolidation of secondary markets for recycled glass.
- Purchase of packaging and paper made from recycled material and that can be recycled again after use.
- Environmental elimination of liquid discharges, i.e. of defective and seized products and disposal of waste materials.
- And finally, awareness of environmental friendliness and to the promotion of recuperation and recycling.

SAQ

The Story of a Salvaging Pioneer
Cascades inc., Recovery Division

Although Cascades was created in 1964, it really began operating as early as the 1950s. Antonio and Bernadette Lemaire, helped by their sons Bernard, Laurent and Alain, ran a salvaging business in the Drummondville area. Known as Drummond Pulp and Fibre, the company salvaged glass, iron, paper, and rags. Already in 1950, a paper press acquired in New Brunswick was being used to compress the sorted paper and cardboard into large bundles that were tied with metal straps. The company had also acquired a grinder and a machine to make cardboard fibre plates in order to sell the fibres as pulp. In 1976, Drummond Pulp and Fibre began concentrating on paper and cardboard salvaging. Récupération Cascades was born.

Things really took off in 1964 when an old paper mill was acquired in Kingsey Falls, a village in the Bois Francs region. That was when Cascades began applying the paper manufacturing techniques using 100% recycled fibres. The company then went through thirty years of uninterrupted growth. It adopted a dynamic investment policy to develop products and manufacturing processes that are less polluting and increase environmental protection measures.

One of the first Canadian paper mills to undertake salvaging, recycling and de-inking of old papers, Cascades now occupies a prime position in this steadily growing niche market. The Cascades company now forms an industrial conglomerate of over 100 companies from North America and Europe. With 12,000 employees and a 2.6 billion dollar turnover in 1999, the group produces and transforms more than 400 value added products. Over two thirds of Cascades' products are made from recycled fibre, including flat cardboard for folding boxes, high-end fine art paper, de-inked pulp, tissue paper, and finally lining and corrugating papers for corrugated cardboard boxes. The company is also involved with plastics, moulded pulp, construction materials and energy.

Its salvaging network includes 11 sorting centres located near the large urban centres of Quebec, Ontario and the United States.

Récupération Cascades' fundamental role is to collect the materials that will supply the group's plants. To meet these needs, a team of experienced buyers is always on the lookout for new sources of materials in order to supply Cascades' plants with the appropriate types of raw materials for the production of their respective products.

All the materials salvaged by the Cascades sorting centres are recycled in the group's North American plants. These plants reuse more than 2.2 million metric tons of waste paper annually. These materials thus find new life in hundreds of products.

With a constant concern for developing new

ways of preserving natural resources, Récupération Cascades devised and implemented salvaging programs tailored to their users, such as:

- BIS and ÉCO-BIS, salvaging programs suitable for all types of businesses, institutions, office buildings, schools, etc.;

- the MOTUS program, used in situations where the confidentiality of papers must be ensured. The collected paper is gathered at a particular site and kept under lock and key in Récupération Cascades boxes or bins. Employees that have been sworn in then pick up the paper and haul it, still under lock and key, to the treatment centre;

- the large scale book pulping service offered to publishing houses, schools, governments, etc.;

- the RIPP program (récupération intégrale du papier dans les papetières). This simple, effective and economical system reduces the removal and disposal costs of paper and cardboard wastes that used to be landfilled;

- the REPI program (récupération efficace du papier dans les imprimeries), an adequate answer to the problems associated with salvaging the overall paper wastes in printing facilities. This program aims to make the printer a partner in the search for cost effective solutions; and

- a series of presses used to compress paper and cardboard into bundles. This service is offered to clients who generate an important amount of paper and aims to reduce the amount of storage space required.

For Cascades, salvage, reuse and recovery constitute an approach that knows no bounds and is perfectly integrated with the reality of each of its business units. As such, it is fully assuming its social responsibility as well as contributing to improving living standards and preserving the resources that will meet the needs of current and future populations.

Cascades

Enviroclub[OM]
The Green Track to Profitability

How can small and medium sized entreprises (SMEs) improve their environmental performance, while engaging in profitable projects? By taking part in the Enviroclub[OM] Program, which helps manufacturers achieve concrete results. Good examples are bicycle manufacturer Cycles Devinci, who his reduced its solvent waste by 80%, saving himself $82,000 per year in the process, and Sani-Terre, which manufactures and operates mobile cleaning equipment for forestry machinery and saves $17,000 per year by reducing its greenhouse gas emissions by almost 60 tonnes. The Enviroclub[OM] Program has helped tens of participating SMEs implement pollution prevention projects that have been every bit as worthwhile.

Established by Canada Economic Development, Environment Canada and the National Research Council of Canada, the Enviroclub[OM] Program is a unique opportunity for Canadian SMEs to improve their performance from a sustainable development perspective. Government partners have made concrete commitments to the program, which is tailored to firms' needs.

Consultants help participating SMEs identify and carry out profitable pollution prevention projects on site. Projects may involve reducing energy or resource consumption, greenhouse gas or toxic substance emissions, or reusing waste on site. SME staff also attend interactive environmental performance workshops given by specialists, where they have the opportunity to meet and talk to other business people. This allows SMEs to improve their environmental profiles, while benefiting from significant economic spinoffs year after year.

Environment Canada | Environnement Canada

For information on Enviroclub[OM], contact Environment Canada at 514-283-4670 or by e-mail at quebec.dpe@ec.gc.ca.

Provigo Inc. Implements a Waste Management Program at its Montreal Head Office

The Company

Provigo Inc., is a subsidiary of Loblaw Companies Limited, and represents the largest retail food distributor in Quebec. The company, combined with its associated and franchised merchants, provides employment for approximately 30,000 men and women. It has built a network comprising nearly 700 stores proudly displaying the Provigo, Maxi, Maxi & Co., Loblaws, L'Intermarché, Axep, Proprio and Atout-Prix banners. Provigo is an important procurement source for its outlets thanks to its many distribution centres located all over the province.

Planning

In the planning and construction of its new head office, which now houses over 1,000 employees in the St-Laurent district, Provigo took the opportunity to introduce a Waste Management Program based on source separation. The main goals of this program, which has been termed *Programme Source,* is to reduce the volume of waste and better control the resources used in the workplace. These objectives were derived from the outlining action principles of Waste Management, the 3Rs.

We began developing the project by defining waste generated by the company's administrative activities in addition to projecting costs and potential revenues. Preliminary planning of our new premises enabled us to integrate spaces in the building to install and implement equipment designed for source separation. The project has, without a doubt, received the formal and unwavering support of the company's executive team.

Means and Implements

Each workstation is equipped with a miniature wastepaper basket attached to a paper recycling bin to encourage source separation. Only used carbon paper and old pencils may be thrown in this basket. Other recyclable substances, such as glass, plastic, metal, and/or organic matter are taken directly by the employee to the integrated source separation centres located in each of the 21 kitchen oasis stationed throughout the building. Paper and cardboard are recovered from all 25 mail rooms where printers, photocopiers and facsimile machines are located.

In the cafeteria, the source separation area is placed near the tray return station (see photo). There are no garbage cans in the dining area nor are there any in the conference rooms. Each employee is responsible for the disposing of the waste he or she generates in the appropriate recycling station.

Prior to being sent to the sorting centre or the composting site, organic and recyclable are assembled in a cold room near the receiving and shipping docks. We've also installed an integrated compactor which is used exclusively to recover fibres. As for other garbage, bins are placed outside the building in 4,2 m^3 containers.

Results

To date, 18 months later, *Programme Source* has performed remarkably well in recovering and beneficiating waste material. The program's success is due, for the most part, to employee participation, but also to the incredible efforts to increase employee awareness, inform and identify centres through various signs in the building. In Nova Scotia, Atlantic Wholesalers, another division of Loblaw Companies Limited, have also integrated source separation centres for waste material into their own installations in response to government legislation enacted in that province. *Programme Source* will continue its progress and thrive within the company.

PROVIGO

Marie-Hélène Michaud, M.Sc., M.Env., Agr.

Diligent Waste Management in Business- Truth or Myth

In September 1998, the Quebec government reiterated its commitment to ensure a significant decrease in the amount of waste that were being landfilled or incinerated by presenting its *Quebec Policy for Waste Management, 1998-2008*.

Government authorities are relying on a direct and substantial contribution on the part of Quebec businesses in order to reach, by 2008, the ambitious objectives it adopted. The regulations outlining businesses' obligations are not yet finalized, but it can be deduced from the *Plan d'action* that much like public institutions and organizations, businesses will be required to:

- assess their current situation with regard to waste management;
- design and implement waste management plans in accordance with government orientations;
- carry out the monitoring and periodic control of management plans;
- report to the government and public authorities the results achieved, as well the efforts required to reach the reduction objectives for landfilled or incinerated waste.

Based on this, business executives can expect to see new requirements and constraints added to the ones they already face on a daily basis in a competitive, market based economy, all of this occurring under the watchful eye of shareholders.

But beyond the restrictive nature of these demands, can businesses find advantages to them? If so, how? There are no easy answers to these questions. Prejudice and false beliefs fuel confusion regarding the process and myths and popular beliefs dominate reality, to prevent a well-informed decision from being made.

The preliminary management audit, a useful exercise? or "Why not tell me what I have to do right now?"

Contrary to popular managerial belief, a rigorous examination of the current waste management situation can be very beneficial to the organization.

The reason for this is that the process involves a review of the needs and operations directly associated with substantial costs such as:

- requirements and terms of waste removal and disposal;
- supply and purchasing needs (input materials, packaging required for shipping and handling, energy, water, hazardous materials, etc.); and
- administrative terms associated with waste management (municipal tax and/or tariff on waste management services, contractual terms, etc.).

From that perspective, although the preliminary management audit makes it possible to compile a precise inventory of the amounts and composition of waste generated by each department or sector, the process, more often than not, allows the identification of resource or energy waste and short term savings opportunities.

Consequently, eventhough the preliminary assessment may seem tedious and constraining at first, it would be a mistake not to give it the attention it deserves, since this is exactly the step where the savings that are identified make it more appealing to carry on with the process.

Staff opposition: "to be taken with a grain of salt"

It is commonly said that employees know they are evaluated based on their productivity (and not on the way they manage the waste they produce) and they therefore have a natural tendency to resist any change to the way waste are managed.

However, staff resistance is often ill known and over estimated. Managers should not forget that outside the business environment, employees are taxpayers who are asked by municipal authorities to sort their waste, notably for

curbside collection. In these circumstances, the real challenge is not to overcome resistance to change, but to implement systems and equipment that are user friendly and simple. Adopting this approach considerably reduces the effort that needs to be simultaneously devoted to an information and awareness campaign.

Useful tools or just more paperwork and time spent in meetings?

A third question needs to be pondered carefully; It concerns the necessity of periodical assessments, meetings and reports, whose usefulness may not be apparent at first.

On this subject, field observations are revealing. In a business setting, when asked about how well reduction, salvaging and management of waste is going, 19 out of every 20 people respond that things are going well. However, if a more rigorous approach is adopted that calls for the use of specific operations and activities, a whole new picture emerges.

In fact, periodic assessments and reports are indispensable. Otherwise, it would be impossible for business managers to assess the progress made in the area of waste management and to demonstrate to government authorities and to the public that their commitment and actions are indeed responsible.

As well, it should be understood that, far from being useless, the formation of a committee with regular meetings in a business environment is the most efficient and dynamic way of quickly achieving significant results. Finally, this process contributes to eliminating any remaining doubts that staff may have regarding management's commitment to waste reduction and waste management.

A questionable myth: "the amount of waste a business produces is a reflection of its financial success

Nowadays, this saying holds less and less truth. In fact, in large organizations, generating substantial amounts of waste and spending hundreds of thousands of dollars to dispose of it, the observed trends indicate a tendency to identify the waste that could permanently be eliminated from the waste stream. In order to do this, suppliers are sometimes asked to take back the packaging that input materials were shipped in. In other instances, needs are reassessed and modifications are made to supplying, handling, warehousing and shipping practices. There are also occurrences of reuse or exchange programs being set up internally between a business's departments or functional groups. And when imagination is put to use, new and sometimes non traditional markets can be found for certain production wastes.

But the emerging trend is seeing the design and organization of ever larger networks where one organization's wastes literally become another's raw materials.

In today's business world, waste elimination is no longer considered the most beneficial option. Proper waste management is becoming a business opportunity like any other, rather than a series of obstacles to productivity.

Simon Lafrance, Waste salvaging, recycling and integrated management specialist RECYC-QUEBEC

RECYC-QUEBEC, a Government corporation: The objectives of the corporation are to promote, develop and foster the reduction, re use, recovery and recycling of containers, packaging materials or products and their valorization with a view to conserving resources. RECYC-QUEBEC proposes innovative and motivating avenues in order to achieve the environmental goals of the *Quebec Policy for Waste Management, 1998-2008*. To that effect, RECYC-QUEBEC has developed a new Program «*ICI on recycle*», which will recognize the efforts and the remarkable results in waste management. For further information on the Program: www.recyc-quebec.gouv.qc.ca (in French only).

A Waste Free Society

You are considering the possibility of recycling part of your business's waste? You should know that in so doing, you could help destitute job seekers find work and reintegrate society. For some twenty years now, not-for-profit organizations (NFPOs) have been active in countering society's bad habit of systematically getting rid of recyclable materials as well as individuals.

No matter where you are in Canada, there is almost surely an NFPO that can offer a salvaging service tailored to the needs of your organization. NFPOs offer quality service at competitive prices. The days of mom and pop's NFPOs, if ever they existed, are over. As in any business, those who last are the ones who adapt, innovate and meet (or better yet anticipate) their clients' needs.

Apparently similar to other businesses, NFPOs have an added a social mission: create jobs for those that no one wants to hire. The physically challenged, drop outs and other marginal members of society will find work in these businesses. Need we remind ourselves that a job is synonymous with social status, a sense of belonging, pride, and integration. Is all of this a little bit too abstract? An example should clear things up.

Pierre suffers from a mild form of mental retardation. In school, he is slow to understand things, always finishes last, and is the target of bad jokes and snowballs. He is directed to "special" classes, on the fringe of "normal" learning. His schooling years end without him obtaining a valid diploma. Nothing for him to be too proud of up to that point. He wants to earn a living like everyone else but the job market will not have him. Isolation and social security are all he has to look forward to. Pierre is restricted but he is also talented. A society worthy of that name must put this talent to good use.

An NFPO hires Pierre. It is a sorting centre where Pierre learns to be a sorter. It is simple work, work he can handle, but he is now a working individual doing something useful for society. Every week he receives his salary and pays income tax. He is part of a team, he is respected, he has friends now and a social life. The company hosts an "open doors" event to celebrate its 15 years of existence. Pierre, as well as his co-workers, explains the workings of the salvaging business to high level executives since he has now become somewhat of an expert on the subject.

A little story that multiplied a thousand fold, contributes to making society better.

The state contributes to the financial well being of these organizations. In truth, the state compensates for the reduced productivity of these individuals, and that is only fair. This compensation allows the NFPO to partake in the economy without being too disadvantaged relative to regular businesses. For the state, it is simply a matter of transforming social security payments into wage subsidies, which is, socially speaking, a much better investment.

We believe that humanitarian and environmental concerns stem from the same humanistic ideal; that the development of salvaging and recycling in Quebec is intricately linked to the development of the network of salvaging NFPOs is not a matter of chance.

For example, there were over 40 community groups dedicated to the development of salvaging in Quebec, in the early 1980s. These groups are responsible for the implementation of curbside collection in most Quebec municipalities. What started out as the battle horse of environmentally concerned idealists, has blossomed into a solidly implemented industry and a driving force of the economy.

SMEs rarely use the services of salvaging organizations. Count on NFPOs to find ways of meeting this challenge.

Richard Lanciault, d. g., RécupérAction Marronniers

The Composting Council of Canada
Composting - The Natural Way to Recycle!

Composting is Nature's way of recycling. Composting decomposes and transforms organic material into a soil-like product called humus (pronounced "hue-mous"). Food scraps, leaves and yard trimmings, paper, wood, manures, and the remains of agricultural crops are excellent organic materials that can be composted.

Composting is an important way to recycle - both at home and at work, where organic material is used and waste is created. It is estimated that about 50 percent of the total waste stream could be composted! Composting not only helps to reduce the amount of waste going to landfills, it produces a valuable soil amendment which can improve the texture and fertility of the soil.

While composting occurs naturally, the process can happen faster with the help of different systems, each designed to manage various types and quantities of organic material.

Backyard, on site, and centralized composting systems are being set up across Canada to recycle our organics. With these systems, each of us has the ability to contribute to waste diversion and the creation of a valuable soil amendment.

By focusing on organics recovery, you can address a significant number of environmental objectives. Diverting organic materials from landfill sites helps to conserve landfill space and to reduce the production of leachate and methane gas (both of which add to the cost and issues associated with operating a landfill). In addition to diverting a large proportion of materials away from landfill disposal, an effective composting program can produce a high quality soil amendment for various end uses.

The Composting Council of Canada is a national non-profit, member driven organization with a charter to advocate and advance composting and compost usage. It serves as the central resource and network for the composting industry in Canada and through its members, contributes to the environmental sustainability of the communities in which they operate.

For more information about composting and how to implement a great organics recovery program, please contact:

The Composting Council of Canada
Le Conseil canadien du compostage
www.compost.org

The Composting Council of Canada
16 Northumberland Street
Toronto, Ontario M6H 1P7
Phone: 416-535-0240
Fax: 416-536-9892
ccc@compost.org
www.compost.org

The Challenge of Mat l Re ery in Public Places

Since March 1, 2001, Publications Métropolitaines has been publishing *Métro*, a French daily newspaper distributed free of charge to more than 100,000 users in Montreal's subway. This causes the production of a large amount of paper on a daily basis. Nonetheless, *Publications Métropolitaines* takes to heart the greening of their operations. They are committed to recovering their product once it has been read.

But to recover a commercial product in a public underground place is not an easy task. In particular, the recovery program planning has to take into account safety and architectural requirements, as well as internal norms.

Courtesy of Publications Métropolitaines

After over six months of work, discussion and meetings, the recovery program was started. In order to satisfy all of the intervening parties, a custom made recycling bin has been devised. The all metal bin has an inclined surface, lockable doors, swing door slots and metal cans inside to collect the newspapers.

The program is currently comprised of 19 such recycling bins. A special run, done every day, assures the collection of the recovered paper, as well as the cleaning (dirt and graffiti) and reparation of the bins. Since some of them are located at the rails' level, the collector has to enter the subway station and use the stairs to reach the recycling bins.

The game is all worth it, as the *Métro's* recovery helps keep Montreal's subways cleaner and reflects the commitment of *Publications Métropolitaines* towards respecting their environment.

Federal Government Waste Management Policies

The Government of Canada is fully committed to the principles of environmental protection and sustainable development. Over the past years, the federal government has demonstrated this commitment by developing and implementing legislation, policies, guidelines, programs and other initiatives that ensure that the environment and sustainable development considerations are built into the operations of all federal government organizations.

Two of the most notable initiatives that the federal government has implemented, with respect to their impact on waste management in the federal government, are the amendments to the *Auditor General Act* (1995) and the *Greening of Government Operations (GGO) Policy* (1995). The following is a description of the amendments to the *Auditor General Act* and the *GGO Policy*, their requirements with respect to waste management in the federal government, and examples of waste management initiatives that have been implemented in the federal government.

Amendments to the Auditor General Act

In 1995, amendments to the *Auditor General Act* created the Commissioner for the Environment and Sustainable Development (Commissioner) within the Office of the Auditor General (OAG) to provide a powerful accountability mechanism. The amendments make tabling of Sustainable Development Strategies (SDSs) in Parliament, every three years, a legislative requirement for the Ministers.

A SDS should outline the department's objectives and targets for integrating sustainable development into its policies, programs, and operations. The Commissioner assesses how well the departments are doing in moving forward on sustainable development by reviewing their progress in meeting their objectives and targets.

Greening of Government Operations Policy

The *GGO Policy* provides guidance to government departments for compliance with the amendments to the *Auditor General Act*. It specifies that each federal department and agency must meet or exceed all applicable environmental statutes and regulations, emulate best practices from the public and private sectors, and develop and implement an Environmental Management System (EMS) that includes an action plan for achieving the SDS objectives and targets.

The *GGO Policy* indicates that the key applicable federal statutes that focus on environmental quality are:

- *Canadian Environmental Protection Act (CEPA)*;
- *Canadian Environmental Assessment Act (CEAA);*
- *Canadian Wildlife Act;*
- *Fisheries Act;* and
- *Transportation of Dangerous Goods Act.*

Of these, the *Canadian Environmental Protection Act (CEPA)*, *Fisheries Act*; and *Transportation of Dangerous Goods Act* are particularly applicable to waste management.

A best practice is a successful practice that has been proven to be effective in reducing the negative environmental impacts of an organization's operations. The *GGO Policy* indicates that each federal department and agency must emulate best practices in seven areas of operation including waste management and that the best practices with respect to waste management are the following:

- realize a 50% waste diversion rate;
- use existing auditing tools and procedures to identify waste reduction opportunities;
- separate waste streams at source to facilitate reuse, recycling, and proper disposal;
- compost organic waste where feasible;
- collect environmentally harmful wastes centrally and store and dispose of them safely; and
- implement a coordinated program to reduce the use of paper by switching to electronically based communication.

Sustainable Development Strategies (SDS) and Environmental Management Systems (EMS) are complementary documents. Most federal government departments use their SDS to describe their environmental objectives, targets, and initiatives in general terms and use their EMS as a "How To" manual.

An EMS is a framework that indicates the specific initiatives that must be implemented in order to achieve the SDS objectives and targets, the resources required and persons responsible for implementing the initiatives, and the procedures for evaluating and documenting the success of the initiatives and for improving the EMS itself. The federal government supports the ISO 14001 standards as a model for the development of an EMS.

Federal Government SDS, EMS, and Waste Management Tools

The federal government has created a number of "tools" to help departments and agencies develop and implement their SDS, EMS, and related environmental initiatives. The following is a list and brief description of the key SDS, EMS, and waste management initiative tools.

Sustainable Development in Government Operations: A Coordinated Approach, 2000

This document proposes best practices, performance measures, and targets for each of the *GGO Policy* areas of operation, including waste management, in order to facilitate a coordinated approach to reducing the government's impact on the environment and to facilitate measuring and reporting on progress across government in these priority areas.

"Choose to Reduce" Guide to Communicating the 3Rs, 1997

The "Choose to Reduce" Guide to communicating the 3Rs was developed by PWGSC in order to facilitate the development and implementation of waste management initiatives within all federal government departments in the National Capital Region. The guide is packaged with a number of related communications tools including an awareness *video cassette*, and electronic and paper graphic and text templates for posters, tent cards, and achievement awards.

National 5 Phases Waste Management Protocol, 1996
PWGSC developed the National 5 Phases Waste Management Protocol to provide federal government departments with a systematic and standardized methodology for conducting non-hazardous solid waste audits. The Protocol includes detailed instructions for completing preliminary evaluations, conducting detailed physical and comparative waste audits, and for developing waste diversion plans. The Protocol is particularly useful for a "first time do-it-yourself" person who wants a complete step-by-step guide.

PROPOSED WASTE MANAGEMENT TARGETS
The "Sustainable Development in Government Operations: A Coordinated Approach" document proposes the following waste management targets:

- by March 31, 2004, divert 70% of solid waste from landfill;
- by March 31, 2004, develop and implement a protocol to use economical alternatives to hazardous materials and/or processes that generate hazardous waste; and
- by March 31, 2001, incorporate solid waste management diversion practices into all construction, renovations, and demolition projects.

Environment Canada has adopted these targets and goals in their SDS.

EMS Self Assessment Guide, 1996
This guide describes the main components of an EMS. It helps the reader identify the elements of an EMS that they already have in place and provides guidance on where to focus attention when developing, implementing, and improving EMS.

Paper Reduction Computer Based Training, 1996
A computer based training program is a computer software that serves as a learning and reference tool. The application of a CBT in an office intranet enables employees to learn at their own pace.

The Paper Reduction CBT helps employees learn how to reduce the amount of paper that they use. It includes tips on how to edit documents on screen, make two sided copies and many other time and paper saving initiatives. The Paper Reduction CBT offers paper saving tips for the most commonly used office software, such as MS Word and Excel, Lotus 1-2-3 and AmiPro, and Corel WordPerfect and Quattro Pro.

A Guide to Green Government, 1995
This guide details what sustainable development means for the way government does business. It provides guidance for federal departments on preparing a sustainable development strategy.

Directions on Greening of Government Operations, 1995
This booklet provides details for federal departments and agencies on the *GGO Policy*, expanding on the guidance related to

operations that is provided in A Guide to Green Government and government approved policy.

Reduce, Reuse, Recycle, Reward, 1994

This clever guide is designed to assist managers recognize employee initiatives and reward environmental stewardship endeavours.

Sample SDS and EMS Waste Management Objectives, Targets, and Initiatives

Government departments have developed a variety of waste management objectives, targets, and initiatives. Some are related to their business lines but most are related to their internal operations.

The following is a sample list of waste management objectives and targets, mostly related to internal operations, that federal government departments and agencies have included in their 2000-2003 SDS and/or EMS.

Waste Diversion Targets

The amount of waste that is diverted from landfill is one of the most common and useful indicators of the success of any waste management program. It is generally accepted that the amount of waste diverted from landfill is calculated by dividing the sum of the weight of waste that is reduced, reused and recycled by the total amount of waste that is produced, or would be produced if it were not reduced.

In 1990, the Canadian Council of Ministers of the Environment (CCME) challenged all government departments to reduce the amount of waste that they send to landfill by 50% by the year 2000, based on a 1988 baseline year. The 2000 date has passed, but the CCME 50% waste diversion target was the first that many government departments adopted and the catalyst that prompted many organizations to act in the area of waste management. Now, many government departments have adopted even higher waste diversion rates.

The following are examples of waste diversion targets that government departments have included in the SDS and EMS.

- Target 2.2.2 of the Human Resources Development Canada SDS indicates that the department is dedicated to reducing the amount of waste that it sends to landfill for disposal by 50% over 1988 baseline levels in its National Headquarters by March 31, 2001 and in all Regions by March 31, 2002.
- Objective 1.12 of the PWGSC SDS indicates that the department will help its client departments in Crown owned Real Property Services facilities achieve and maintain a 60% diversion rate of office solid waste from landfill and incineration by March 31. 2004.

3Rs Initiatives

Many federal government departments have found it useful to list specific waste management initiatives that they will implement in their SDS and EMS. For example:

- the PWGSC SDS indicates that the department will reduce the amount of paper that the department uses for the employee publication "Ensemble" by 50% by June 2001 from average levels in the 1998-2001 planning period; and

- health Canada has committed itself to implement the Zero Waste Program at all of the facilities that it owns and operates by the end of March 2004, where a municipal recycling program is available.

Employee Awareness

Communications is the key to the success of any waste management initiative. Therefore, many departments indicate that they will implement employee awareness and other communications initiatives in their SDS and EMS. For example, the Canadian heritage will distribute, on a regular basis, reminder information and procedures to follow for setting printers to the two sided feature; reminders on reducing, whenever possible, the need for printing on line documents and on reducing the length of reports or the number of copies required.

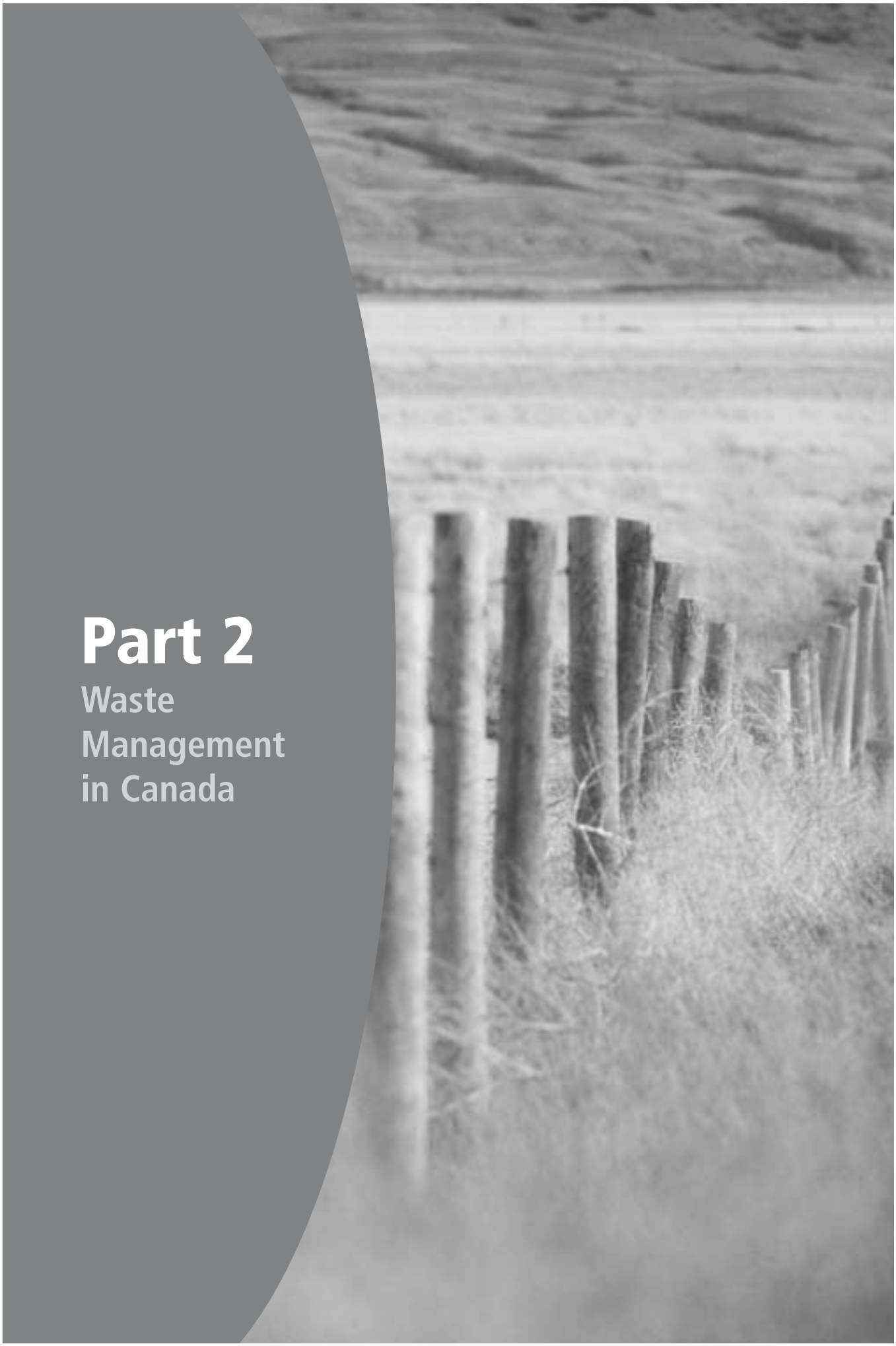
Baseline and Success Measurement

It is necessary to measure the results achieved with any waste management initiative. The first step in measuring results achieved is the measurement of the baseline levels before initiatives are implemented.

Once baseline levels are measured and initiatives are implemented, the results should be measured. These measurements, often called success measurements, not only serve to determine the results achieved, but also to identify further waste management opportunities and how existing initiatives can be improved.

The Department of National Defense is aware of this fact. The DND 2000 SDS indicate that the department will establish baselines and benchmarks for progress in five areas of operation, including solid waste management, so that it can later measure the results of initiatives that it implements.

Many departments have included similar baseline measurements as objectives and targets in their first (1997) SDS. When preparing their 2000 SDS, many of them found that they had to modify their waste diversion and other environmental objectives and targets based upon the results of their baseline and success measurement results. They have learned that it is important not to get discouraged and to be realistic about what can be accomplished with the resources available.



Part 2

Waste Management in Canada

Part 2

This section of the Waste Management Guide has many objectives.

Initially, it is important to dissipate the doubts that entrepreneurs and managers may have and to present them with the overall portrait of the prevailing situation in Canada's waste management sector.

On the other hand, waste management is not an activity that occurs within a closed system. On the contrary, embracing new management practices is impossible without forming partnerships with external resources and without markets for recovered, recycled and reusable materials. Fortunately, over the years, waste management has given birth to new activities and new organizations and businesses with a private, public or community character.

The third section presents the main elements of the vast network of organizations and contributors that constitute the many potential collaborators for SME managers.

Businesses must deal with existing waste collection systems. However, these systems have their own characteristics, which can be specific in some cases, yet and complementary in others. The fourth section paints a general picture of current systems. In this area, business owners will have to get their information from local experts and allow some time for adaptation.

The implementation of waste management within an SME also raises the question of operational feasibility and related difficulties. Despite the wide variety of waste that exists, the task at hand is not insurmountable. Indeed, by relying on the models and classifications provided in section 5, managers can easily develop solutions tailored to their needs.

General State of Affairs in Canada

The per capita amount of waste that most industrialized nations send to landfill, incinerate, or dump in the ocean, including Canada, has increased since the industrial revolution. This is due to an increase in our mobility, leisure time, and buying power and a decrease in unit prices for an ever growing variety of consumer items, including disposable products and products with "built-in obsolescence". This is also due to the fact that many countries and/or jurisdictions within the countries operated low cost landfill sites and incinerators that enabled the public to perceive waste disposal as easy and without consequence.[1]

However, this situation is slowly changing.

In Canada, both governments and industries have made significant progress since the 1980s. Federal, provincial, and some territorial governments have adopted the Canadian Council of Ministers of the Environment (CCME) 50% waste diversion goal and/or developed applicable legislation. Municipal governments have created recycling infrastructures and programs. And many businesses and organizations have used the infrastructures to implement waste management initiatives.

The situation is similar in all developed countries. Waste management legislation is becoming more demanding and various organizations and businesses are implementing 3Rs initiatives.

The following is a description of the situation in Canada and a comparison of the situation in Canada and around the world.

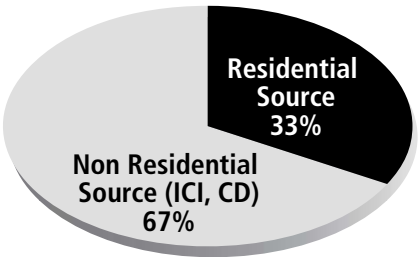
1. Waste Production

Canada is one of the top waste producing nations of the world. A survey from Statistics Canada[2] reveals that in 1998, we produced 29.6 million tonnes of waste originating from municipal, commercial, institutional, industrial and construction, renovation, and demolition (CRD) sectors., Of these materials, 33% were generated from residential sources such as households and 67% from non-residential (figure 1). The average Canadian generated 990 kg of waste/year from which 295 kg is actually reused or recycled (=30% diversion) In comparison, Mexico is the industrialized nation that has the lowest per capita waste production at 300 kg per person per year.[3]

Canadian municipalities produced a total of 21 million tonnes of waste in 1997. This is equivalent to 630 million wheelbarrows full of waste, which are enough wheelbarrows to cover the distance between Charlottetown P.E.I. and Vancouver B.C. 105 times when placed end to end.

1 Société Suisse pour la protection de l'environnement (1988)
2 Statistics Canada (2000)
3 Globe and Mail (October 14, 2000)

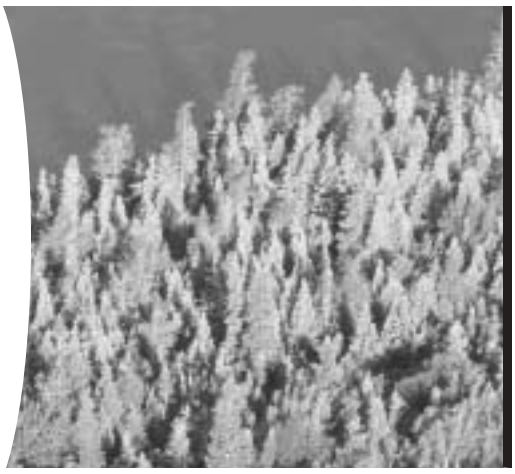
Figure 1:
The sources of the waste produced in Canada



Source: Statistics Canada (2000)

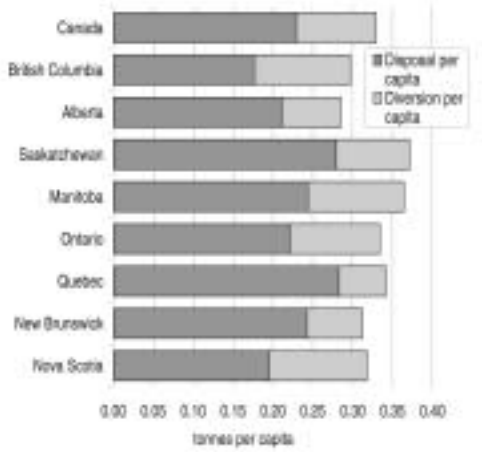
Together, the industrial, commercial, and institutional sectors are responsible for approximately one third of the waste produced in Canada. This includes large and small manufacturers, offices, retail outlets, as well as institutions such as governments, schools, and hospitals. Together, the residential, and CRD sectors account for the other two thirds of the waste we produce in Canada.

In 1998, 53% of non-hazardous waste disposed of came from industrial, commercial and institutional sources. Residential, and construction and demolition sources accounted for 34% and 13% of total non-hazardous waste respectively. The industrial, commercial and institutional sector was the largest source of non-hazardous waste in all provinces (Statistics Canada, 2000).



Details about diversion rates for each province are shown on figure 2. However, it must be noted that this generation and diversion figure should be used with some caution. They are a proxy for total waste generation and diversion in Canada (Statistics Canada, 2000).

Figure 2:
Diversion rates in Canada



Source: Statistics Canada (2000)

In the same year (1998), approximately 604,000 tonnes of hazardous waste were disposed of in Canada. A total of 267,931 tonnes were exported from Canada, and 662,893 tonnes were imported in 1999. The United States was the main trading partner in each case. Quebec and Ontario imported 99% of the total hazardous waste imported in Canada.[4]

Revenues in the business sector of the waste management industry totalled $2.8 billion in 1998. This translates into an 8% growth rate from 1996 levels. Ontario and Quebec are responsible for 67% of those revenues. The waste management industry is concentrated in the hands of a relatively small number of large firms. The 59 largest businesses (50 employees or more) reported 65% of the total revenue although they accounted for

[4] Environics International (2002)

only 4% of the total number of businesses in the industry. Over 20,000 persons were employed by waste management businesses in 1998. This represents a 6% increase from 1996. (Statistics Canada, 2000).

Figures are not available for most developing nations. However, it is known that by the age of only six months, each Canadian will have consumed as much material as the average person in the developing world will consume in his or her lifetime.[5]

Studies indicate that on a small local scale, the composition of the waste produced in Canada and other countries varies according to the industries that are present. However, the figure below indicates that on a larger scale, the composition of the waste that Canada and other industrialized nations produce is fairly similar.

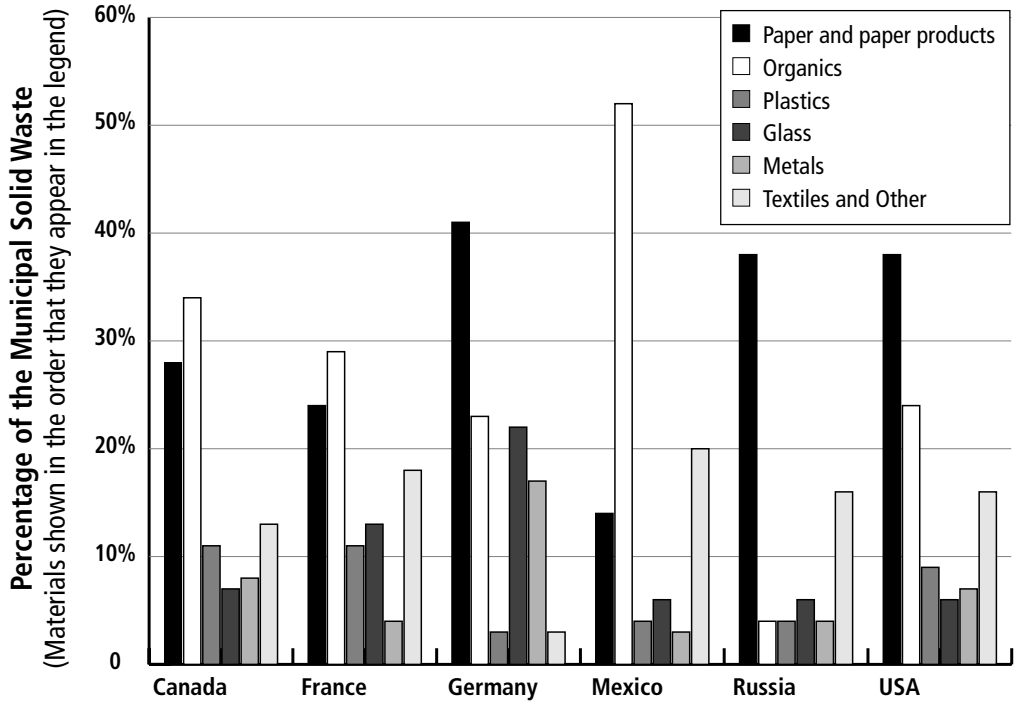
An examination of the figure reveals that for all of the countries shown, except for Russia, paper and organic waste together account for approximately 60% of the waste produced. This indicates that there is a great deal of potential for waste diversion, through recycling and composting in these countries.

Although waste management is considered to be a relatively new environmental issue, waste has been a problem for much longer.

In 1870, waste in England began to surpass landfill capacity and the country started to incinerate, SOCIÉTÉ SUISSE (1988)

In 1896, France started to crush their waste for use as a fertilizer. SOCIÉTÉ SUISSE (1988)

Figure 3:
The composition of the waste produced by various industrialized nations
(Based on EOCD Data for 1997 except for Russia which is based on 1990 data)



[5] www.rco.on.ca/factsheet/fs_f02.html

Waste Management (disposal, diversion programs)

There is global consensus that waste management is one of the most important modern environmental issues. Accordingly, governments in all developed nations have been developing waste management legislation that is more demanding and focused on reduction and diversion and have been implementing a variety of related initiatives. For example:

- in 1987, Germany implemented a deposit system for beverage containers;
- in 1988, the USA Environmental Protection Agency (EPA) recommended that 25% of municipal waste be recycled by the end of a five-year program[6];
- in March 1991, the European Union directed all Union countries to develop waste diversion initiatives;
- in 1992, France responded to the European Union directive by passing a law that provided for the closure of 7,875 landfill sites and required the implementation of waste diversion initiatives including incineration with energy capture[7];
- on April 1st, 2001 Japan passed a new law requiring citizens to pay as much as 7 600 yen ($96) to have their refrigerators, televisions, air conditioners and washing machines collected for recycling. Other countries, such as the Netherlands and Sweden, have introduced similar programs for recycling electrical goods. However, they have chosen to make producers pay[8];
- the United Kingdom developed a Waste Strategy that includes a target 61% recovery rate for packaging waste for 2006, and a consultation paper called the "Recovery and Recycling Targets for Packaging Waste in 2002" and the Producer Responsibility Obligations (Packaging Waste) Regulations to support this strategy[9];
- the State of Rhode Island passed regulations that require virtually all organizations of any size, including businesses, municipalities, schools and non-profit groups, to recycle products such as office paper, newspaper, laser-printer toner cartridges, and corrugated cardboard. These Regulations enable the state to fine organizations up to $1,000 per day for non-compliance[10]; and
- in many countries, such as Canada and Germany, the plastics industry marks their products to facilitate proper material sorting.

Federal, provincial, territorial, and municipal governments in Canada have also implemented a multitude of waste management initiatives. These include:[11]

- the development of a variety of waste management regulations;
- the closure of landfill sites and landfill bans for various materials;
- investments in central recycling and composting facilities;
- the implementation of source separation programs;
- curbside collection for the residential and small business sectors;
- variations on the blue box such as central depots for hazardous materials;
- redemption programs for beverage containers that include deposits and refunds;
- stewardship programs for products such as tires, used oil, and other hazardous products; and
- the use of economic tools such as levies, incentives, and funding.

Results Achieved

The results achieved with these global and Canadian initiatives are generally very good.

For example, in Canada:

6 Mother Earth News (Jan 2001)
7 Vaisman, Sylvia (1998)
8 The Economist (US) (April 7, 2001)
9 Energy & Environmental Management (Nov-Dec 2001)
10 Providence Business News (Oct 1, 2001)
11 For a more detailed list of provincial and territorial initiatives, see section 2 of this part.

- the P.E.I. Waste Watch program has enabled the residential, and industrial, commercial, and institutional sectors in the province to divert from landfill 65% of the waste they produce;
- the NS Used Tire Management program has enabled the province to recycle 3 million tires;
- Ontario's Blue Box program, which now provides 90% of the provinces households with access to curbside recycling, diverted 658 000 tonnes of waste in 1999[12];
- the western Canada Used Oil Materials Recycling Programs recovered 8.57 million oil filters in 2000. This is equivalent to 80% of the filters available for recycling; and
- in the NWT, the Inuvik Recycling Society clear bag program has diverted almost 184,000 items from landfill within the first seven months of operation.

Positive results have been achieved in many other nations as well. For example, the waste diversion rate achieved in the USA has increased from 6.3% in 1960 to 27% in 1995 with a slow increase since then with 28% diversion in 1999.[13] In England and Wales, the amount of waste recovered by composting, recycling, and incineration for energy generation rose by 12% (5.5 million tones) between April 1999 and March 2000.[14]

On the other hand, in developing countries, there are towns and cities, such as Manilla in the Phillipines and Caracas in Venezuela, that have no waste disposal systems. Waste in these cities/countries is simply placed in the streets or behind the houses that produce the waste. Children can often be seen scrounging through waste in wealthy neighbourhoods to find "valuable resources" such as food and fabric, glass, metals, and other materials that they resell to artisans that transform them into new objects. A lack of public funding and political will are the main barriers to waste management in these countries.[15]

The implementation of public outreach and education initiatives is the key to most of the successful waste management programs. Other factors that have contributed to the successful development and operation of waste management initiatives include the difficulty in locating new landfill sites, increased waste disposal costs, high density service territories, and government and community commitment.

However, much remains to be done with respect to waste management in Canada and in other industrialized nations. For example:

- waste management programs in Newfoundland and the territories are only in their infancy;
- the recovery rates for certain materials are very low such as the recovery rate for automotive oil containers in Alberta which is only at 7%; and
- waste management regulations are not always enforced such as in Rhode Island in the USA where most businesses do not recycle despite the fact that state regulations require virtually all organizations of any size, including businesses, to recycle a variety of materials and can impose a fine of up to $1,000 per day for non-compliance.[16]

The major obstacles in developed countries are low public participation and awareness and a lack of full cost accounting. Other obstacles include small population densities, a lack of infrastructure, distance from processing centres and end markets, and a lack of perceived necessity.

[12] Eco-Log Week (Sept. 24, 2001)
[13] www.epa.gov
[14] Mother Earth News (Jan 2001)
[15] Vaisman (1998)
[16] Colias (2001)

2. Waste Management Action Plan and Policies Across Canada

In Canada, the responsibility for managing waste is shared between the federal, provincial/ territorial, and municipal/regional governments.

Municipal/regional governments are primarily responsible for the collection and disposal of residential waste, and for the management of facilities such as landfill sites and incinerators. In many cases, municipalities/regions also collect waste from small businesses and institutions; but mostly, businesses are responsible for contracting private companies to collect and dispose of their waste.

The provincial/territorial governments are primarily responsible for developing waste diversion regulations and policies that enable them to implement related programs in coordination with the municipalities/regions within their jurisdiction. When the provincial/ territorial governments share the responsibility for implementing waste diversion initiatives with the municipal/ regional governments, the provincial/ territorial governments usually provide the municipal/regional governments with the required financial and technical support.

The federal government is primarily responsible for the regulation of the interprovincial and international movement of waste, including hazardous and non-hazardous wastes. However, the federal government is also responsible for regulating hazardous wastes produced by various industries, diverting the waste that it produces, and supporting the provinces/territories by conducting research, educating the public, and coordinating various activities.

The following is an overview of the acts, regulations, policies, guidelines, and programs that relate directly and indirectly to waste management, which the federal and provincial/territorial governments have developed, implemented, and/or administered. Although the provision of a detailed list of the waste diversion initiatives that Canadian municipal/regional governments have implemented is beyond the scope of this booklet, examples have been included where appropriate.

A review of the sections that pertain to the federal regulations, policies, and programs, reveals that:

- there is a growing international consensus that individual nations and political subunits should strive for 'self-sufficiency' in the management of waste generated by individuals, businesses and governments within such political entities;
- there is an emphasis at the federal level on the management of hazardous waste and the protection of physical areas that are not protected by the legislation of individual provinces/territories; and
- the federal government is committed to being a leader in the field of waste management and is demonstrating this commitment through the implementation of various waste management policies and programs.

2.1 Inter-Provincial and International Movement of Waste

In Canada, legislation regarding the management and disposal of waste is controlled primarily by the provinces and territories. However, there are a number of federal acts and regulations that address the inter-provincial and international movement of waste directly and indirectly. They include the Canadian Environmental Protection Act, Export And Import Of Hazardous Wastes Regulations, PCB Waste Export Regulations, Export Control List Notification Regulations, Transportation of Dangerous Goods Act, Ocean Dumping Regulations, and Fisheries Act. The following is a brief description of these acts and regulations.

CEPA, 1999
"An Act respecting pollution prevention and the protection of the environment and human health in order to contribute to sustainable development."

Canadian Environmental Protection Act, 1999

The Canadian Environmental Protection Act (CEPA) is the most extensive single piece of federal environmental legislation. It provides individuals with many protections and addresses numerous environmental issues. For example CEPA:

- provides "whistleblower protection" by prohibiting the disclosure of the identity of individuals who report CEPA offences;
- enables Canadian residents of at least 18 years of age to request an investigation of an alleged offence;
- provides authority to assess the toxicity of substances and manage toxic substances; and
- ensures that federal government operations and land, including aboriginal land, are subject to the same types of environmental regulations as entities regulated by the provinces (Part 9).

CEPA also addresses the issue of waste management, including hazardous waste, hazardous recyclable material, and prescribed non-hazardous waste. Specifically, Part 7, "Controlling Pollution and Managing Wastes" (CEPA Guide, Sections 116 to 192) does the following:

- provides authority to establish a permit system for the import, export and transit of hazardous wastes, hazardous recyclable materials, and prescribed non-hazardous wastes destined for final disposal (Sections 185 - 192);
- requires that details about proposed imports, exports and transits must be published in the Canada Gazette, the Environmental Registry, or in any other manner that the Minister considers appropriate; and
- provides authority to require exporters to prepare and implement reduction/phase-out plans for hazardous wastes that are shipped abroad for final disposal, (Section 188) and to include in these plans the benefits of using the nearest appropriate disposal facility, even if such a facility is located across a border (Section 191).

Part 7 of CEPA allows Canada to meet its commitments under the Canada-US Agreement Concerning the Transboundary Movement of Hazardous Waste, the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal, and the OECD Council Decision C(92)39 concerning the transfrontier movement of waste destined for recovery operations.

CEPA Schedule 3, indicates the substances for which export is controlled including prohibited substances, substances that are subject to notification or consent, restricted substances, and toxic substances. Schedule 5 provides a list of waste or other matter for which an ocean disposal permit can be sought. And Schedule 6 provides the waste assessment framework taken from the 1996 Protocol to the London Convention on Ocean Dumping.

Export and Import of Hazardous Wastes Regulations, 1992

The *Export and Import of Hazardous Wastes Regulations*, made pursuant to the *Canadian Environmental Protection Act*, specifically address the transboundary movements of hazardous waste and hazardous recyclable materials. The Regulations include requirements for:

- prior notification and consent of import and transit;
- the existence of contracts between importers and exporters;
- insurance for Canadian importers and exporters and their carriers; and
- tracking of the movement from its point of origin to its final destination through the use of manifests and certificates of recycling/disposal.

PCB Waste Export Regulations, 1996

The *PCB Waste Export Regulations* are an enhancement of controls for PBC waste under the *Export and Import of Hazardous Wastes Regulations.* Specifically, the *Regulations* require the following for PCB liquids, solids, mixtures, equipment, and PCB contaminated solid or electrical equipment, as well as packaging that held any of these materials:

- consent from U.S. authorities;
- exports only to facilities authorized to thermally or chemically destroy PCB wastes;
- transport by authorized carriers;
- liability insurance of $5 million in case of release of PCB wastes into the environment during export; and
- making alternative arrangements where the PCB waste cannot be received or disposed of as intended.

Export Control List Notification Regulations, SOR/20000-108

The *Export Control List Notification Regulations,* which replace the *Toxic Substances Export Notification Regulations* (TSEN Regulations, SOR/92-634), require exporters to provide notice to the Minister of Environment, of the proposed exports of substances on the Export Control List, in Schedule 3 of the *Canadian Environmental Protection Act*, 1999 and to submit annual reports.

Transportation of Dangerous Goods Act, 1992

The *Transportation of Dangerous Goods Act* regulates the handling and provision of dangerous goods for transport. The Act outlines strict safety measures, including requirements for specific documentation and emergency response plans. It also requires the reporting of releases of dangerous goods and implementation of emergency measures to minimize danger to the public in the case of release (Directions p. 10).

Ocean Dumping Regulations, 1985

The *Ocean Dumping Regulations* limit ocean dumping to the disposal of non-hazardous waste, where it is the environmentally preferable and practical option. The only wastes or other matter that can be considered for an ocean dumping permit under the Regulations are the following:

- dredged sediment;
- fish wastes;
- ships and platforms;
- uncontaminated organic waste of natural origin;
- inert inorganic geologic matter; and
- bulky items such as steel, iron and concrete.

Canada-US Agreement Concerning the Transboundary Movement of Hazardous Waste, 1986

The Agreement permits the export, import, and transit of hazardous waste across the Canada USA border in order to facilitate treatment, storage, or disposal at the nearest appropriate facility.

Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal, 1989 and OECD Council Decision C(92)39, 1992

Together, the Basel Convention and OECD Decision ban the export of hazardous wastes from OECD

countries, the European Union, and Liechtenstein to non-OECD countries, including materials that are bound for recycling except for non-OECD countries that have provided plans for the proper disposal to the Secretariat of the Basel Convention.

Protocol to the London Convention on Ocean Dumping, 1996

The protocol bans the dumping and incineration of industrial waste at sea, including radioactive waste.

Ocean disposal permits are required for all Canadian ships and foreign ships in Canadian waters, aircraft, platforms and other artificial structures.

Fisheries Act, 1985

The *Fisheries Act* prohibits the deposit of harmful substances into waters where fish are found, and prohibits activities which damage fish habitat, unless authorized through regulation. The Act is of particular relevance to businesses operating in coastal regions.

2.2 Provincial Waste Management Action Plan and Policies

A closer examination of the situation from coast to coast reveals that some provinces are more "advanced" with the respect to the implementation of waste management initiatives than other provinces, and than the territories. Factors that contribute to this discrepancy include differences in population densities, provincial/territorial funding capacity, landfill space availability, and access to waste diversion infrastructures.

However, an examination of the information contained in the following sections also reveals that there is a continuous increase in the understanding of the importance of waste management initiatives. It is expected that all those concerned, the various levels of government, organizations, and businesses, will continue to work towards better results.

2.2.1 Newfoundland

The province of Newfoundland and Labrador is making great strides with respect to waste management. Since 1997, the Multi-Material Stewardship Board has been operating the Beverage Container Deposit Refund System, and implementing many related initiatives. In 2001, the province appointed a Waste Management Advisory Committee to meet with the public in order to propose a province wide waste management strategy, and presented a draft *Environmental Protection Act* to the House of Assembly.

The following is a description of the draft *Environmental Protection Act*, the proposed Waste Strategy, the Multi Material Stewardship Board, and the Beverage Container Deposit Refund System. The following is also a brief description of the Conservation Corps Newfoundland and Labrador and the Newfoundland and Labrador Environmental Awards Program.

Other regulations, which are relevant to waste management in the province, include the Environment Act, Waste Management Act, Waste Material Disposals Act, and Environmental Assessment Act.

Waste Management Legislation and Policies

Environmental Protection Act, SNL 2002 cE-14.2 http://www.gov.nf.ca/hoa/statutes/e14-2.htm

The Environmental Protection Act (EPA) revises and consolidates the five following existing acts:

- the Environment Act, which is an all encompassing environmental protection Act;
- the Waste Management Act; which gives the Minister expanded powers with respect to waste management, and allows the minister to designate materials for management and impose fees and levies for designated waste;
- the Waste Materials Disposal Act; which addresses the storage, handling, processing, and treatment of all forms of waste including hazardous waste;
- the Pesticides Control Act; and
- the Environmental Assessment Act.

The EPA is based on the precautionary principle and the principles of human health protection, pollution prevention, sustainable development, stewardship, stakeholder involvement, and polluter pays. The EPA :

- is binding on the Crown;
- increase the authority of inspectors;

- introduce a new fine structure for environmental offences with separate fine levels for individuals and corporations; and
- provide "whistle-blower protection" which will prohibit employers from disciplining or threatening an employee who reports an action that may be in contravention of the Acts.

PRECAUTIONARY APPROACH
Where there is a threat of serious or irreversible damage to the environment, lack of full scientific knowledge about environmental protection measures will not deter reasonable actions to protect the environment.

STEWARDSHIP
The EPA strives to ensure product stewardship, whereby those who produce and market a product are required to take steps to minimize the product's environmental impact throughout its life cycle.

POLLUTION PREVENTION
The EPA empowers the Minister to specify a minimum content of recyclable materials in product manufacture and designate materials which are to be reduced, composted, recycled or banned.

Sections 13 to 21 of the EPA address waste management specifically. They:

- generally prohibit the release of waste unless it is handled as part of an approved waste management system;
- ban certain toxic materials, limit packaging and designate waste for recycling or composting;
- facilitate a new comprehensive waste management strategy for the Province; and
- continue the Multi-Materials Stewardship Board to oversee the operation of the deposit-refund program for beverage containers and enable the Minister to approve additional waste management programs for the Board.

The EPA also creates new provisions for handling dangerous goods, waste dangerous goods and deals with contaminated sites.

The 2002 Newfoundland and Labrador Waste Management Strategy [1]

In March 2001 the government of Newfoundland announced its intention to develop a formal waste management strategy for the province. As part of this initiative, the government created a Waste Management Advisory Committee and asked the Committee to hold consultations with individuals, communities, and other interested parties, and to develop a proposed waste strategy. The results of these consultations revealed that:

- people in the province want modern waste management and to be able to recycle more types of materials and that these services must be affordable for households and communities;
- community leaders want continued political support for waste management; and
- the public must understand the importance of progressive waste management.

A CALL TO ACTION ON ENVIRONMENTAL PROTECTION

Increasing the kinds of materials that can be recycled was the most frequent suggestion for improving waste management.

The results of the consultations is a document called 'A Call to Action On Environmental Protection' which includes the following recommendations:

[1] Available at www.gov.nf.ca/env/Env/PollPrev/WasteManagementStrategy_apr2002.pdf

- Government should initiate a public awareness program on waste management;
- the MMSB should initiate stewardship programs for cardboard and newsprint;
- Government should continue to encourage communities to develop and implement regional waste management systems. These systems should include provisions for hazardous waste;
- in isolated areas, emphasis should be on improving existing disposal sites and enhancing opportunities for diversion;
- Government should consider means of encouraging entrepreneurs and innovators to investigate value added products as well as the viability of a central diverted waste marketing agency/waste exchange;
- composting should be encouraged through information and demonstration projects at different community and commercial scales;
- Government should aggressively pursue industry stewardship agreements;
- Government should initiate a study to determine the sources, volume and types of packaging coming into the province;
- Green Depots should continue to be an integral part of the waste management system; and
- Government should work with various organizations to ensure that training, research, and development programs are available to support business and professional opportunities associated with the modernization of waste management in this province.

In April 2002 the Provincial Waste Management Strategy is premised in five primary actions:

Those actions are:

1: Increasing waste diversion
2: Establishing waste management regions
3: Developing modern standards and technology
4: Maximizing the economic and employment opportunities
5: Maximizing the public education.

Beverage Container Control Regulations and Deposit Refund System, 1997

The *Beverage Container Deposit Refund Regulations* and Deposit/Refund System, which were developed and implemented to reduce the amount of waste going into landfill sites throughout the province, have surpassed a 60% recovery rate for alcoholic and non-alcoholic beverage bottles.

Currently, there are 37 Green Depots, 26 satellite sites, and five mobile units throughout the province; and 14 collection programs in coastal Labrador. Since its inception, the program has created 90 full-time and 145 part-time positions, and diverted more than 400 million beverage containers.

Money collected through the deposit/refund system is used for depot operator handling fees, transportation, processing costs, and program administration.

Container	Deposit	Refund
Non-Alcoholic	$0.08	$0.05
Alcoholic	$0.20	$0.10

MMSB SCHOOL RECYCLING CONTEST

During the 2000-2001 school year, participating schools recycled 5,678,263 beverage containers and earned $475,354 through their recycling refunds and matching funds. Based on the success of last years contest, MMSB anticipates paying $350,000 in matching refunds to schools this year.

Since the MMSB started the school recycling contest in January 1999, a total of 28 computers have been awarded to schools.

Waste Management Programs, Organizations, and Tools

Multi-Material Stewardship Board, 1997

The Multi Material Stewardship Board (MMSB), which was established in 1997, is a Crown agency of the Department of Environment. The MMSB's mandate is to develop, implement, and manage a variety of waste diversion initiatives in the province.

The MMSB is currently responsible for the Beverage Container Recycling Program, a pilot Household Hazardous Waste Collection Program and the administration of the Newfoundland and Labrador Waste Management Trust Fund.

The MMSB has achieved many successes. These include the following.

- The operation of the beverage container deposit/refund program Green Depots.
- The provision of funds and plastic recycling bins, bags, and promotional assitance to enable Green Depot operators to establish recycling programs at festivals and events throughout the province.
- The implementation of the annual school recycling contest that enables children from kindergarden to grade 12 levels to raise funds and win a computer by collecting and redeeming beverage containers.
- The development of the Green Biz Kids program that enables children to set up a system to collect recyclable beverage containers from their friends, family, and neighbours and return them to local Green Depots to collect the refund.

The MMSB has many plans for the future. They include the potential development of province-wide waste diversion programs for scrap tires and for paper, magazines, and newspaper.

Conservation Corps Newfoundland and Labrador

The Conservation Corps Newfoundland and Labrador is a charitable, non-profit agency with a mandate to provide young people with meaningful work, training, and educational opportunities in the areas of environmental and cultural heritage conservation and enhancement.

The flagship of the Conservation Corps is the Green Team Program comprised of groups of young people aged 16 to 27 who work on an environmental or cultural heritage project in their community during the summer months. Projects include recycling, water quality testing, site remediation, and natural resource management. Other significant programs of the Corps are: the Climate Change Action: The Job Begins at Home program (Home Environmental Audits), the Environmental Leadership Program (Environmental Internships in Costa Rica) and the Alumni and Volunteer Program (year-round special events including public environmental education).

Newfoundland and Labrador Environmental Awards Program

The Newfoundland and Labrador Environmental Awards Program was established in partnership with the Newfoundland and Labrador Women's Institutes and the Department of Environment to create public awareness for the pro active environmental actions being taken by Newfoundlanders and Labradorians. The Department and Women's Institutes wanted to celebrate our environmental heroes. The object is to demonstrate the contributions people are making to create a healthier environment and through their efforts encourage others to do the same.

The Newfoundland and Labrador Environmental Awards Program presents awards on an annual basis to individuals, schools, community organizations, and businesses.

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2.2.2 Prince-Edward Island

Prince Edward Island (PEI) is proud of its environmental accomplishments. PEI has the highest return rates in all of Canada for soft drink and beer containers (98 percent each); in August 1992, PEI became the first province to regulate the proper handling of used motor oil; and in June 2001, it became the first province to regulate the proper installation and regular replacement of home heating oil tanks.

Many of the regulations that have enabled the province to achieve these successes have been developed under the *Environmental Protection Act*. However, the province also uses the *Automobile Junkyards Act*, *Unsightly Property Act*, and the PEI Environmental Innovation Strategy to address waste management on the Island. The following is a description of these acts, the Strategy, and the regulations that apply to waste management under the EPA. The following is also a description of the Island Waste Management Corporation that provides waste management services to residences and businesses on the Island.

Other programs that are directly and indirectly related to waste management in the province are the Young Environmentalist Program and the PEI Environmental Awards.

Waste Management Legislation and Policies

Environmental Protection Act and Regulations, updated 2002

The *Environmental Protection Act* and the *Regulations* under the *Act* address many environmental issues including air quality, sewage disposal, excavation pits, water quality certification/water wells, lead acid batteries, ozone depleting substances, petroleum storage tanks, and sand removal from beaches. There are also Regulations under the Act that address waste management. They are the following:

- the Petroleum Storage Tanks Regulations, updated in 2001, require all above and underground storage tanks of specified capacity be registered with the province and be labeled or tagged to indicate the registration. The Regulations outline construction and installation standards for new tanks, including the containment, drainage, and ventilation systems; license requirements for tank installers, and the tank operation and leakage reporting procedures. They also outline the requirements for the upgrade and/or removal and disposal of old and/or non-compliant storage tanks;
- the 2000 Waste Resource Management Regulations outline the permit and operating requirements for landfills, composting and recycling operations, and construction and demolition debris disposal sites;
- the Litter Control Regulations, last updated in 1999, specify that all flavoured and carbonated soft drinks and beer must be sold in refillable containers and that all wine and liquor must be sold in recyclable containers. These containers are subject to deposits and

refunds. The Regulations also indicate that all beverage labels must indicate the refillability or recyclability of the container;

- the 1994 Ozone Depleting Substances Regulations indicate that only licenced handlers can remove ozone depleting substances (ODS) from refrigeration, fire extinguishing, and similar equipment discarded in the province. They indicate how the ODS must be stored and that all transfers of these materials be recorded and reported to provincial environment officials;
- the 1993 Lead Acid Battery Regulations indicate that it is illegal to dump, bury, or incinerate lead acid batteries in the province. Consumers pay a deposit upon purchase and obtain a partial refund when they return the used battery to a licensed handler. The difference between the deposit and refund is used to pay for the collection, transportation, and treatment of the used batteries; and
- the 1992 Used Oil Handling Regulations describe the disposal restrictions for used and contaminated oil. The Regulations indicate that all sellers of oil must provide a return service for used oil or enter into a contract with a return service provider that is within five kilometers of the seller. The operator of the return facility must accept used oils in specified quantities without charge to the client during normal business hours, in compliance with the Petroleum Storage Tanks Regulations (EC187/90) and the National Fire Code of Canada, and keep records of the transactions.

Automobile Junkyards Act, 1974

The *Automobile Junkyard Act* provides guidelines for the location and operation of automobile and automobile part disposal sites in the province, including the permit and fee requirements.

The *Act* provides the location restrictions for junkyards including minimal distances from facilities such as residences, beaches, cemeteries, hospitals, and schools. It indicates that every automobile junkyard and its contents must be entirely screened from view from these facilities by natural objects such as hedges and trees or by a fence that is at least seven feet high.

The *Act* also indicates that junkyards will be inspected for leaking automotive fluids, including oils, coolants, and acids from lead acid batteries.

Unsightly Property Act, 1988

The *Unsightly Premises Act* provides the province with a tool to ensure that all properties in the province are maintained according to the standards of the community in which the properties are located. The *Act* provides inspectors with the powers to issue clean-up orders for properties that do not meet community standards, outlines the offences, penalties, and exemptions under the *Act*, and provides the forms for the issuance of the clean up order.

A clean up order can include requirements for the demolition of dilapidated buildings, structures or parts thereof, or to remove any litter causing or contributing to the unsightliness of the property; or to build a structure to prevent the property from being viewed. Fines can be levied for property owners who fail to comply with the specifics of a clean up order within a reasonable amount of time.

Waste Management Programs, Organizations, and Tools

Waste Watch™ is an innovative locally developed system that enables the residential and industrial, commercial, and institutional (IC&I) sectors in the province to divert from disposal sites 65% of the waste that they produce. Specifically, the system enables residents, businesses, and industries to separate their waste at source into recyclables, compostable organics, and waste.

The program is based on the beliefs that:

- each person is responsible for the management of his/her waste;
- most materials called “garbage” are actually “resources”;

- source separation is the least expensive and most precise option for managing and separating waste; and
- current generations are responsible for the state of the environment that is left to future generations.

Developed in 1994, Waste Watch™ was administered by a commission until a provincial crown corporation, called the Island Waste Management Corporation (IWMC) was formed in June 1999. (see below).

The Pollution Prevention Division in the PEI Department of Fisheries, Aquaculture, and Environment is responsible for the Waste Resource Management Regulations, under which the Waste Watch system operates. The Department is also mandated to promote the system in other jurisdictions

Island Waste Management Corporation (IWMC), 1999
Island Waste Management Corporation (IWMC) is the provincial Crown Corporation that administers and provides solid waste management services throughout Prince Edward Island. IWMC's mandate is to deliver a cost effective and environmentally responsible provincial waste management system to both the residential and commercial sectors of PEI.

IWMC operates and maintains most provincial disposal sites, including the East Prince Waste Management Facility (EPWMF) and the Queens County Regional Landfill; and is responsible for the Waste Watch™ program (see above).

PEI Environmental Innovation Strategy
The PEI Environmental Innovation Strategy offers seed funding for projects that contribute to innovation in the environment industry sector or contribute to pollution prevention in Prince Edward Island. Funds are provided on a matched 50/50 basis to a maximum of $3,000 and are disbursed upon receipt of an acceptable final project proposal.

As of October 2001, Island Waste Management Corporation has made the first component of Waste WatchTM - blue bag recycling - available to 100% of PEI households

In 2002, Island Waste Management Corporation will expand the Waste WatchTM composting program, which was available only to the East Prince and Cambridge areas of the province, to all areas of the province.

Seed funding is only available for start up costs for projects that will have an on going benefit to environmental innovation or pollution prevention in Prince Edward Island. Funding is normally used to purchase equipment or materials, undertake research, or advertise in the media. It is not given to finance wages for project staff.

In the past, the PEI Environmental Innovation Strategy has funded projects to make plastic lumber and other building materials from post consumer recycled waste plastic.

Principle Contact Information

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E-mail: reception@iwmc.pe.ca
Internet: www.iwmc.pe.ca

PEI Environmental Business Directory
Internet: http://www.gov.pe.ca/photos/original/directory.pdf

PEI Environmental Innovation Strategy
Internet: www.gov.pe.ca/forms/pdf/61.pdf

Island Regulatory and Appeals Commission
Internet: www.irac.pe.ca/legislation

2.2.3 New Brunswick

In 1987, New Brunswick adopted a Solid Waste Management Plan that placed priority on environmental protection through the management of landfill sites, and initiated the establishment of Regional Solid Waste Commissions. The implementation of the Plan enabled the province to:

- close environmentally unacceptable dumps;
- open a sophisticated new system of sanitary landfills;
- create the Beverage Containers Act and Regulations which enabled the development of one of the best beverage container return programs in North America;
- establish the Tire Stewardship Regulation; and
- make a good start in the area of recycling.

As of 2000, New Brunswick achieved a 40% per capita reduction in waste sent to landfill through private sector and voluntary efforts in communities across the Province, and some ground-breaking environmental legislation.

The province is now focusing on waste reduction, reuse, and recycling initiatives and has drafted a document called "Waste Reduction and Diversion: An Action Plan for New Brunswick" for public review and comment.

The following is a brief summary of the contents of the proposed Waste Reduction Action Plan, the *Beverage Containers Act* and *Regulations*, and *Tire Stewardship Regulation*; and a description of the work completed by the Regional Solid Waste Commissions. The following is also a brief description of the New Brunswick *Clean Environment Act,* which is the principal environmental act in the province and the Environmental Trust Fund that provides many organizations with funding for environmental projects.

Other pieces of legislation that are directly and indirectly applicable to waste management in the province are the *Unsightly Premises Act*, *Environmental Trust Fund Act, Clean Water Act*, and *Clean Air Act*

Waste Management Legislation and Policies

Clean Environment Act, 2002
Administered by the Department of the Environment and Local Government, the *Clean Environment Act* is a key environmental statute in the province of New Brunswick. The *Act* addresses the release of contaminants into the environment, including the release of solid waste and wastewater, and the management of facilities for the treatment and/or disposal of these contaminants.

The *Act* requires persons or organizations wishing to discharge a contaminant to obtain approval from the Minister and enables the Minister to order the clean up, rehabilitation, and/or remediation of contaminated sites. It also outlines the penalties and fines for violations of the *Act*. Regulations under the *Act* include:

- the Environmental Impact Assessment Regulation requires that certain undertakings be registered with the Minister;
- the Petroleum Product Storage and Handling Regulation establishes standards for the design and construction of petroleum storage tanks, and requires registration and licensing of specified storage systems;
- the Water Quality Regulation outlines the approval requirements for industrial operations that release contaminants into bodies of water;

- the Appeal Regulation allows anyone who is the subject of a decision by the Minister to appeal the decision.

Regulations under the *Clean Environment Act* also include the *New Brunswick Tire Stewardship Regulation* which is described on the following pages and the *Regional Solid Waste Commissions Regulation* which establishes voting procedures and conflict of interest parameters for solid waste commissions, and addresses financial management, auditing, and financial reporting requirements of these commissions. This *Regulation* also outlines conditions under which commissions may accept solid waste and provide services related to solid waste management. The *Regulation* complements the framework for solid waste commissions provided for in the *Clean Environment Act*.

Powdered or frozen juices, cocktail mixers, and fruit syrups are not considered "ready-to-drink" beverages and therefore do not have a deposit.

Beverage Containers Act, 1992 and Regulations, January 2000

The *New Brunswick Beverages Containers Act* and *Regulations* under the *Act* establish the framework and details for the deposit/refund system for "ready to drink" soft drink, juice, and alcoholic beverage containers that are sold within the province. Specifically, the *Act* and *Regulations* outline the registration procedures for Redemption Centres and rules for their operation, as well as responsibilities of distributors. The legislation also establishes handling fees and addresses the remittance of proceeds to the Environmental Trust Fund (see next pages for details about the Environmental Trust Fund)(see table 1).

The provincial government is pleased with the results achieved with the *Act* and *Regulations* to date. Since they have been developed, the *Beverage Containers Act* and *Regulations* have enabled the province to:

- establish 84 redemption centres within the province;
- create and sustain over 250 jobs;
- divert approximately 160 million non-alcoholic recyclable containers, 30 million alcohol recyclable containers, and approximately 10 million dozen refillable beer bottles from landfill annually; and
- maintain a return rate for all containers at nearly 80%.

During the past year, the government has reviewed the *Beverage Container Regulations* to examine the need to ensure that only approved redemption centres are allowed to purchase containers from the public. This will promote the economic viability of registered redemption centres and aid in providing the public with safe and clean locations where containers can be returned.

Tire Stewardship Regulation, 1996

In 1995, the government partnered with tire manufacturers, distributors, and retailers to explore a new way of handling scrap tires. The result was the *New Brunswick Tire Stewardship Regulation,* under the *Clean Environment Act*, which enabled the province to create the New Brunswick Tire Stewardship Board that manages the provinces tire stewardship program. The *Regulation* indicates that the Board can:

Table 1

Container	Deposit	Refund for Refillables	Refund for Recyclabes
Non-alcoholic, ready to drink, any size	$0.10	$0.10	$0.05
Alcohol, 500 ml and less	$0.10	$0.10	$0.05
Alcohol, over 500 ml	$0.20	$0.20	$0.10
Refillable beer bottles	$0.10	$1.00	$0.50

- require all suppliers of new tires to be registered with the Board and to remit a fee for each new tire that they supply;
- use the fees to pay for the collection, recycling, processing, handling, packaging, and distribution costs associated with the operation of a facility that grinds used tires into "rubber crumb" then manufactures new products; and
- conduct inspections of supplier premises and/or records to ensure compliance with the regulations.

In New Brunswick, about 700,000 new tires are sold each year. As of 2000, the *Tire Stewardship Regulation* has enabled the province to divert 2.5 million tires from landfill under this stewardship program.

The *Regulation* prohibits the importation of scrap tires into the province without a permit from the Board. It requires the Board to provide the Minister with an annual report detailing the program results and to make this report available to the public (see table 2).

Waste Management Programs, Organizations, and Tools

Waste Reduction and Diversion: An Action Plan for New Brunswick

"Waste Reduction and Diversion: An Action Plan for New Brunswick" is a document that outlines the province's proposed plan for the management, reduction, reuse, and diversion of solid waste over the next five years. It consists of a 10-point plan featuring key initiatives, which are designed to help shape New Brunswick's environmental and economic future by establishing clear province wide commitments, strengthening regional priorities, and supporting waste reduction actions by individuals, communities, businesses and institutions.

The following is a summary of the 10 key initiatives contained in the plan.

1. Develop legislation that will require the Regional Solid Waste Commissions to provide the following services to all residents: recycling for corrugated cardboard, newsprint, boxboard, office paper, and plastics coded with the Society of Plastics Industry (SPI) numbers 1 and 2, and composting for all organic waste by specified dates.
2. Measure the results of current waste provincial government diversion initiatives in order to identify opportunities for the implementation of further initiatives, establish benchmarks, identify links between waste diversion and procurement practices, and develop an environmentally responsible and economically sound procurement policy which will be mandatory for all government departments, agencies and boards.
3. Develop and disseminate educational materials that will increase the public's awareness of the importance of waste management initiatives and waste diversion actions with a specific focus on the benefits of the 3R's (reduction, re-use, recycling), household hazardous waste, and illegal dumping.

Table 2

Tire Type/Rim Size (The fees do not apply to replacement tires if the original tire was defective)	**Maximum Fee (exclusive of taxes)**
Automobile, truck, trailer, and van	
8.00" (20.32 cm) up to 17.00" (43.18 cm)	$3.00
17.00" (43.18 cm) up to 24.50" (62.23 cm)	$9.00
Over 24.50" (62.23 cm)	Varies
Motor driven cycle and motorcycle tires all sizes	$3.00

4. Enable waste management partners by ensuring that they are aware of funding opportunities offered by the Canada-New Brunswick Infrastructure Program and Environmental Trust Fund, and creating economic incentives and opportunities such as the development of end-use markets for waste materials.
5. Require that each Regional Solid Waste Commission develop a Waste Reduction and Diversion Plan that includes an implementation schedule for meeting the provincial Action Plan, addresses the disposal of household hazardous wastes, states projected diversion rates, includes a public awareness and education strategy, considers all delivery options, and provide a complete cost analysis.
6. Address the issue of illegal waste dumping by providing waste collection services in Local Service Districts that currently do not receive service, expand the waste collection services to include items such as small furniture pieces and building material where services are currently provided, and develop legislative or regulatory measures to enhance compliance and enforcement efforts.
7. Working with the Canadian Council of Ministers of the Environment (CCME), other provinces and territories, and the federal government to develop regulations for recycled content standards and 'extended producer responsibility' (EPR) programs.
8. Increase industry stewardship by finalizing a milk container stewardship program with the New Brunswick Dairy Industry during 2002, developing a model for Paint Stewardship during 2002, and finalizing a Used Oil Regulation for implementation by Spring 2002.
9. Explore potential legislative tools that can encourage Municipalities to develop alternative waste management initiatives, and examine the feasibility of a tiered tipping fee approach for institutional, commercial, and industrial waste.
10. Consider implementing provincial or regional landfill bans for materials that can be recycled or otherwise diverted and/or for which a source separation program exists.

The province is aware that the implementation of this Action Plan will have an impact on all New Brunswickers through changes in lifestyle and workplace habits. However, the plan was developed with significant public consultation, is still subject to comments and review, and will be implemented in coordination with key stakeholders.

This regional approach allows for the differences in population, infrastructure, and other characteristics between various areas of New Brunswick. Decisions are made on a local basis by representatives of the people most directly affected by those decisions, within the comprehensive waste management strategy that guides the Province as a whole.

Solid Waste Commissions, 1987

In New Brunswick, twelve solid waste commissions are responsible for the development and implementation of waste management initiatives at the regional level, and to facilitate the implementation of initiatives by municipalities, businesses, and community organizations. For example, many of the Commissions do the following:

- have Household Hazardous Waste depots;
- operate regional sanitary landfills, transfer stations, and recycling depots;
- implement public awareness campaigns on the benefits of waste reduction and recycling such as quarterly newsletter, displays at community events, and school presentations; and
- investigate new alternative waste reduction alternatives.

The following is a sample of specific initiatives that the Solid Waste Commissions have enabled other organizations to implement:

- the Fredericton Commission operates a residential curbside grey and blue box recycling program in Fredericton and New Maryland;
- the Fundy Commission operates a residential curbside collection program for organics and a depot system for paper and plastics;
- the Kings and Kent Commissions have implemented a wet/dry program throughout the region in conjunction with the Westmorland-Albert Corporation;
- the North West Commission operates a depot system for plastics and paper and distributes backyard composters and related awareness materials every year;
- the South West and Valley Commissions operate depot systems for paper; and
- the Westmorland-Albert Solid Waste Corporation embarked on a wet/dry program in its regions that requires homeowners and businesses to sort their waste into wet organic waste for composting or dry wastes for sorting into recyclables and non-recyclable.

12 Solid Waste Commissions in New Brunswick

- **Acadian Peninsula**
- **Fredericton Region**
- **Fundy Region**
- **Kent**
- **Kings County**
- **Nepisiguit-Chaleur**
- **North West**
- **Northumberland**
- **Restigouche**
- **South West**
- **Valley**
- **Westmorland-Albert**

The Regional Solid Waste Commissions operate according to the directions of the *Regional Solid Waste Regulation* under the *Clean Environment Act.*

Environmental Trust Fund

The Environmental Trust Fund provides funding to municipalities, community, regional and provincial based organizations, and non-profit organizations within the province as well as national organizations requesting assistance to undertake environmental projects within New Brunswick. Eligible projects fall under the following six categories:

- the **conservation** of natural and man made resources in the private and public sectors in the province including solid waste reduction/recycling initiatives;
- the **protection** of essential ecological processes, biological diversity, and renewable and non-renewable resources;
- the **restoration** of the quality and sustainability of air, land and water resources;
- **sustainable development** economic and social activities that protect and enhance resources and environment;
- **education** programs and curricula which address environmental issues and the principles of sustainable development; and
- the **beautification** of the province's visual environment, particularly roadsides, shores and coastal access points.

The Environmental Trust Fund obtains the funds from the environmental fees collected under the *Beverage Containers Act.* In 2000, the Fund provided organizations with a $4.5 million for the completion of 116 projects aimed at benefiting the environment.

The Environmental Trust Fund is regulated under the *Environmental Trust Fund Act.*

"The ETF empowers New Brunswickers to address the important environmental issues in their communities"
Environment and Local Government Minister Kim Jardine

Principle Contact Information

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Environmental Trust Fund
Department of the Environment and Local Government
Tel: 506-453-3703
Web site: http://www.gnb.ca/elg-egl/0373/0002/0001-e.html

2.2.4 Nova Scotia

Nova Scotia has perhaps the most comprehensive and integrated waste management program in North America and can be considered as a world leader in composting.

The province has achieved this success by passing the *Environment Act* and *Solid Waste Resource Management Regulations*, and developing a Solid Waste Resource Management Strategy.

The following is a summary of the requirements of the *Environment Act* and *Solid Waste Resource Management Regulations*, a list of the Solid Waste Resource Management Strategy's primary objectives, and a brief description of some of the initiatives that have been implemented as a result of this comprehensive approach to waste management.

The Activity Designation Regulations, which enable the province to designate a variety of activities for permitting purposes, are other regulations that are applicable to waste management in the province.

Nova Scotia achieved its 50% waste diversion goal as of March 31, 2000

Waste Management Legislation and Policies

Environment Act, 1995
The *Environment Act* recognizes that all Nova Scotians share the responsibility for the sustained health of the environment and the economy and that producers are responsible for their products from the point of manufacturing to the point of final disposal. However, the Act also recognizes that the Government must act as the catalyst in the area of environmental protection and enables it to develop objectives, policies, and guidelines to encourage stewardship and the development of innovative environmental technologies and systems.

The Act addresses many environmental issues including asbestos waste, dangerous goods, and PCB management, emergency spills, ozone layer protection, pesticides, used oil, and solid waste resources. With respect to non-hazardous solid waste management, Part IX of the Act, Waste Resource Management indicates the following:

- the Minister shall establish a solid waste resource management strategy for the province;
- the province shall adopt the CCME 50% waste diversion goal for the year 2000; and
- the government may set specific waste reduction goals for materials and may ban specific materials from landfills.

Solid Waste Resource Management Strategy, 1995
The Solid Waste Resource Management Strategy, which was developed after extensive consultation with people involved in all

aspects of the solid waste system, is based on the premise that solid waste is a valuable resource. The Strategy has four main goals:

- achieve 50 percent diversion by December 31, 2000;
- implement new disposal standards by December 31, 2005;
- achieve greater regional cooperation to reduce costs; and
- increase economic opportunities through recognition of waste as a resource.

Since the strategy was formally adopted, there have been many initiatives implemented to support its goals.

- The deposit/refund system has been expanded to include all beverage containers with the exception of milk containers, which are recycled.
- Nova Scotians have achieved an 80% return rate on beverage containers by using the 90 Enviro-Depots and five Regional Processing Facilities that have been established.
- 53 of 55 municipalities offer centralized composting facilities for use by the business sector. All of the municipalities offer recycling services.
- The province has reduced the number of landfills sites by approximately 75 percent, and will ensure that all sites will meet stricter guidelines to prevent leachate and other problems.
- The Used Tire Management Program, which has applied environmental fees for new passenger vehicle and truck tires, has enabled Nova Scotians to recycle 3.0 million tires within the province.
- Retailers who sell motor oil must either accept used oil or provide a collection depot within 5 kilometers of their business.
- The province will promote the marketing of the innovative environmental technologies developed in Nova Scotia to other jurisdictions.

The Strategy has both challenged and created opportunities for business owners and operators. It has enabled the creation of approximately 1,000 jobs. The increased access to recycling and composting facilities has also ensured that a level playing field exists for all businesses.

Solid Waste Resource Management Regulations, 2000

The *Solid Waste Resource Management Regulations* were made under Section 102 of the *Environment Act*. They are divided into four divisions which address 1) solid waste reduction, 2)disposal of municipal solid waste, 3) regional solid waste resource management plans and regional requirements; and 4) financial assistance.

APPLICABLE DEPOSITS AND RETURNS

Container Type	Deposit	Return
Non-Alcoholic	$0.10	$0.05
Alcoholic ≤ 500 ml	$0.10	$0.05
Alcoholic >500 ml	$0.20	$0.10

Specifically, the Regulations do the following:

- establish the Resource Recovery Fund and the Fund Board (see below);
- establish the regulations for the operation of the deposit/refund system;
- ban the disposal of selected materials from landfill sites (see side bar);
- establish Regional Waste Reduction Coordinators in seven regions within the province (see below);
- provide a list of initiatives that qualify for financial assistance;
- ban open burning of municipal solid waste; and
- outline the approval requirements for the operation of commercial composting facilities, landfill sites, incinerators, and ash disposal sites.

The Regulations also indicate that businesses that sell products in/with cartons, utensils, containers, foils or paper that patrons may

discard in the vicinity of the business, and organizers of special events, must provide receptacles for litter and recyclable materials in appropriate and easily accessible locations, and shall service and empty the receptacles as prescribed in these regulations.

MATERIALS BANNED FROM LANDFILL SITES IN NOVA SCOTIA
All businesses must separate these banned materials for disposal.

- **Compostable organic material (food waste, leaf and yard waste, and non-recyclable paper)**
- **redeemed beverage containers;**
- **Newsprint;**
- **corrogated cardboard;**
- **steel/tin food containers;**
- **glass food containers;**
- **select plastics (Society of Plastics Industry #2 HDPE non-hazardous containers, and stretch wrap used for bulk shipping);**
- **used tires;**
- **waste paint;**
- **car lead-acid batteries; and**
- **automotive antifreeze (ethylene glycol).**

WASTE REDUCTION FACT SHEETS

- **Business and Institution Recycling**
- **Business and Institution Organic**
- **Material Separation**
- **Waste Reduction in Convenience**
- **Stores**

Available from
http://gov.ns.ca/envi/wasteman/pubs.htm

Waste Management Programs, Organizations, and Tools

Resource Recovery Fund Board

The Resource Recovery Fund Board Inc. (RRFB) is a private, not-for-profit organization that is mandated under the *Solid Waste Resource Management Regulations* to administer a substantial portion of the Solid Waste Resource Management Strategy, including the following:

- funding for municipal or regional diversion programs;
- development and operation of the deposit/refund system for beverage containers;
- development and implementation of industry stewardship programs, especially for materials that are banned from landfill;
- development of education and awareness programs; and
- promotion of the development of value-added manufacturing in the Province.

The RRFB, which has representatives from industry, municipalities, and the provincial government, operates with money from revenues generated from the deposit refund system on beverage containers; donations, and surcharges on tires.

NOVA SCOTIA'S WASTE RESOURCE MANAGEMENT REGIONS

- **Cape Breton Island Region**
- **Antigonish, Guysborough, and Pictou**
- **Cumberland, Colchester and East Hants**
- **Halifax Regional Municipality**
- **Kings and Annapolis**
- **West Hants, Lunenburg, Queens and Shelburne (Mun. Dist.)**
- **Barrington, Yarmouth and Digby**

Regional Waste Reduction

Each of the 7 Waste Resource Management Regions must achieve the 50% waste reduction goal set by the province. In order to accomplish this, each Region must develop and implement a regional solid waste resource management plan that includes:

- public awareness initiatives;
- a program for the diversion of household waste dangerous goods;
- programs for source reduction, reuse, recycling and composting;
- proposals for identifying markets for diverted materials;

- cost estimates for each initiative, and
- cost sharing arrangements.

"PUTTING OUR FUTURE FIRST"
Clean Nova Scotia is celebrating 12 years as an environmental resource. Over that time, they have reached thousands across the province and around the world through our proactive work with government, businesses, organizations, and over 200,000 volunteers

Clean Nova Scotia
Clean Nova Scotia is a non-profit environmental education educational that provides Nova Scotians with information regarding the importance of environmental responsibility and the means to make positive decisions about the environment. They do this by delivering environmental programs province-wide such as:

- the Planet Action Club for Kids (PACK) newsletter,
- the Great Nova Scotia Pick-Me-Up, and
- the Waste Reduction Centre.

The Clean Nova Scotia team consists of a knowledgeable, committed staff and Board of Directors, and a supportive group of volunteers and members. Their membership includes individuals, families, volunteer groups, businesses, and institutions from across the province.

Principle Contact Information

Nova Scotia Dept. of the Environment
P.O. Box 697, Halifax, NS, B3J 2T8
Tel.: (902) 424-5300
Fax: (902) 424-0569

RRFB
Recycling and composting information hotline
1-877-313-7732
Directory of Solid Waste, Reuse, Recycling and Composting Contacts in Nova Scotia
http://www.gov.ns.ca/envi/wasteman/contents.htm

2.2.5 Quebec

Today, waste management is part of the main challenges facing modern societies. In the past few years, managers have been confronted with this issue even more often since the urban environment, with its multiple activities, produces large amounts or waste material. Similarly, Canadian governments, like those of other states, must meet the challenges of waste management as part of their commitment to sustainable development.

Although businesses and municipalities did implement recycling and reduction measures following the adoption of the *Politique québécoise de gestion intégrée des déchets solides* in 1989, it is now apparent that these measures could be more widespread and efficient. In fact, 2002 has seen the disposal of a large majority of the waste material production, as well as failure to achieve the reduction objective that had been set out in 1989.

To correct the situation in a sustainable manner, it was becoming necessary for all the players to further assume their roles and responsibilities. In this context, the Quebec government recently modified its orientations regarding waste material management by making important modifications to the Environment Quality Act and by adopting its *Politique québécoise de gestion des matières résiduelles 1998 – 2008.* These legislative tools now constitute the guidelines referred to by governmental, municipal and private managers operating in the area of waste material management in Quebec.

Waste Management Legislation and Policies

Since 1989, governmental orientations in the area of waste material management are tied to the following events:

- In 1989, adoption of the *Politique de gestion intégrée des déchets solides* :
  - Based on the 4R-D concept (source reduction, reuse, recycling, recovery and disposal);
  - Main objectives: 1- achieve a 50%

reduction of waste destined for disposal by 2000, 2- reinforce standards governing waste disposal sites.

- In 1996, generic investigation on waste material management in Quebec by the *Bureau d'audiences publiques sur l'environnement (BAPE)*[1] :
  - In 1997, production of the investigation commission's report[2] containing 69 recommendations that would commit Quebec to a continual improvement process leading to the achievement of its « Zéro déchets (no waste) » objective.

- In 1998, adoption of the *Plan d'action québécois sur la gestion des matières résiduelles 1998-2008*, based on the following main objectives:
  - Recover, by 2008, 65% of recoverable residual materials;
  - make disposal sites safer; and
  - dispose only of ultimate waste, which is to say, waste that remains such despite going through the processing, conditioning and recovery processes.

- In 1999, adoption of the *Loi modifiant la Loi sur la qualité de l'environnement et d'autres dispositions législatives en matière de gestion des résidus*:
  - Constitutes the legislative framework that will make it possible to carry out the actions set out in the Plan d'action québécois sur la gestion des matières résiduelles 1998-2008.

- In 2000 and 2001, officialization of the governmental orientations adopted in 1998 and 1999:
  - May 2000, the *Loi modifiant la Loi sur la qualité de l'environnement et d'autres dispositions législatives en matière de gestion des résidus* becomes effective; except for sub-section 2[3] of section VII;
  - September 2000, adoption of the *Politique québécoise de gestion des matières résiduelles 1998-2008*;
  - January 2001, sub-section 2 of section VII of the *Loi modifiant la Loi sur la qualité de l'environnement et d'autres dispositions législatives en matière de gestion des résidus becomes effective.*

- In 2002, adoption by the National Assembly of Bill 102 amending the *Environment Quality Act* and the Act respecting the *Société québécoise de récupération et de recyclage*. The main component of this bill aims to favour the participation of businesses producing recyclable goods in the financing of municipal recycling activities such as curbside collection. Another component of the bill expands RECYC-QUEBEC's role in order that this Crown Corporation can ensure more effective co-ordination and monitoring of recycling and recovery activities in Quebec.

Environment Quality Act

The Environment Quality Act was amended in December 1999 as a result of the adoption of the Loi modifiant la *Loi sur la qualité de l'environnement et d'autres dispositions législatives concernant la gestion des matières résiduelles*. Part of this new Act took effect in May 2000. Sub-section 2 of Section VII of this Act, which makes provisions for the creation of waste material management plans, took effect on January 1st, 2001**.**

The amendments to the Environment Quality Act constitute a major advance in the field of waste material recovery. It constitutes the new legal framework that will make it possible to implement the various actions provided for by the *Politique québécoise de gestion des matières résiduelles 1998-2008.*

Objectives

Recent amendments to the Environment Quality Act define the powers and various means by which waste materials can be recovered and disposed of, while also specifying the responsibilities of the government and

1 Mandated by the Minister of Environment.
2 Bureau d'audiences publiques sur l'environnement (1997)
3 Provides for the elaboration of waste material management plans by regional municipalities and urban or metropolitan communities on their territory.

the Minister of Environment with regards to waste material management. As such, they aim to:

- establish that the actions of both government and municipalities, in the area of waste material management, are based on principles that favour resource conservation, recovery of waste material and a reduction in the disposal of waste material;
- establish the increased responsibility of manufacturers regarding the products that they bring to market;
- allow the government to force municipalities into implementing the elements of the *Politique québécoise de gestion des matières résiduelles 1998-2008*;
- allow the government to force, by way of regulation, the operator of a disposal site to put together and fund a watchdog committee whose role it is to monitor the site and carry out surveillance activities;
- review the mechanisms for the constitution of monitoring funds following the closure of disposal sites and plan for interim arrangements; and
- review the rights of Quebec's Administrative Tribunal to modify the rates charged by disposal site operators.

Applications

The amendments made to the Environment Quality Act namely provide for:

- the mandatory elaboration of waste material management plans by regional municipalities, urban communities or groups of municipalities;
- the attribution to regional municipalities and urban communities of the right to limit or forbid alien waste materials from entering their territory for disposal;
- the implementation by municipal authorities of public consultation mechanisms for the elaboration and monitoring of waste material management plans; and
- the reinforcement of the government's regulatory powers in order to achieve better control over the generation and disposal of waste material. As a result, the government will be able to:
  - force businesses to collect and recover packaging or printed materials or contribute financially to curbside collection; and
  - force businesses to collect and recover any hazardous domestic waste that they generate.

Regulatory framework

The main laws targeted by the amendments to the Environment Quality Act and the adoption of the *Politique québécoise de gestion des matières résiduelles 1998-2008* are:

- the Environment Quality Act (R.S.Q., c. Q-2)
  - governs all activities related to the environment
- the Act respecting the Société québécoise de récupération et de recyclage (R.S.Q., c. S-22.01)
  - creates a Crown corporation to promote recovery activities
- the *Loi sur l'établissement et l'agrandissement de certains lieux d'élimination de déchets* (L.R.Q., c. E-13.1)
  - requires that projects for the creation or expansion of waste disposal sites follow Quebec's process for the assessment and study of environmental impacts. This process involves performing an environmental impact assessment and holding public consultations under the auspices of the *Bureau d'audiences publiques en environnement (BAPE)*
- the *Loi portant interdiction d'établir ou d'agrandir certains lieux d'élimination de déchets (L.R.Q., c. I-14.1)*
  - orders a moratorium preventing the creation or expansion of new disposal sites until the Règlement sur la mise en décharge comes into force
- the *Loi sur la vente et la distribution de bière et de boissons gazeuses dans des contenants à remplissage unique*
  - creates a mandatory deposit system for single-use containers
- the *Loi sur l'aménagement et l'urbanisme (L.R.Q., c. A 19.)*

- governs general land use designations in regional municipalities

Politique québécoise 1998-2008

The *Politique québécoise de gestion des matières résiduelles 1998-2008* came into effect on September 30th, 2000, on the occasion of its publication in the *Gazette officielle du Québec*. This policy officializes the *Plan d'action québécois sur la gestion des matières résiduelles 1998-2008*, made public by the Environment Minister in 1998. By the same token, it replaces the *Politique de gestion intégrée des déchets solides*, adopted in 1989.

Briefly, the *Politique québécoise de gestion des matières résiduelles 1998-2008* invites all municipal, industrial and environmental players as well as the people of Quebec to join forces with the government to achieve waste material management that is more respectful of the environment and human health (*Gazette officielle du Québec,* September 30th, 2000, 132nd year, issue 39). One of the key components of the policy is the elaboration of waste management plans by regional municipalities or urban communities or groups of municipalities.

Objectives

The *Politique québécoise de gestion des matières résiduelles 1998-2008* is based on the objective of 65% recovery of waste that can be recovered by 2008. It is also based on the following main disposal goals (see table 3):

- make disposal sites safer; and
- dispose only of ultimate waste, which is to say waste that remains such despite going through the processing, conditioning and recovery processes.

Fundamental principles

To achieve the established targets, various actions are proposed in the *Politique québécoise de gestion des matières résiduelles 1998-2008*. They are based on the following fundamental principles:

- the prevalence of 4R-D, which is, in order of importance, source reduction, reuse, recycling, recovery and disposal;
- increased responsibility of the manufacturers to make them assume their environmental responsibilities with regards to the products that they market;
- citizen participation in the elaboration and monitoring of the means set forth to ensure the efficient management of waste materials;
- the regionalization of decisions having to do with means selection and implementation; and
- the partnering of all levels in order to achieve the objectives.

Table 3: Sector-based Objectives

Category	Municipalities	Industries, businesses and institutions	Construction and demolition industry
Cellulose fibres	60%	70%	60%
Glass	60%	95%	
Plastic	60%	70%	60%
Metals	60%	95%	60%
Cumbersome waste	60%		
Organic waste	60%	60%	
Wood	60%	70%	60%
Textiles	50%		
Hazardous domestic waste	75%		
Tires		85%	
Deposit (cans, bottles)	80%		
Other			60%

Source: Politique québécoise de gestion des matières résiduelles 1998-2008, Gazette officielle du Québec, September 30th, 2000, 132nd year, issue 39.

Waste Management Programs, Organizations, and Tools

RECYC-QUEBEC is a Government corporation. The objectives of the corporation are to promote, develop and foster the reduction, re use, recovery and recycling of containers, packaging materials or products and their valorization with a view to conserving resources. RECYC-QUEBEC proposes innovative and motivating avenues in order to achieve the environmental goals of the *Politique québécoise de gestion des matières résiduelles 1998-2008 (Quebec Policy for Waste Management, 1998-2008)*.

Innovative and motivating actions and tools

WASTE MANAGEMENT PLANNING	
Elaboration of waste management plans on a territorial basis for a regional municipality (RM) or urban community (UC)	Include all the municipalities on the RM's or UC's territory.
	Plan on a 20-year basis, update every 5 years (can be modified at any time).
	Touch on the entire array of waste, with the exception of non-domestic hazardous materials, biomedical waste, mining waste, contaminated soil and gaseous materials.
	Contain an inventory of the waste generated on the subject territory with mention of each material's nature and origin.
	Contain a list of existing and planned recycling, recovery and disposal installations on the subject territory.
	Define more clearly the orientations and objectives that must be achieved in the areas of recycling, recovery and disposal, as well as the services that must be offered in order to achieve the objectives (in compliance with the Quebec Policy).
	Contain an implementation plan that will encourage the public's involvement and the collaboration of organizations and businesses operating in the area of waste management.
	Contain a budgetary estimate and an implementation schedule.
	Contain a tracking and monitoring program to confirm the achievement of objectives and the effectiveness of the measures taken.
	Include a master plan for the management of municipal and industrial sludges.
PUBLIC PARTICIPATION	
During the elaboration of the management plans and the monitoring of their implementation	Hold a public consultation on the projected management plan by way of a commission.
	The commission is formed by the regional municipality (RM) and is composed of ten members at most, including: • A representative of the business sector; • A union representative; • A representative of the community services sector; • A representative from environmental protection groups.
	The commission must hold assemblies in at least two local municipalities that are part of the RM's territory.
	The commission must report on the consultations to the public and the Minister of Environment.
Through community watchdog groups	Created by disposal site operators.
	For the tracking and monitoring of the operation, the closure and the post-closure management of: • Existing disposal installations and • New disposal installations.

EDUCATION AND INFORMATION

Elaboration of educational and informational tools	Reach the greatest possible number of persons and groups.

RESEARCH AND DEVELOPMENT

Financial support	For recycling and recovery sector businesses.
	Develop and adapt technologies and methods for waste material recovery.

SUPPORT FOR SOCIAL ECONOMY BUSINESSES

Financial support	For starting and developing social economy businesses that will work toward waste material recycling and recovery.

WASTE RECYCLING AND RECOVERY

Strengthening of the municipal curbside collection program	Financing for the municipal curbside collection program to be provided by industrial or commercial businesses that manufacture or market containers, packaging or printed material (regulation planned).
Organic waste collection	Regulatory obligation, for municipalities, to collect grass and leaves that will not have been left on site.
Hazardous domestic waste collection	Regulatory obligation, for businesses, to collect and treat the hazardous products (waste oil, solvents, pesticides, batteries) that they manufacture and market.
Recovery of construction, renovation and demolition waste	Amend disposal regulations to promote recovery of these materials: the creation or expansion of solid waste dumps will no longer be authorized.
Reduction and recovery of industrial, commercial and institutional production wastes	Creation of a recognition program for environmental actions taken by industries, businesses and institutions in order to reduce and recover their waste materials.
	Have the Quebec government use environmental management tools in the day to day administration of its ministries, organizations and networks and reinforce its environmental procurement policy by favouring environmentally friendly products.
Collection of returnable beer and soft drink containers	Financing for the collection of the products to be provided by the businesses that bring them to market (financing terms set in an agreement with the Minister of Environment).
Collection of used tires	Non-refundable fee paid by the consumer to the merchant upon purchase of new tires. This fee is used by the government to cover used tire collection costs and help finance businesses that reuse, recycle or recover energy from used tires.
Recovery of industrial and municipal sludges	Creation by the RMs if master plans for the management of industrial and municipal sludges: • To identify the source, quantity and quality of sludges generated on their territory; and • To determine whether recovery can be favoured.
	No sludge should be landfilled unless it has been demonstrated that its recovery is not economically feasible.

DISPOSAL

Engineered disposal sites	Stricter standards governing engineered disposal (proposed disposal regulation published in the Gazette officielle du Québec on October 25th, 2000) : • Creation of water-tight disposal cells to ensure superior groundwater protection; • Leachate collection and treatment prior to release into the environment; • Collection and evacuation of biogases and in some cases, their combustion.

DISPOSAL	
Solid waste dumps	Stricter standards requiring operators to monitor surface water and groundwater quality (proposed disposal regulation published in the Gazette officielle du Québec on October 25th, 2000).
Environmental monitoring of disposal sites	Obligation, by decree, for operators to constitute financial guarantees in the form of trusts for the post-closure monitoring of the disposal installation.
Trench dumps	Limit the number of installations.
Incineration	Stricter standards requiring operators to monitor surface water and groundwater quality.
	Creation or expansion permitted when the promoter demonstrates that his installation does not go against recovery objectives.
	Stricter standards governing gas and particle emissions to the atmosphere.
IMPLEMENTATION MONITORING	
Results of the Quebec policy's implementation	Published every two years.
	Policy to be reassessed every five years following its adoption and, when needed: • Revise orientations based on the results obtained in the areas of source reduction and waste recovery.

Source: *Politique québécoise de gestion des matières résiduelles 1998-2008, Gazette officielle du Québec*, September 30th, 2000, 132nd year, issue 39.

Impacts of the government's orientations

With the application of the *Politique québécoise de gestion des matières résiduelles 1998-2008* and the coming into force of the amendments to the Environment Quality Act, municipalities and businesses will pursue their initiatives and have an increased tendency to explore new avenues for respecting governmental objectives, principles and orientations in their pursuit of ever more efficient waste material management. Reduction, recycling and recovery measures will no doubt become more ambitious, in keeping with the recovery objectives. On the other hand, waste material disposal standards will be stricter.

With the coming into force of section VII, subsection 2 of the Environment Quality Act, RMs, UCs and MCs will have two years[3], starting January 1st, 2002, to table their waste material management plan before the Minister of Environment. The plans will have to be presented to the Minister before they come into effect and they will have to comply with the requirements of the *Politique québécoise de gestion des matières résiduelles 1998-2008*. Therefore, in order to elaborate and adopt their waste material management plan in compliance with the orientations of the Quebec policy, while simultaneously respecting the socio-economic and political context of their territory, those involved will have to commit themselves to a process involving research, analysis, results and objectives with short, medium and long term focus. These aspects are part of the larger steps that lead to the adoption of a master plan.

Finally, the municipalities and the public and private organizations will have to implement the measures described in their territory's waste material management plan.

Predictions

In order to meet the objectives set out in the *Politique québécoise de gestion des matières résiduelles 1998-2008*, new management methods and new waste material treatment infrastructures should be analyzed or further implemented by municipalities. Things that come to mind, among others, would be organic waste collection, the creation of waste collection centres and the application of a usage based fee structure for waste materials.

As far as businesses, institutions and organizations are concerned, we should witness the gradual integration and application of environmental management policies, such as

[3] The law allows a one year extension to be granted by the Minister of Environment if a request was previously submitted.

ISO 14000, and various environmental actions aiming to make better use of resources and ensure better environmental compliance (procurement policy, waste reduction programs, environmental scorecard). Moreover, the respect of sustainable development and continual improvement principles should become better integrated with managerial decision making.

On the other hand, the recovery of waste materials involves the creation of programs encouraging source reduction, reuse, recycling and recovery in all economic sectors. The materials thus recovered will have to be shipped to infrastructures specific to the waste materials and the resulting secondary materials, and these infrastructures will have to take into account regional waste management concepts.

Principle Contact Information

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RECYC-QUEBEC
Headquarters
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Toll free : 1-800-807-0678
communications@recyc-quebec.gouv.qc.ca
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2.2.6 Ontario

The province of Ontario is a leader in waste management. In 1981, Kitchener Ontario became the first city in the world to introduce a residential curbside blue box program. In 1994, the province announced the 3Rs Regulations that provided many municipalities and businesses within the province and the federal government of Canada with the initial incentive for implementing waste management initiatives.

Ontario municipalities have done it again! 2000 has been another record breaking year of recycling and composting efforts. In 2000, your tonnage diverted from disposal rose 3% (1.248 million tonnes, up from 1.213 million reported in 1999).

Today, Ontario is still working to be a leader in waste management. The province has:

- the *Environmental Protection Act* that addresses a variety of environmental issues;
- the Pollution Prevention Pledge Program that recognizes achievements in waste reduction;
- the Environmental SWAT Team that ensures compliance with all environmental legislation; and
- the Recycling Council of Ontario that implements a variety of excellent public education initiatives.

The province has also adopted on June 13, 2002 Bill 90 (*Waste Diversion Act)*.

The following is a description of these pieces of legislation, programs, and organizations. Other pieces of legislation that are directly and indirectly applicable to waste management in the province are the *Environmental Bill of Rights*, and the *Waste Management* and *Environmental Assessment Acts*.

Waste Management Legislation and Policies

Waste Diversion Act, 2002, S.O. 2002, c. 6
The *Waste Diversion Act*, established a permanent not-for-profit corporation named Waste Diversion Ontario (WDO) and enabled the appointment of a WDO Board of Directors which has as its mandate the promotion of reduction, reuse and recycling of waste in Ontario. The WDO will accomplish:

- development and implementation of waste diversion programs for designated wastes in consultation with the public and interested parties and in co-operation with an existing industry funding organization or an industry funding organization to be incorporated for the purpose of the program;
- monitoring of the effectiveness of the programs;
- development of an activity report and business plan on an annual basis and make the plan and report available to the public; and
- establishment of resolution processes for disputes that could arise as a result of the operation of waste diversion programs.

The *Waste Diversion Act* indicates that the WDO waste diversion programs can include 3Rs, research, product development and promotion, and public awareness and education activities. It also:

- indicates that the waste diversion programs implemented under the Act must affect Ontario's marketplace in a fair manner;
- describes how the Ontario *Environmental Bill of Rights* will apply to the proposed Act;
- enables the Minister to develop regulations under the *Act* and establish policies applicable to the WDO Board of Directors; and
- describes the penalties for offences under the *Act*.

The WDO's first task is to establish an industry funding organization to set and collect fees from industry to pay 50 per cent of municipal Blue Box costs. The WDO also develops, implements and funds waste diversion initiatives for used oil, organics such as kitchen waste, household special wastes such as paints and solvents, scrap tires, and other materials.

Environmental Protection Act, R.S.O. 1990, c. E-19

The *Environmental Protection Act* addresses a number of environmental issues including ozone depleting substances, spills, emissions from motor vehicles, abandoned motor vehicles, damages to crops or livestock by contaminants, as well as litter and waste management. The general provisions describe the Minister's powers with respect to the administration, application, and enforcement of the *Act*. They indicate that the Minister can:

- conduct research, develop awareness and training programs, establish experimental systems, and/or publish information relating to the issues addressed in the *Act*;
- provide grants and loans for the above;
- seek assistance from committees, analysts, and officers, delegate powers, and enter into agreements with other organizations to meet the objectives of the *Act*;
- investigate alleged offences to the *Act* and issue control, or remedial orders for discharges;
- make regulations under the *Act*; and
- establish an Environmental Site Registry that will facilitate public access to information filed in accordance with this *Act*.

Regulations under the Environmental Protection Act include the:

- **Containers,**
- **Designation of Waste,**
- **Disposable Containers for Milk, and**
- **Disposable Paper Containers for Milk Regulations.**

With respect to litter and waste management, the Act indicates that:

- no person shall discharge into the environment a contaminant in an amount or concentration in excess of that prescribed by regulations under the Act, except as permitted by a certificate of approval, in accordance with a reduction or control program, or in the context of normal agricultural operations;

- a person that emits a contaminant into the environment in excess of permitted levels must notify the minister;
- no person shall abandon any material in a place or manner such that the material will become litter;
- persons operating facilities or equipment for the storage, handling, treatment, collection, transportation, processing, or disposal of waste must have a certificate of approval; and
- municipalities may make by-laws that address waste management.

The *Act* does not apply to the storage or disposal of a person's domestic waste on the person's own property unless the storage or disposal creates a nuisance.

The 3Rs Regulations have played a significant role in the creation of jobs in recycling and composting. They have also created a demand for products that are made with less material, reused materials, recycled materials, less energy, and products that are easily recyclable.

Ontario 3Rs Regulations, 1994

In 1994, the province of Ontario announced the *3Rs Regulations* which made reducing, reusing, and recycling mandatory, and therefore provided the initial incentive for many municipalities and businesses to reduce, reuse, recycle, and compost and have provided the incentive for waste management businesses to establish themselves.

- *Regulation 101/94, Recycling and Composting of Municipal Waste*, states that municipalities with populations of 5,000 or more, must implement curbside recycling and backyard composting programs. Sections 12 and 13 of the regulation state that municipalities with populations of 50,000 or more must provide curbside leaf and yard waste collection and a municipal composting program. Parts III to V of Regulation 101/94 contain details regarding the operation of municipal waste recycling depots, recycling sites, and leaf and yard composting sites.
- *Regulation 102/94, Waste Audits and Waste Reduction Work Plans, states that major waste generators such as shopping centers*, large construction and demolition projects, office buildings, restaurants, hotels, motels, hospitals, schools, and large manufacturers must annually conduct waste audits and produce waste reduction workplans.
- *Regulation 103/94, Industrial, Commercial*, and Institutional Source Separation Programs, states that these same waste producers must implement recycling programs with separation at source for a given number and certain types of materials.
- *Regulation 104/94, Packaging Audits and Packaging Reduction Workplans*, states that major packaging users such as large food or beverage manufacturers, paper manufacturers, chemical manufacturers, and importers must conduct packaging audits and produce packaging reduction workplans and that they must update them every two years.
- *Regulation 105/94*, is an amendment to the Environmental Protection Act that makes it possible for recycling facilities to bypass the Certificate of Approval process, provided that certain standards are met.

Municipalities that are required to implement curbside recycling and/or composting programs under *Regulation 101/94* are required to report annually to the Director. Waste audit reports and workplans for Regulations *102/94* and *104/94* are only required upon request but must be posted such that they are visible to employees.

Waste Management Programs, Organizations, and Tools

Recycling Council of Ontario

The Recycling Council of Ontario (RCO) is a non-profit organization that has as its mission to inform and educate all members of society about the importance of the 3Rs, and to encourage and enable the public to

implement waste management initiatives. The RCO:

- believes in the principles of full cost accounting and shared responsibility;
- supports the use of financial incentives and economic instruments;
- encourages all stakeholders to become informed about their roles and responsibilities, and participate in all levels of program implementation;
- supports the development of voluntary and legislated programs in a harmonized and practical manner; and
- believes that the efficiency of all programs must be measured and monitored.

In support of its beliefs and mission, the RCO provides the province of Ontario with leadership in waste management research, policy, and initiatives. Initiatives that the RCO have implemented include:

- Waste Minimization Awards;
- Waste Reduction Week;
- ReVamp, an Environmental Fashion Show;
- ReinCARnate, a Vehicle Recycling Program;
- Municipal Recycling Program Databases;
- 3Rs Library and Resource Centre;
- 3Rs Networking Breakfast;
- Recycling Markets Forums;
- 3Rs Seminars and Workshops;
- RE-News Electronic Bulletins; and
- RCO Highlights, the Headlines Daily Environmental Clipping Service

Approximately 75% of the content of the more than 400,000 cars that are removed from Ontario roads each year can be reused or recycled.

The RCO offers free towing and charitable tax receipts to people who donate their used cars to the ReinCARnate program which disassembles the car in order to reuse parts, and recycle metals and fluids.

Tickets issues by the Environmental SWAT Team carry a maximum fine of $500.

Cases that require further investigation are referred to the Environmental SWAT Team's investigators who report to the ministry's Investigations and Enforcement Branch.

Further investigation can result in charges laid. A company convicted of its first major offence could be fined up to $6 million per day. Individuals could be fined $4 million per day and face jail terms of 5 years less a day.

Environmental SWAT Team, 2000

The Environmental SWAT Team is a fully operational unit that complements the enforcement work of the Ministry of Environment district offices in ensuring that companies and individuals comply with Ontario's environmental laws. The Environmental SWAT Team's goal is to improve environmental compliance rates in order to create a healthier ecosystem and provide a level playing field for all businesses in the province.

The Environmental SWAT Team does its work by:

- completing unannounced site inspections in businesses in industry sectors that have high non-compliance rates and/or may present a high risk to public health;
- issuing Provincial Officer Orders, writing tickets, and/or issuing court summons under the *Provincial Offences* Act when violations are found;
- seizing property and securing scenes;
- referring cases for further investigation when required; and
- following up to ensure that violators have taken corrective action.

The Environmental SWAT Team uses risk assessments, historical data, and information provided by district offices to determine which sectors and companies within the sectors to inspect, and to develop inspection protocols for each sector.

Since Fall 2000, the Environmental SWAT Team has been fully operational and actively conducting inspections throughout Ontario. The Environmental SWAT Team is now a permanent unit within the Ministry that has conducted inspections in the electro/metal plating, hazardous waste transfer and processing, pesticide application, and septic, hazardous, liquid industrial, and solid waste hauling sectors.

The Environmental SWAT Team is expected to begin work in the recycling in the industrial, commercial and institutional sectors soon.

The Pollution Prevention Pledge Program
The Pollution Prevention Pledge Program is a recognition and incentive program that encourages the adoption of pollution prevention and pollution prevention planning by industrial, commercial and institutional and government participants. Recognition is given to companies that have achieved reductions in the use, generations and/or release of hazardous wastes and industrial effluents.

Facilities registered at the P2 level (making a public reduction pledge) or at the P3 or P4 levels (achieving reductions) receive Pollution Prevention Certificates acknowledging their participation. Exemplary projects may be eligible to win one of the Ministry's annual Awards of Excellence.

To date, over 150 facilities across Ontario have enrolled at the level P2 or higher. They illustrate the program's broad scope throughout the various sphere of environmental concern. Total reductions reported though the program are currently greater than 52,000 tonnes per year.

The Pollution Prevention Pledge Program has honoured the following companies with Achievement Awards

- **Canadian Auto Collision for reducing solvent wastes and VOC and dust emissions.**
- **Careful Hand Laundry and Dry Cleaners Ltd. For reducing their use of perchloroethylene by 42%.**
- **Ontario Store Fixtures for reducing solvent use by 65%, paint sludge by 85%, and VOCs by 120,000 kg per year, lowering energy consumption, and reducing the amount of solid waste going to landfill.**

Principle Contact Information

Government of Ontario
Ministry of the Environment
http://www.ene.gov.on.ca/
http://www.ene.gov.on.ca/waste.htm

Investigations and Enforcement Branch
5775 Yonge Street
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North York, ON M2M 4J1
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Recycling Council of Ontario
www.rco.on.ca
rco@rco.on.ca

Environmental SWAT Team
http://www.ene.gov.on.ca/envision/swat/index.htm
305 avenue Milner, Bureau 1003
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M1B 3V4
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Contact:
John Steele
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Ministry of Environment and Energy
(416) 314-6666

2.2.7 Manitoba

Manitoba's waste reduction goal is to reduce the amount of waste that it sends to landfill by 50% based on the 1989 baseline of 1,000 kg per person per year. In order to achieve this goal, the province has implemented many initiatives including:

- the legislation of the *Waste Reduction and Prevention Act*;
- the creation of Manitoba's Product Stewardship Agencies; and
- establishment of the Waste Reduction and Pollution Prevention Fund.

The following is a brief description of this legislation and of the Manitoba's Product Stewardship Agencies' mandate established by the *Interim Multi-Material Stewardship Regulation*. Other pieces of legislation that are relevant to waste management in Manitoba are the *Tire Stewardship Regulation,* the *Used Oil, Oil Filters and Containers Stewardship Regulation*, and the proposal of the *Household Hazardous Waste Stewardship Draft Regulation,* the *Household Hazardous Waste Stewardship Draft Regulation*, and the proposed Plan to Manage Household Hazardous Waste in Manitoba.

An estimated 950 000 tonnes of waste (840 kg/person/year) was sent to waste disposal grounds in Manitoba in 1996. This represents a 16% decrease in the amount of waste disposed per capita between 1989 and 1996.

Waste Management Legislation and Policies

Waste Reduction and Prevention Act, 1990

The *Waste Reduction and Prevention Act* (*WRAP*) recognizes that the volume of waste generated in Manitoba is a threat to the environment and that governments, government agencies and all members of society are responsible for reducing and preventing waste. It also recognizes that the responsibility includes contributing toward the cost of waste reduction and prevention.

The Manitoba Product Stewardship Corporation (MPSC) is the fund board that is legislated under WRAP to administer residential waste recycling programs within the province.

The Manitoba Product Stewardship Corporation is responsible for managing the two-cent levy program for all non deposit beverage containers (excluding dairy) sold in the province.

The purpose of *WRAP* is to reduce and prevent the production and disposal of waste in accordance with the principles of sustainable development and to this end *WRAP*:

- requires manufacturers, distributors, and/or retailers of designated materials to collect *WRAP* levies and remit them;
- established industry operated *WRAP* funds that pay for the collection, transportation, storage, processing and disposal of the designated materials as well as related public awareness, research, and marketing activities; and
- sets out the powers of enforcement officers and penalties.

Used Oil, Oil Filters and Containers Stewardship Regulation, 1997

Established under *WRAP*, the *Used Oil, Oil Filters and Containers Stewardship Regulation* requires all companies in the province that sell automotive oil, oil filters, and oil containers to participate in a recycling program for these products.

Specifically, the Regulation and guidelines under the Regulation set out by the minister indicate that vendors must do the following:

- be registered with the minister as a vendor for the products and participate in the stewardship program or purchase supplies from registered stewards instead; and

- make information about the stewardship program available to the consumer

The industry run, non-profit stewardship program for used oil, oil filters and containers in Manitoba requires stewards to pay $0.05 per litre of oil, $0.05 per litre of container capacity and $0.05 to $1,00 per filter that they supply.

The fees are used by the Manitoba Association for Resource Recovery Corporation (MARCC) to pay for the management of the program including the collection, transportation, storage, processing and disposal fees of used oil products. MARCC also uses the fees to develop and implement public awareness education programs, including point of sale awareness programs.

It is estimated that MARCC is now recovering in excess of 11.2 million litres of used oil annually or almost 75% of the amount considered recoverable.

Household Hazardous Waste Stewardship Draft Regulation

Households in Manitoba threw 1,979 tonnes of household hazardous waste (HHW), such as paint, solvents, pool chemicals, cleaners, pesticides, and pharmaceutical products into landfill sites in 1998. Although these products are safe for their intended use, they pose elevated risks if disposed of in the "regular" waste disposal system.

Manitoba Conservation spent $435,000 supporting collection events throughout the province in the year 2000, however demand for the service is much higher than the budget will support. Several groups, such as the Association of Manitoba Municipalities, the Regional Waste Management Task Force and environmental groups, along with many citizens have asked for a more comprehensive program with improved access.

In response to this request, Manitoba Conservation has released for public discussion, a draft regulation under the *WRAP Act*. Under the proposed regulation, companies that sell products designated as contributing to the household hazardous waste stream will be given three months to develop plans for an alternative waste management program to divert these wastes from landfill.

Since 1995, the creation of the MPSC recovery of residential recyclable materials has more than doubled to 38,827 tonnes in 2000. Municipal recycling programs continue to grow and expand.

Waste Management Programs, Organizations, and Tools

Manitoba's Product Stewardship Agencies, 1995

One of the greatest improvements to Manitoba's solid waste management system over the last decade has been the establishment of alternative waste management systems. These systems are important because they offer communities a reuse or recycling alternative for products and materials that may have previously gone to landfill.

The development of alternative waste management facilities has been stimulated in part by the support provided by Manitoba's Product Stewardship Agencies, including:

- Manitoba Product Stewardship Corporation (MPSC) – multi-material recycling;
- Manitoba Association for Resource Recovery Corporation (MARRC) – used oil, filters and containers;
- Tire Stewardship Board (TSB) – used tires;
- Crop Protection Institute of Canada (CPIC) – pesticide containers; and
- Manitoba Ozone Protection Industry Association (MOPIA).

Principle Contact Information

www.gov.mb.ca/conservation/
Pollution Prevention Branch
Manitoba Conservation
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Drostkowsk@gov.mb.ca

Manitoba's Product Stewardship Agencies
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Web site: www.mpsc.com

MARRC
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E-mail: marrc@icenter.net
Web site: www.usedoilrecycling.com

MOPIA
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Web site: www.mopia.mb.ca

Tire Stewardship Board
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E-mail: mbtirebd@escape.ca
Web site: www.catraonline.ca/manitoba/

2.2.8 Saskatchewan

The province of Saskatchewan is aware that the disposal of unwanted items is a problem, since most of the material is not readily broken down by natural processes and many may contain toxic or hazardous substances that can damage the environment. The province has therefore adopted the CCME 50% waste diversion goal as its objective and has implemented a number of waste management initiatives including:

- the legislation of the *Environmental Management and Protection Act*, the *Litter Control Designation Regulations*, and the *Scrap Tire Management Regulations*;
- the creation of the Saskatchewan Scrap Tire Corporation and Saskatchewan Environmental Directory; and
- the development of a successful working relationship with SARCAN Recycling.

The following is a brief description of these initiatives. Other relevant initiatives that the province has implemented include:

- the legislation of the *Used Oil Collection Regulations, Litter Control Act, and Clean Air Act*; and
- the creation of the Saskatchewan Association for Resource Recovery Corporation and the Saskatchewan Waste Reduction Council

Saskatchewan Environment and Resource Management's mandate is to manage, enhance and protect Saskatchewan's natural and environmental resources - fish, wildlife, lands, forests, parks and protected areas, air, water and soil - for conservation, recreation, social, and economic purposes and to ensure they are sustained for future generations.

Waste Management Legislation and Policies

The Environmental Management and Protection Act, 2000

The *Environmental Management and Protection Act* sets out the duties, powers, and functions of the Minister to preserve and protect the environment, and the schedule of offences and penalties for violations of the *Act* and regulations under the *Act*.

Specific issues that the *Act* addresses include:

- application and permit requirements for waterworks, sewage works and industrial effluent works;

- reservoir land use;
- prohibitions on pollution; and
- reporting and investigating discharges into the environment.

The Litter Control Designation Regulations, 1998

The *Litter Control Designations Regulations* outline the details of the provinces deposit/refund system for beverage containers. Specifically, the regulations indicate the types of containers that are included in the system, the applicable refund/deposit for each container type, and the organizations that are officers for the enforcement of the regulations. The regulations also indicate that there is an Environmental Handling Charge for each container, which is used to pay for the deposit/ refund system transportation, processing, and marketing costs.

The Saskatchewan deposit/refund system currently covers all ready-to-serve beverages packaged in non-refillable containers (except milk), including soft drinks, fruit juices, fruit drinks, bottled waters and liquor containers. Milk containers are collected separately by Sarcan Recycling (see below) under contract by the dairy industry (see table 4).

The Scrap Tire Management Regulations, 1998

The *Scrap Tire Management Regulations* establish scrap tires as a prescribed material. They indicate that every retailer in the province who sells or distributes tires is required to have a product management program or enter in agreement with an operator of a product management program for the collection, transportation, and recycling of scrap tires, which is approved by the Minister.

Specifically, the regulations indicate that the Scrap Tire Management Program is required to record the number of scrap tires handled, provide province-wide service, and provide annual reports on the Program's operation.

Waste Management Programs, Organizations, and Tools

SARCAN Recycling

SARCAN Recycling is a division of the Saskatchewan Association of Rehabilitation Centers (SARC), a provincial coordinating and advocacy organization dedicated to improving educational/training opportunities and the employment potential of persons with disabilities. Under the authority of the *Litter Control Act* and Saskatchewan Environment and Resource Management (SERM), SARCAN Recycling administers the provincial system to collect and recycle beverage containers that have been sold in Saskatchewan.

Currently, SARCAN Recycling operates 71 collection depots in 62 communities, two

TABLE 4: SASKATCHEWAN ENVIRONMENTAL HANDLING CHARGES AND REFUNDABLE DEPOSITS

Container Type	Environmental Handling Charge (per container)	Refundable Deposit (per container)		
		0-300 ml	301-999 ml.	1 litre or more
Metal Cans	5¢	10¢	10¢	20¢
Plastic Bottles	6¢	10¢	10¢	20¢
Non-refillable glass bottles	7¢	10¢	20¢	40¢
Multi-material, shelf stable containers (i.e. aseptic,				
Tetra-Pak ,juice box, etc.)	3¢	5¢	5¢	5¢
Paper-based, polycoat gable top containers	3¢	5¢	5¢	5¢

processing plants in Regina and an administration center in Saskatoon. SARCAN employs 365 people, over 80% of whom are persons with disabilities or formerly on social assistance.

Amounts collected are staggering and represent a return rate of 92 per cent, one of the highest in North America. In 1998/1999, SARCAN recycled over 230 million beverage containers, 11 per cent more than in the previous year. So far SARCAN has recycled 14,128 tonnes of material, diverting it from our waste disposal grounds, thus extending their life span by many years. Also in 1998, SARCAN recycled its one billionth container!

Saskatchewan Scrap Tire Corporation
The Saskatchewan Scrap Tire Corporation (SSTC) is a non-profit, non-government agency formed in 1996 that manages a scrap tire management program in Saskatchewan under the *Scrap Tire Management Regulations*. The SSTC has a membership of 1,200 retailers, including retailers who sell new tires either individually or on vehicles such as cars, trucks, farm implements, recreation vehicles.

In Saskatchewan, consumers pay a recycling fee to tire retailers, which submit the recycling fee to the SSTC. The SSTC uses the funds to contract an approved and recognized processing firm to collect the tires and deliver them to a recycling plant. Some of the numerous products that are made from recycled tires include playground equipment, vehicle ramps, civil engineering material and alternate fuels. Tire recycling has created 150 jobs in Saskatchewan.

Since its inception in May 1996, the SSTC program has recycled the equivalent of over one million used passenger tires.

Saskatchewan Environmental Directory, 1998
http://www.serm.gov.sk.ca/corporate/whoswho/
The Saskatchewan Environmental Directory is a comprehensive list of non-government organizations, government and private agencies and offices that offer services or are involved in activities that pertain to the environment. The Saskatchewan Environmental Directory provides the user with the organization name, address, contact name, telephone/fax number and an organizational profile where applicable. The directory is updated on a continuing basis.

Principle Contact Information

Saskatchewan Environment and Resource Management
Environmental Protection Branch
3211 Albert Street
Regina, Saskatchewan
S4S 5W6
Tel.: (306) 787-6169
Fax: (306) 787-0197

SARCAN Recycling
Ken Homenick
(306) 933-0616
111 Cardinal Crescent
Saskatoon, Saskatchewan
S7L 6H5
Tel.: 1-800-667-3016

Saskatchewan Scrap Tire Corporation
Teresa McQuoid
(306) 721-8473
to be dealt with all contact information
P.O. Box 1936
Regina, Saskatchewan
S4P 3E1
Tel.: 306-721-TIRE (721-8473)
Fax: 306-721-1585.

Saskatchewan Association for Resource
Recovery Corporation
http://www.usedoilrecycling.com/
Tel.: 1-877-645-7275

Recycling in Saskatchewan Brochure
http://www.serm.gov.sk.ca/environment/recycle/recycling-brochure.pdf

Saskatchewan Waste Reduction Council
http://www.saskwastereduction.ca/

2.2.9 Alberta

Alberta is committed to the protection of its environment and the conservation of its resources through proper management of waste wherever it occurs. The province's main focus has been to foster municipal, industrial and public stewardship in support of proper waste management.

Alberta has implemented many initiatives in order to achieve its objectives. This includes the creation of legislation such as the *Environmental Protection and Enhancement Act*, *Activities Designation Regulation*, and the *Waste Control Regulation*; and the implementation of programs such as the Action on Waste Program and stewardship programs for beverage containers, scrap tires, and used lubricating oil, oil filters, and oil containers.

The following is a description of these pieces of legislation and these programs. The following also provides a list of Action on Waste publications that are of particular interest to small and medium businesses.

Waste Management Legislation and Policies

Environmental Protection and Enhancement Act, E-12 RSA, 2000

The *Environmental Protection and Enhancement Act* (*EPEA*) addresses a number of issues including environmental assessments, the release of substances into the environment, management of waste disposal facilities, contamination of sites and potable water, conservation and reclamation of lands, unsightly properties, management and disposal of hazardous substances and waste, and non-hazardous waste management.

The general provisions of the *EPEA* describe the Minister's powers with respect to the administration and enforcement of the Act. They indicate that the Minister:

- can appoint committees, consult with experts, delegate powers, and create regulations, policies, guidelines, and programs in order to apply the *Act*;
- shall cooperate with other Ministers with respect to matters that affect health and the environment;
- may use economic instruments to meet objectives of the *Act* including incentives, subsidies, fees, and levies; and
- shall report annually on the state of the Alberta environment.

The specific provisions of the *Act* do the following:

- prohibit the release of substances into the environment in amounts, concentrations, or at rates that are in excess of permitted levels or that can have a significant negative impact on the environment, including substances with offensive odours except for substances created by normal agricultural operations;
- indicate that no person shall dispose of waste except at a waste management facility, through an approved refuse disposal system, or in accordance with a permit;
- establish the Environmental Protection and Enhancement Fund and Environmental Protection Security Fund for the general protection of the environment and environmental emergencies;
- address the generation, sale, distribution, storage, handling, transportation, collection, treatment, recycling, and disposal of hazardous substances including pesticides;
- establish a provincial Recycling Fund and enable industries to create industry specific recycling funds for the operation of waste minimization programs and related education, research, and promotional initiatives; and
- indicate that manufacturers, distributors, and/or retailers of designated material must collect a prescribed surcharge, remit the surcharge to the appropriate recycling fund,

and establish depots or other methods for the recovery of designated materials.

The *EPEA* also describes the Minister's powers with respect to the enforcement of the *Act* including penalties for offences to the *Act*, and provides a list of activities that may cause the release of substances into the environment and are therefore covered by the *Act*.

Activities Designation Regulation (AR211/96) 2000

The *Activities Designation Regulation* lists the industrial activities for which an approval, registration, and/or notice is required, and indicates that undertakings that consist of more than one listed activity may be granted one approval or registration that covers all of the activities.

Activities that are listed in the *Regulation* and that are related to waste management include the construction, operation, and/or reclamation of:

- facilities where waste is treated using specified processes;
- incinerators including mobile incinerators that accept waste that contains substances such as halogenated organic compounds, lead, and mercury, and small incinerators;
- facilities that derive and/or produce fuel from wastes;
- fixed facilities used for the storage, processing, and/or disposal of hazardous recyclables, and the management of hazardous substance containers;
- landfill sites;
- facilities where alternate fuel is burned; and
- various composting facilities.

Waste Control Regulation, 1996

The *Waste Control Regulation* addresses the transportation, storage, disposal, and burning of non-hazardous waste, hazardous waste including PCBs, and hazardous recyclables.

The general provisions and schedules describe the properties of non-hazardous waste, and hazardous wastes and recyclables that are addressed by the *Regulation*. They also provide forms for enforcement and environmental protection orders that can be issued, security amounts and terms, approval and reporting requirements, and offenses under the *Regulation*.

The specific provisions of the *Regulation* indicate that no person shall:

- deposit waste for disposal in any place other than an authorized waste management facility;
- burn waste at a facility located within the boundaries of a city, town, or village but can burn waste within these boundaries if it is conducted in accordance with the Substance Release Regulation, under specified conditions;
- dilute hazardous waste for the purpose of avoiding the requirements of this Regulation;
- dispose of hazardous waste in a landfill, except for specified waste in various concentrations in specific Class 1 landfills;
- import hazardous waste into Alberta for disposal; and
- import hazardous waste for storage for a period exceeding 30 days, and hazardous recyclables for treatment without first obtaining written authorization from the Minister.

The *Regulation* also outlines the procedures and limitations for the siting, design, construction, operations, and reclamation of Class II and III landfill sites, and Class I and II compost facilities, and the requirements for storage of hazardous waste and hazardous recyclables.

Waste Management Programs, Organizations, and Tools

Action On Waste

Developed by the government of Alberta, Action on Waste is a program that helps Albertans develop and establish integrated waste management strategies that protect the environment, conserve resources and stimulate economic opportunities. Action on

Waste is working to achieve these goals by:

- developing a province-wide integrated infrastructure for the diversion of priority wastes;
- creating awareness of 3Rs opportunities (see "Action on Waste Publications" below);
- helping municipalities and industry develop and implement effective waste management plans;
- promoting voluntary participation and compliance; and
- providing technical information and assessment services.

Over 4.5 million litre equivalents of household hazardous waste materials have been safely treated and disposed of since 1988.

The Alberta Recycle Info Line receives approximately 700 calls per month.

The following is a list of activities and programs that Action on Waste has initiated:

- a beverage container collection/recycling program (see next section);
- a tire recycling program (see next section);
- a used oil, oil container, and oil filter recycling program (see next section);
- annual Household Hazardous Waste Round-ups in 100 communities;
- the Capital Region Waste Minimization Advisory Committee, which is a voluntary committee that works to increase waste minimization efforts on a co-operative regional basis;
- the toll free **Alberta's Recycle Info Line** which provides waste management information to municipalities, industry, and the public at no cost from 8:15 to 4:30, Monday to Friday; and
- programs for key waste materials, such as construction and demolition wastes, organics composting, household hazardous waste, electronics, and other stewardship activities.

Action On Waste Publications

As indicated in the previous section, one of the primary goals of the Action on Waste program is to increase awareness of 3Rs opportunities in the province. Accordingly, Action on Waste has developed a wide range of information materials and programs. These include publications and programs for schools, community groups and general interest:

- a series of 25 business specific two to four page Waste Minimization Fact Sheets that provide general waste management tips for materials that are typically found in each business type;
- a series of detailed Waste Minimization Manuals that assist selected industry sectors in developing waste minimization plans;
- a Mid-Scale Composting Manual that identifies some of the factors that affect the success of long-term programs and provides technical information for managing mid-scale composting facilities;
- a Leaf and Yard Waste Composting Manual which provides technical information for the start-up of a leaf and yard waste composting program; and
- the Sustainable Composting Options Study which provides information on the different types of feedstock materials, costs, and types of composting technologies available.

Product Stewardship Programs

In Alberta, there are stewardship programs for beverage containers, scrap tires, and used lubricating oil, oil filters, and oil containers that are based on the principle that consumers, industry, and government share the responsibility for the management of recycling programs for materials that are designated under the Alberta *Environmental Protection and Enhancement Act* (*EPEA*).

The Beverage Container Recycling Program is a deposit refund system for over 30,000 ready-to-serve beverage products in containers made of glass, metal, plastic or a combination

of materials. The program encourages consumers to return empty containers to a depot for recycling or refilling. The Beverage Container Management Board manages the Beverage Container Recycling Program.

Specific businesses and industries for which fact sheets and/or manuals have been prepared include:

- **Laboratories;**
- **Dentists;**
- **Golf courses;**
- **Grocery stores;**
- **Sanitorial services;**
- **Hair and beauty salons;**
- **Hotels and motels;**
- **Welding shops;**
- **Offices and institutions;**
- **Restaurants;**
- **Detailers;**
- **Automotive shops;**
- **Construction and demolition projects;**
- **Lawn and garden services; and**
- **Carpenters.**

The Scrap Tire Recycling Program uses a $4.00 per tire Advanced Disposal Surcharge on each new passenger vehicle tire sold in the province to provide funding to industries that use scrap tires to manufacture products such as molded bricks, playground surfaces, and as additives in road embankments. The Program is administered by the Tire Recycling Management Association (TRMA) which is responsible for managing the Advanced Disposal Surcharges collected in a Tire Recycling and Management Fund.

The Alberta Used Oil Management Program enables the province to collect used oil, oil filters, and containers and to use these materials to produce re-refined oil, asphalt, nails, wire, plastic pipe, guardrails, and plastic patio furniture. The program is managed by the Alberta Used Oil Management Association which obtains its funding from Environmental Handling Charges placed at the wholesale level on oil, oil filters, and oil containers.

It is estimated that these programs enable the province to divert the following from landfill per year:

- **1 billion beverage containers;**
- **42 million litres of oil;**
- **1 million oil filters;**
- **3 million oil containers; and**
- **3.25 million passenger tire equivalents.**

The recovery rates for the beverage containers and tires are excellent as they range from 80 to 90%. However, the recovery rates for oil and related products are significantly lower, ranging from 57% for oil to 7% for the containers.

These stewardship programs are supported by the *Beverage Container Recycling Regulation*, *Used Lubricating Oil Material Recycling Regulation*, and the *Tire Recycling and Management Regulation*.

Principle Contact Information

Action on Waste
4th Floor, Oxbridge Place
9820 – 106 Street
Edmonton, AB T5K 2J6
Phone: 1-800-463-6326
(Toll Free Recycle Info Line)
Or (780) 427-6982
Fax: (780) 422-5120
E-mail: wastenot@env.gov.ab.ca
http://www.gov.ab.ca/env/waste/aow

Recycling Council of Alberta
http://www.recycle.ab.ca/

Olds College Centre for Innovation
Composting Technology Centre
http://www.occi.ab.ca

2.2.10 British Columbia

The "Ministry of Environment, Lands and Parks 2001 Annual Report" indicates that British Columbia has developed legislation and programs to avoid, reduce, and eliminate wastes before they reach the environment and that these initiatives have helped the province:

- achieve a 36% reduction in the per capita amount of municipal solid waste going to landfills or incinerators between 1990 and 1998;
- recover 84% of the 1.5 billion beverage containers sold in the province per year;
- divert 751,655 batteries and 3,423,666 passenger tire equivalents between April 1, 2000 and March 31, 2001; and
- collect 4.0 million equivalent litre containers (ELCs) of paint in 2000.

The total amount of waste sent to landfills and incinerators in British Columbia decreased from 2,9 million tonnes in 1990 to 2,4 million tonnes in 1998. This decrease in waste disposed was achieved despite a population increase of 22% for the same time period.

The following is a description of the *Waste Management Act*, *Beverage Container Stewardship Program Regulation*, *Post-Consumer Residual Stewardship Program Regulation*, Financial Incentives For Recycling Scrap Tires (FIRST) Program, and the industry operated Product Care Program that have helped the province achieve these successes; and of the Ministers Environmental Awards that reward individuals and groups for their efforts at protecting the environemnt.

Other pieces of legislation and programs that are directly related to waste management in the province are the:

- *return of Used Lubricating Oil Regulation;*
- *post Consumer Paint Stewardship Program Regulation;*
- *organic Matter Recycling Regulation; and*
- the Small Business Pollution Prevention Working Group, which involves all levels of government and key small business sectors, that develops voluntary pollution prevention programs such as the printing sector "clean print" Internet web site (http://www.cleanprint.org/bc/).

Waste Management Legislation and Policies

Waste Management Act, [RSBC 1996] Chapter 482, [Updated to September 6, 2000]

The *Waste Management Act* provides the legislative framework for the management of all waste discharges in the province, including industrial and municipal solid, liquid, and gaseous waste, as well as special waste. It also governs air emissions from fuels and their combustion, and the identification, registry, remediation, and management of contaminated sites and for the liabilities associated with contaminated sites.

With respect to waste and special waste, the Act indicates the following:

- a business must not introduce or allow waste or special waste to be introduced into the environment in such a manner as to cause pollution except as allowed by a permit, approval, order, or regulation, or waste management plan;
- there are limits to the amount of special waste that a person can store and transport; and
- managers may issue permits for the introduction of waste into the environment, storage of special waste or treatment or recycling of special waste.

With respect to municipal waste, the *Act*:

- enables the minister to require municipalities or a group of municipalities to submit a waste management plan that addresses the management of recyclable material or waste and requires the muni-

cipalities to provide the public with an opportunity to review and be consulted with respect to the plan; and

- provides regional districts with the authority to manage municipal solid waste and recyclable material and enables the regional districts to set fees payable by generators of municipal solid waste or by other persons who use the services of a waste hauler.

The *Act* also describes the enforcement powers of the Minister and penalties for violations of the *Act* with respect to activities that produce or are capable of producing waste, and/or causing pollution, including the storage, handling, treatment, destruction or disposal of waste.

Beverage Container Stewardship Program Regulation, B.C. Reg. 406/97, O.C. 1353/97
The *Beverage Container Stewardship Program Regulation* requires all brand owners and sellers of ready to serve beverages in aluminium, glass, paper, plastic, steel, and asceptic containers with a volume of less than 10 litres that hold ready to serve beverages except for milk, milk substitutes, rice milk, soya milk, flavoured milk, infant formulas, meal replacements or dietary supplements; to have a stewardship plan approved by the Ministry.

The *Regulation* states that the Stewardship Plans must indicate how the containers will be recovered by the use of a return-to-depot system, ensure that depots are convenient to consumers, and ensure that an 85% recovery rate will be achieved. It also indicates that every beverage container agency must report the effectiveness of the stewardship plan on an annual basis. Retailers must (currently) accept, for return and refund, up to 24 containers per person per day.

Schedule 4 of the *Regulation* provides the minimum deposit and refund rates for various beverage containers.

Container Size	Minimum Amount & Type of Deposit or Refund
1 litre or less for non-alcoholic beverages	$0.05
1 litre or less for alcoholic beverages	$0.10
more than 1 litre for any beverages	$0.20

Post-Consumer Residual Stewardship Program Regulation, B.C. Reg. 111/97 O.C. 333/97
The *Post-Consumer Residual Stewardship Program Regulation* requires brand owners of solvent/flammable liquids, domestic pesticides, gasoline, and pharmaceuticals, and/or the associations that represent them to either submit a stewardship plan for ministry approval or establish a system that:

- collects the specified residuals and their containers at the point of sale or within specified distances from the seller's premises during regular business hours, for a minimum of five days per week, including Saturday;
- provides the collection services without charge to consumers;
- reuses, recycles, recovers energy, treats, or contains the residuals collected in accordance with the 3Rs hierarchy;
- provides the sellers with consumer awareness tools/materials at no cost to the seller; and
- reports the results of the Stewardship Program on an annual basis.

Part 4 of the Regulation outlines the penalties for violations of the Regulation and lists the products that are included in the Regulation.

Organic Matter Recycling Regulation, B.C. Reg. 18/2002 O.C. 84/2002
The *Organic Matter Recycling Regulation* sets requirements for the construction and operation of composting facilities and the production, distribution, storage, sale and use or land application of biosolids and compost. The regulation also creates a classification of product quality for biosolid and compost.

The British Columbia targets are to return 7,600 kg of unused pharmaceuticals and 105,000 equivalent litre containers (ELCs) of waste solvents, flammable liquids, pesticides, gasoline per year.

In 2000/01, the province surpassed the pharmaceutical target by returning 9,500 kg of wastes, but only collected 87,000 ELCs of waste solvents, flammable liquids, pesticides, gasoline were collected.

Waste Management Programs, Organizations, and Tools

Ministers Environmental Awards, 1981

The Minister of Water, Land and Air Protection honours individuals and groups that enhance, preserve, and protect the environment of British Columbia by offering awards for activities and achievements on an annual basis. Awards are given in each of the following categories:

- Individual Citizens;
- youth (individuals or groups under the age of 25);
- Federal, Provincial, or Local Government organizations or individual employees;
- community or Non-Profit Organization;
- Business, Industry, or Labour;
- Environmental Education (groups or individuals in academia or public education);
- Communications or Media (organizations or individuals in journalism, the arts or other forms of public communications); and
- excellence in Stewardship (organizations and individuals who have worked voluntarily to protect biodiversity values on private lands or in watersheds).

To be eligible for an award, nominees must have been instrumental in:

- identifying, reducing, solving or avoiding an environmental problem; and
- demonstrating consistently responsible environmental management practices; and/or promoting public awareness, understanding and active concern for the enhancement and protection of the environment.

"Protecting the environment is a responsibility we all share. These awards are an opportunity for government to recognize the efforts of people, groups and businesses that go the extra mile to promote exemplary environmental stewardship. "

Joyce Murray, Minister of Water, Land and Air Protection Minister

The Financial Incentives for Recycling Scrap Tires (FIRST) Program, 1991

The Financial Incentives for Recycling Scrap Tires (FIRST) program provides financial incentives to organizations that utilize used tires as a fuel source and/or to produce new consumer products. FIRST provides the organizations with financing in the form of transportation and end use incentives.

The transportation incentives are based on the weight of the tires that are transported, the distance they must be transported from the point of generation to the nearest registered processor, and a trucking cost factor. The end use incentive can be up to $110/tonne for tire-derived fuel (TDF) and $183/tonne for tire derived products (TDP).

Between June 1991, and January 2002, the FIRST program has enabled the province to divert over 30 million passenger tire equivalents (PTEs), from landfills and other inappropriate forms of disposal, at a total cost in program incentives of over $50 million.

The program currently captures about 285,000 PTEs per month.

FIRST is administered by government and funded by consumers through a $3 per tire levy. There is no involvement of the tire industry, other than retailers, who collect the levy on behalf of the government and voluntarily take back scrap tires from consumers.

The program is very successful. For both passenger and light truck, and medium truck tires, the capture rates are estimated to be approximately 100% if the tires removed from the scrap tire stream for reuse are considered. The TDP sector is utilizing in excess of 82% of tires captured. The TDF sector is using the remaining 18%.

Product Care, Paint in 1995 and Wastes in 1997

http://www.paintandproductcare.org/

Product Care, formerly Paint & Product Care, is a nonprofit industry sponsored association responsible for the management of British Columbia's *Post-Consumer Paint Stewardship Program Regulation* and *Post-Consumer Residual Program Regulation*.

Product Care protects the environment through a depot and management system, diverting leftover products from landfills, waterways, and sewers. It operates more than 100 depots across the province where consumers may return leftover paint and 35 depots where consumers may dispose of flammables, gasoline and pesticides at no charge.

Product Care is funded through an "eco-fee", collected at the point of sale. The eco-fee, which ranges from 10¢ to $4 depending on product type and container size, is clearly disclosed to consumers at the time of purchase. Product Care believes that:

- consumers should be aware of the costs associated with the safe disposal of hazardous materials;
- consumer awareness may reduce the consumption of hazardous materials;
- a separate eco-fee allows for the tracking of program costs and can travel through the chain of distribution without being marked up; and
- eco-fees help maintain a level playing field within an industry.

Principle Contact Information

First
PricewaterhouseCoopers
first@pwccanada.com

Product Care
contact@productcare.org

Greg Cheesman
Manager – Environmental Stewardship
Tel.: (250) 387-9973
E-mail: greg.cheesman@gems7.gov.bc.ca

2.2.11 Northwest Territories and Nunavut

People in the Northwest Territories (NWT) and Nunavut understand that there are strong links between the environment and their well-being. The governments of these territories are therefore dedicated to protecting and enhancing the quality of the environment of the North.

Other initiatives that have been implemented in the NWT are:

- **household Hazardous Waste Days were held in eleven communities;**
- **The provision of start-up funding to volunteer groups operating community-based recycling depots;**
- **an anti-litter campaign for schools that includes an educational video and instructional activities;**
- **a government-wide office paper recycling program;**
- **a drop-off recycling program in and the collection of batteries and waste oil in Yellowknife.**

To this end, the Government of the NWT has developed legislation and guidelines to control the discharge of contaminants, especially hazardous wastes, into the environ-

ment. These include the NWT *Environmental Protection Act*, the *Guideline for the General Management of Hazardous Waste*, and the proposed *Beverage Container Refund Program and Legislation*. When Nunavut was created in 1999, the territory adopted many of the pieces of NWT legislation as its own, at least on an interim basis. These include the two first pieces of legislation listed above.

Both of the territories face many challenges with respect to the implementation of waste management programs. Both territories have relatively small populations that are dispersed over vast land masses, pay high costs for goods and public services, are distant from markets for recycled materials, and do not have waste management infrastructures. Therefore, there is no legislation that applies directly to non-hazardous waste in the territories.

Despite this fact, the NWT has developed a number of useful initiatives including the NWT Waste Management Program and the Liquor Commission Deposit/ Refund Program, and the Inuvik Recycling Society has developed a recycling program for businesses and residents in this community. However, Nunavut is a much younger political entity, and must use airplanes or boats to transport material in and out of the territory, and has not yet had the opportunity to develop similar initiatives.

The following is a brief description of the *Environmental Protection Act* and the *Guideline for the General Management of Hazardous Waste*, which apply to both territories, and the proposed NWT *Beverage Container Refund Program and Legislation*. The following is also a description of the NWT Waste Management Program, Liquor Commission Deposit/ Refund Program, and Inuvik Recycling Society program.

Other pieces of legislation that are directly and indirectly applicable to waste management in the NWT and Nunavut are shown in the Table 5 below.

Table 5

Legislation	Applicable in NWT	Applicable in Nunavut
Environmental Protection Act	Yes	Yes
Spill Contingency Planning and Reporting Regulations	Yes	Yes
Asphalt Paving Industry Emissions Regulation	Yes	Yes
Guideline for Agriculture Waste	Yes	No
Guideline for Dust Suppression	Yes	Yes
Guideline for Site Remediation	Yes	Yes
Guideline for Industrial Waste Discharges	Yes	Yes
Guideline for the General Management of Hazardous Waste	Yes	Yes
Guideline for Ambient Air Quality Standards for Sulphur Dioxide and Total Suspended Particulate	Yes	Yes
Guideline on Ozone Depleting Substances	Yes	Yes
Guideline on Waste Solvents	Yes	Yes
Guideline on Waste Antifreeze	Yes	Yes
Guideline on Waste Asbestos	Yes	Yes
Guideline on Waste Lead and Lead Paint,	Yes	Yes
Guideline on Waste Paint	Yes	Yes
Guideline on Waste Batteries	Yes	Yes
Industrial Projects on Commissioner's Lands	No	Yes
Disposal Guideline for Fluorescent Lamp Tubes	No	Yes
Pesticide Act	Yes	Yes

Waste Management Legislation and Policies

NWT & Nunavut Environmental Protection Act, 1988

The NWT and Nunavut *Environmental Protection Acts* address the discharge of contaminants into the environment and unsightly lands. The general provisions of the *Acts*:

- outline the administrative, permit, and license application processes;
- indicate that the Ministers can appoint a Chief Environmental Protection Officer and peace officers to enforce the *Acts* and describe the powers that these individuals have to investigate possible violations of the *Act*; and
- describe the punishments for violations of the Act.

With respect to the discharge of contaminants into the environment, the *Acts*:

- indicate that the discharge of certain contaminants, such as exhaust from a motor vehicle, smoke from burning leaves, and residential waste, are exempt from the *Act*;
- enable the Ministers to issue permits for the discharge of non-exempt contaminants and to order the clean-up of the environment if non-exempt contaminants are released;
- enable the Ministers to negotiate remedies for the release of contaminants when the release is reported voluntarily; and
- enable the Ministers to make regulations and guidelines with respect to the identification, release, handling, storage, and transportation of specific contaminants including regulations for the operation of disposal sites.

The Acts also enable the Ministers to order clean-ups of unsightly lands, and indicate that municipalities can create by-laws with respect to disposal of litter on private land and unsightly land.

NWT & Nunavut Guideline for the General Management of Hazardous Waste, 1998

The *Guideline for the General Management of Hazardous Waste,* developed under the *Environmental Protection Act,* provides general information about the proper management of hazardous waste. It is intended to complement, not replace, regulations and guidelines that address the management of specific hazardous materials.

The Guideline provides definitions for hazardous wastes, contaminants, and empty containers. It indicates that:

- hazardous waste must not be mixed together in the same container, or mixed or diluted with any substance or divided into smaller quantities to avoid meeting the definition of a hazardous waste;
- the responsibility for proper management rests with the generator, even when the generator contracts a carrier, receiver, and/or other management service providers for the material;
- registration with various government bodies may be required to hazardous waste management service providers and facilities;
- a manifest form must accompany all hazardous waste in transit;
- hazardous waste should be stored in specified, well labeled, not damaged or leaking containers in a safe secure manner;
- the storage of hazardous waste is not an acceptable long term waste management solution; and
- consideration will be given to proposals for alternate management methods that provide an equivalent level of environmental protection to those identified in the guideline.

The Guideline for the General Management of Hazardous Waste defines a hazardous waste as a contaminant which is a dangerous good that is no longer used for its original purpose and is intended for recycling, treatment, disposal, or storage.

More than 25 million ready-to-serve drinks are sold in the Northwest Territories every year.

In the NWT, a beverage container recovery program could provide over $500,000 in salaries and wages.

The Guideline encourages the application of the 3Rs with respect to the use and disposal of hazardous materials and provides reduction, reuse, and recycling tips. Appendices to the Guideline provide lists of waste exchanges, recycling service providers, and management associations. The appendices also provide details about the dangerous goods classifications and quantities.

NWT Beverage Container Refund Program, proposed in 2001

In May 2001, the Northwest Territories published a document called the "Northwest Territories Beverage Container Recovery Discussion Paper, May 2001" for public review and comment, which proposes the development of a beverage container deposit/refund program for the Territory. The proposed program, which is modeled on similar programs in Canadian, would:

- use government funds for its start-up, and the difference between the deposit and refund to fund pay for the program and repay the start-up costs;
- ensure that every community in the NWT would have at least one depot or store that accepts empty containers for refund;
- include all ready-to-serve drinks except milk as well as beer, liquor, and wine containers that are currently accepted under the NWT Liquor Commission Deposit/Refund Program (see below);
- be administered by the Department of Resources, Wildlife and Economic Development in coordination with a multi-stakeholder committee, at least initially; and
- use an efficient and effective system to transport the containers from the collection depots to the processing centers that are proposed for Yellowknife and Hay River, and to end-use markets in Edmonton, Calgary and Vancouver.

Within the Discussion Paper, the government proposes to develop legislation that will provide legal support for the beverage container deposit/refund.

In July 2001, the government produced a paper summarizing the public consultation results. The paper, called a "Report on Public Consultation NWT Beverage Container Recovery Discussion Paper" indicates that there is support for the program and the public has given the government the mandate to pursue legislation for a beverage container program.

PROPOSED DEPOSITS AND REFUNDS FOR THE NWT BEVERAGE CONTAINER REFUND PROGRAM

Container Type/Size	Deposit	Refund
Non-alcoholic, less than 1 litre and glass beer and cooler	$0.15	$0.10
Non-alcoholic, more than 1 litre	$0.35	$0.25
Brewers Distribution	$0.05	$0.00
Glass and plastic wine and liquor	$0.35	$0.25

Waste Management Programs, Organizations, and Tools

NWT Waste Management Program

The NWT Environmental Protection Service has a mandate similar to a provincial environmental agency. In cooperation with the community Renewable Resource Officers, it operates programs that address hazardous substances, air quality, environmental impact assessment, and waste management.

Through its Waste Management Program, the NWT Environmental Protection Service provides advice and assistance to businesses and the public on pollution prevention, including tips for the proper management, storage, and disposals of wastes. Selected publications available through the Waste Management Program are the following:

- Beverage Container Report on Public Consultation;
- Beverage Container Recovery Discussion Paper;
- Backyard Composting;
- Municipal Solid Wastes Suitable for Open Burning;
- Pollution Prevention: NWT Community Health Centres Fact Sheet; and
- Pollution Prevention: NWT Automotive Repair Industry Fact Sheet.

There are other non-profit groups in some NWT communities that are involved in recycling. For example, in Norman Wells, the Girl Guides collect and store cans and bottles to raise money for their group. They shred, bag, and ship containers by barge and truck to Edmonton and Hay River.

Some non-profit organizations interested in recycling in NWT: Ecology North, Alternatives North, Inuvik Recycling Society, Norman Wells Girl Guides, and Deh Cho Friendship Centre.

NWT Liquor Commission Deposit/ Refund Program

The NWT Liquor Commission operates a deposit/refund program for all liquor, wine, and beer containers sold in the Territory. The program:

- requires consumers to pay a $0.10 deposit on refillable bottles that are sold through Brewers Distributing and the NWT Liquor Commission contracted vendors;
- requires the NWT Liquor Commission vendors and Brewers Distributing to pay consumers a partial refund that varies from community to community when the consumers return the bottles;
- requires the vendors to transport the empty containers to Brewers Distributing in Alberta where they collect the cost of the refund; and
- enables the contracted vendors to retain $0.02 per container for handling fees and the profits made from the sale of materials.

There are NWT Liquor Commission contracted vendors in Yellowknife, Fort Simpson, Hay River, Fort Smith, and Inuvik that participate in the program.

Inuvik Recycling Society 2001

The Inuvik Recycling Society is a non-profit registered society with a volunteer board that was formed in the summer of 2000. The Society's objective is to reduce waste entering the town landfill by developing and implementing a practical and sustainable recycling and waste diversion program. The Society's approach is to facilitate recycling and environmentally responsible waste management by:

- supporting and expanding existing recycling programs;
- increasing public awareness with education programs including school education programs;
- working with the Town of Inuvik to include recycling in the current waste management and beautification plans;
- providing residents with opportunities for safely disposing household hazardous wastes and composting organic waste; and
- helping businesses establish new programs for the collection and sale of more types of recyclables.

Within the first seven months of operation, the Inuvik Recycling Society clear bag program has diverted almost 184,000 items from landfill.

This is remarkable since the Inuvik population is only 3,300

Since June 2001, the Society has been operating a collection program for recyclable single serving beverage containers such as metal pop cans, glass juice bottles, tetrapak

drinking boxes, #2 plastic milk jugs, #1 plastic water and pop bottles; and other beverage containers such as 1 litre tetrapak boxes, large #1 plastic pop bottles, and any beer or liquor containers. The program:

- provides residences and businesses with clear plastic bags;
- enables and encourages residents and business operators to use the clear plastic bags for the temporary storage of their recyclable materials, and to place the bags and their contents into the dumpsters and curbside boxes that they use for garbage disposal;
- requests that Artic Tire, the company that picks-up the garbage from the dumpsters and boxes, pick-up the clear plastic bags at the same time as the garbage; and
- separates the recyclables from the garbage at the local landfill/disposal site with the assistance of the local landfill contractor, Albert Bernhardt.

The Inuvik Recycling Society has built a Recycling Drop Off Station and a Winter Storage/Sorting facility at the landfill to assist the efforts of the landfill contractor who sorts the materials and sends them south for further processing and shipping to end users. Raven Recycling, in Whitehorse, is one of the southern facilities that accepts the recyclables from Inuvik.

The Society receives funding from the Environment Canada Eco-Action program and in-kind support from a number of local businesses.

Principle Contact Information

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2.2.12 Yukon

The Yukon has developed many successful waste management initiatives. They include the:

- legislation of the *Environment Act, Beverage Container Regulations*, and *Solid Waste Regulations*;
- implementation of the Waste Reduction and Recycling Initiative; and
- creation of the Recycling Club.

There are recycling depots in all Yukon communities. In Whitehorse, where 75% of the territories' 31,000 residents live, aluminum, office paper, newspapers, brown paper bags, tin cans, corrugated cardboard, plastic drink containers and household batteries can be recycled. It is estimated that up to 75% of the waste produced in Whitehorse is recyclable.

The following is a description of this legislation and these initiatives. The following is also a description of the Yukon Council on the Economy and the Environment, which was the first legislated round table on the economy and the environment to be established in Canada.

Other regulations, which are relevant to waste management in the Territory, are the *Recycling Fund Regulation*, *Special Waste Regulations*, and the draft *Designated Materials Regulations* under the *Environment Act*. Other programs that have been implemented in the Yukon are the Special Waste and Household Hazardous Waste Collection programs.

Waste Management Legislation and Policies

Environment Act, 1991

The Yukon *Environment Act* is a landmark act that recognizes that the way of life of the people of the Yukon is founded on an economic, cultural, aesthetic and spiritual relationship with the environment. Generally, the Act:

- provides the people of the Yukon with a number of rights, including the right to ask for investigations, launch formal complaints over decisions made, legally pursue individuals and the government for damages to the environment, and the right to employee protection;
- addresses the release of contaminants, hazardous substances, and pesticides into the environment, spills, enforcement, penalties and offences to the Act;
- enables the government to develop partnerships with organizations such as the Yukon First Nations, Government of Canada, Yukon municipalities, and private businesses to implement programs that support the Act;
- outlines the procedures for establishing integrated resource management plans and obtaining development approvals and permits, and
- establishes the Yukon Council on the Economy and the Environment, and empowers the Council to review the Yukon government policies, conduct research, and promote public awareness.

The general provisions of the Act also enable the government to develop regulations under the Act.

Parts 7 and 8 of the Act relate directly to waste management in the Yukon. Part 7, titled "Waste Management", indicates that no person shall dispose of solid or special waste in a manner that is contrary to the regulations under the Act. Part 8, titled "Waste Reduction and Recycling" enables the government to establish waste reduction and recycling programs, create a Recycling Fund to fund waste diversion projects and activities; and ban packaging and/or products if their normal use will cause a significant impairment of the natural environment.

Some of the 12 regulations developed under the Environment Act include the:
- **Recycling Fund Regulation;**
- **Beverage Container Regulations;**
- **Special Waste Regulations;**
- **and, the Solid Waste Regulations.**

These are directly related to waste management in the Yukon.

Beverage Container Regulations, (1992, amended/expanded in 1996 and 1998)

The *Beverage Container Regulations* indicate that consumers must pay a deposit when they purchase beverages from retailers, including the Yukon Liquor Corporation, and that consumers can receive a refund when they return the empty containers to a registered recycling depot in the territory.

The Regulations require beverage wholesalers to send the deposit to the Recycling Fund which then pays out contributions to registered recycling depots to help pay for

collection, processing and shipping costs. The Recycling Fund is administered separately from the government's general revenues. It is used to promote container returns, improve recycling facilities at community depots, and pay part-time wages for depot staff (see table 6).

Solid Waste Regulations, 2000

The *Solid Waste Regulations,* under the *Environment Act,* indicate that no person shall abandon or discard solid waste except at a dump or waste disposal facility, except as permitted by the *Environment Act.*

For example, it is illegal to dispose of litter from a motor vehicle under the Yukon Solid Waste Regulations.

The *Regulations* do not require individuals to have permits for small private dumps and do not prohibit the burning of solid waste. However:

- the Regulations require operators of commercial dumps and waste disposal facilities, which accept waste from the public, to obtain permits that detail the operating conditions for the site;
- the Regulations describe the requirements for designing, constructing, operating, maintaining, and closing small private dumps; and
- an Air Emissions Permit under the Environment Act is required for burning.

Waste Management Programs, Organizations, and Tools

Waste Reduction and Recycling Initiative, 2000

The Waste Reduction & Recycling Initiative (WRRI) provides funding for new recycling programs at licensed Recycling Depots, and the removal and/or collection of selected wastes from specified locations for reuse, recycling, and/or proper disposal. Specifically, the program can provide funding to:

- the 25 eligible public landfill sites in the Territory for the removal of tires, oil , and ozone depleting substances from white goods that are within the landfill sites; and
- businesses for the removal of used oil.

The landfill sites and interested businesses must apply to the Yukon Department of Environment, which funds and operates the Initiative, for the funding. Private companies may also participate in this Initiative by bidding on the contracts to collect and transport the specified materials.

In each of its first two years of operation, the Yukon Department of Environment has made $100,000 available for the Waste Reduction & Recycling Initiative.

Recycling Club

The Recycling Club encourages children between the ages of 4 and 16 to redeem beverage containers in order to collect points and exchange the points for toys, music, and outdoor equipment.

Table 6

Container Type	Deposit	Refund	Containers Sold 2000/01	Containers Returned 2000/01	Return Rate 2000/01
Small (aluminum, glass, plastic, tin and Tetrapak 1000 ml or less)	$0.10	$0.05	13,000,000	10,200,000	78.5
Large (glass, plastic, tin and Tetrapak 1001 ml or more)	$0.35	$0.25	536,000	480,000	89.6
Small Liquor Containers (200 ml - 499 ml)	$0.15	$0.10	239,000	271,000	113.5
Large Liquor Containers (500 ml or more)	$0.35	$0.25	493,000	490,000	99.3
Refillable Beer and Cider Bottles	$0.10	$0.10	3,600,000	3,600,000	100.0
Total			**17,900,000**	**15,200,00**	**84.9**

The Raven Recycling Society manages the points and prizes on behalf of the Club and other Yukon recycling depots. The Club is sponsored by Yukon Environment, the Recycling Fund, and businesses, which sponsor prizes for the Club's annual catalog.

Yukon Council on the Economy and the Environment (YCEE)
http://www.ycee.yk.net/

The Yukon Council on the Economy and the Environment (YCEE), created in November 1989, was the first legislated round table on the economy and the environment to be established in Canada.

The YCEE's mandate is to advise the Yukon government and encourage non-governmental organizations, individuals and businesses to adopt practices and approaches that will further the goal of sustainable development in the Yukon. Specifically, the YCEE does the following:

- reviews major government policies, strategies, legislation and programs which affect the Yukon's economy and environment;
- advises on the implementation of the Yukon Economic Strategy and the Yukon Conservation Strategy and monitors the progress achieved by the implementation of the strategies;
- holds public meetings, workshops and conferences on major economic and environmental issues;
- promotes public awareness and understanding of the connections between the environment and the economy; and
- recommends research on sustainable development issues.

The YCEE functions as an independent advisory group that reports to the Government Leader of the Yukon. Members of the Council are appointed from business, industry, labour, First Nations, environment and community organizations.

Principle Contact Information

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3. Salvaging, Sorting and Elimination Organizations

The waste management sector includes a number of contributors whose roles and responsibilities relate to the different process stages ranging from collection to elimination. The main contributors are: salvagers and sorting and salvaging centres, recyclers, thrift centres, composting businesses, disposal businesses, municipalities and support organizations.

3.1 Salvagers and Sorting and Salvaging Centres

Salvagers and sorting and salvaging centres collect items made of paper, cardboard, metal, plastic, or glass and then proceed to sort these materials. What they are in fact doing, is separating the materials into different categories and then bulking them

into bails or containers that will be shipped to a recycler or directly to a user. In this way, waste is transformed into secondary materials.

Each day, sorting centres receive massive amounts of waste materials. In Quebec, located in Montreal's Saint Michel Environmental Complex (CESM) the salvaging centre of the City of Montreal has received more then 92,000 tonnes of recyclable material[1] in 2002. With its 150,000 tonne capacity, the CESM is the biggest sorting center in Canada. In the curbside collection of the urban territory of Montreal, cardboard and paper make up 72.4 % of the material collected. Glass accounts for 18.2 % of material, while metal and plastic respectively make up 3.3% and 4.6% of collected weight[2].

Courtesy of RécupérAction Marronniers

Sorting table for paper

In addition to sorting the waste, sorting centre operators must find markets for the paper, glass, plastics and metals. They must negotiate a price that gives them the best possible retribution for the sorted materials.

Salvaging and sorting centres are different from salvagers, in that they use a much more elaborate array of equipment to sort and condition the materials. Given this difference, businesses must often themselves condition the materials provided by salvagers. This is not the case for materials coming from sorting centres. Because of their positioning, sorting centres, in essence, constitute the heart of salvaging in Canada.

3.2 Recyclers

Recyclers use the secondary materials provided either by salvagers or by sorting or salvaging centres. Their objective is to transform salvaged materials into readily usable materials for the manufacturing of finished or semi finished products.

3.3 Thrift Centres

The thrift centres (or *"ressourceryie"* in Quebec) founded in Canada are businesses or organizations specializing in the salvaging of waste materials, plus are an important social mission in the community. Some of them collect furniture, while others are more interested in clothing or appliances. The collected goods are refurbished and sold at a discount. Sometimes, merchandise is handed out for free.

By getting in touch with regional thrift centres, it becomes possible to give new life to waste materials.

3.4 Composting Businesses

Organic material is the most polluting of all materials when it is eliminated. Table scraps, grass clippings and leaves all fit the description of organic materials. In 1998, more than 1 million tonnes of organic material were salvaged, which represents only 10% of all the organic compostable material (agriculture and forestry sectors are excluded) Composting facilities transform organic waste helped by the microorganisms natural capacity to decompose fresh organic matter into humus. Those facilities use different composting technologies which could be as simple as an outdoor platform, or more sophisticated like bioreactor or enclosed and ventilated windrows. The composting of organic waste allows the destruction of pathogenic bacteria living in the waste by

[1] Communauté Métropolitaine de Montréal (2003)
[2] Chamard - CRIQ - Roche (2000)

reaching high temperatures during the process. The compost obtained from the value enhancement process can be used to improve soil quality on agricultural land, landscaping applications, golf courses, tree nurseries, etc.

Courtesy of City of Edmonton

Edmonton Composting Facility

The Edmonton Composting Facility is a perfect example of high level technology**,** which rapidly transforms organic matter into compost. The 200,000 t/year facility processes Edmonton's residential solid waste and sewage biosolids, producing 125,000 t of compost per year.

Nevertheless, the outdoor composting with returned windrows is more commonly spread in Canada.

3.5 Elimination Businesses

Elimination businesses dispose of the majority of waste generated in Canada. The elimination methods used are landfill and incineration. The landfill sector is almost exclusively controlled by private businesses. They eliminate 60% to 70% of waste.

The traditional landfill method consists of compacting waste into successive layers that are covered with inert granular material, usually soil. In general, the waste layer does not exceed two metres. Most waste is disposed of by elimination, most often in landfills.

Today, many landfills still release rejects to the environment or contaminate the ground water. Many of them are still using the soil's natural filtering capacity without using a water collection and treatment system.

In 1998, most of solid non hazardous waste was disposed of, in 767 publicly and privately owned landfills in Canada.

Between 5 to 10% of the disposed tonnage was in one of the 45 incinerators across the country. Some incinerators in Canada are specialized in the destruction of hazardous waste, biomedical waste and municipal sludge. Incineration of non hazardous waste is still under fire because of the ashes and gases that are generated.

3.6 Municipalities

Municipalities play an important role in waste management. They are the first in charge of waste management.

The municipalities should form partnerships to determine the means of collection, transportation, treatment, and elimination best suited to their situation. Municipalities must determine the best location for municipal or regional waste management equipment and govern or operate waste collection, transportation or treatment services.

Courtesy of RECYC-QUÉBEC

Returning of windrows on an outdoor composting platform

3.7 The Support Organizations

Many provinces across Canada have founded governmental or non governmental support organizations with the mission to promote, develop and favour source reduction, reuse,

salvaging, and recycling of containers, packaging, materials, or products, as well as their value enhancement and also to inform, sensitize and educate decision makers and citizens in an effort to conserve resources.

No matter which, whether the *Recycling Council of British Columbia* or of *Alberta*, the *Saskatchewan Waste Reduction Council*, the *Manitoba Product Stewardship Corporation*, the *Recycling Council of Ontario*, *RECYC-QUÉBEC* or the *Resource Recovery Fund Board* of Nova Scotia, business managers can find a great deal of information in these resourceful organizations so as to achieve their waste management goals. Part 4 of this guide shows a complete list of those organizations in Canada.

4. Collection systems

There are different types of collection: selective collection, deposit system and Household Hazardous Waste (HHW) collection.

4.1 Curbside collection

The wide majority of Canadian households is currently equipped for recycling waste materials such as paper, cardboard, glass, metal and plastic.

At this time, rare are the municipalities that offer the selective collection service to businesses. Managers must, of their own initiative, negotiate a deal with a private company specializing in the collection of recyclable materials.

With regards to businesses, the municipality usually sets a limit of bins. The maximum volume of waste accepted may vary from one city to the other, so it is wise to inquire about applicable municipal requirements.

If the company generates more waste than the allowable limit set by the municipality, it will be forced to contact a service supplier and negotiate a contract.

Courtesy of RECYC-QUÉBEC

Municipal curbside collection

As a result of the increased volume of waste material, the lack of landfill space and the risks associated with toxic materials, municipalities have adopted new strategies: recyclable material selective collection systems and hazardous domestic waste collection systems.

4.2 Household Hazardous Waste (HHW) Collection

Many Canadian municipalities have a Household Hazardous Waste (HHW) collection program. It could be a travelling collection system: mobile units travel throughout the city at a specific period of the year. In other municipalities, permanent collection centres make it possible for citizens to dispose of their HHW any time.

Members of the community are asked to bring paint residues, used oils, car batteries, used batteries and solvents, as well as pesticides, cleaning products and medicines.

For now, in the majority of Canadian municipalities, businesses unfortunately do not have access to this service. Businesses must themselves contact specialized HHW collection companies.

The operator of the HHW collection centre must find an installation willing to accept the hazardous waste at the lowest possible cost. It is a fact that contrary to selective collection, HHW transfer centre operators must pay companies to accept and recycle most of the waste that they collect.

4.3 Deposit System

Deposit systems for beer and non alcoholic beverage bottles have been in wide use for a long time in many provinces in Canada. In almost every country, private companies introduced these systems. At first, the objectives were purely economical: the price of beverages can remain lower when containers are reused. With increased awareness toward environmental quality and energy and raw material shortages, public powers view deposit systems as an instrument of the environmental policy.

Generally speaking, deposit systems are considered compatible with the polluter pays principle: beverage drinkers, whether the beverage is alcoholic or not, must pay a certain ex ante amount for the pollution that they could cause. When the bottle or can is returned, pollution is prevented and the deposit returned. There is a certain element of reward that could make deposit systems more attractive. When they are effective, these systems contribute to reducing waste disposal problems, the presence of waste in natural settings and raw material and energy consumption.

Deposit systems should thus be considered for reusable products or substances, for recyclable products (bottles, cans and packaging) and for products whose destruction requires their return (tires). In addition, users and consumers must be able and willing to participate in the system, the quantity of products submitted to the deposit system must be sufficient and the collection system must be easy to implement.

The environmental effectiveness of deposit systems is related to the percentage of returns. The degree of effectiveness of deposit systems as a solution to environmental problems ultimately depends on the difference that exists between the costs of these systems and the costs associated with other systems showing comparable environmental effectiveness.

5. Waste: Action, Variety and Classification Principles

The volume and wide variety of waste produced by businesses and organizations can be such that effective waste management seems an insurmountable challenge in the eye of managers. However, volume is rarely an issue in the case of SMEs. When it does constitute an issue, it is usually because quantities are so small that they prevent volume savings.

In fact, in most cases, what actually complicate**s** things **is** the diversity of wastes and materials**,** as well as the selection of a strategy and appropriate treatment.

5.1 The Action Principle

Material management is made up of a variety of principles and concrete actions. In certain organizations, procedures can be very elaborate and complex. In others, they can be limited to simple operations that are easy to carry out. Whatever the case, effective waste management revolves around the following five action principles:

- **Source reduction**

Reduce energy, material and water consumption by using only the necessary amount of resources. This is a first way to reduce the production of waste.

- **Reuse**

Many products or materials can be used more than once, namely cartridge pens, beverage containers and rechargeable batteries.

- **Recycling**

Wastes containing recyclables are sorted prior to selective collection. This procedure focuses exclusively on products and materials that cannot be reused.

- **Recovery**

This action applies to materials whose transformation can yield energy or raw materials. This option should be considered only when reduction, reuse or recycling is not viable.

Paper and Cardboard Waste

Paper is an organic material. Landfilled, it biodegrades more or less rapidly depending on environmental conditions. It thereby contributes to the production of explosive and malodorant biogases as well as to the contamination of landfill leachate. If left untreated, the suspended solids and organic compounds occurring in the leachate can impact drinking water sources and aquatic ecosystems.

The pulp and paper industry is one of the driving forces of the Canadian economy. In 2000, the industry's 257,500 workers received 14 billion dollars in wages and produced 21 million tonnes of paper and cardboard. Despite the fact that 80% of Canadian production is exported, paper products are both the most disposed of and the most recycled category of waste, not to mention the waste most targeted by waste reduction programs. In addition, over the last 10 years, the Canadian pulp and paper industry has invested more than 6 billion $ in environmental upgrades.

In 1989, there was only one mill in Canada that could manufacture recycled content newsprint. Today, there are 22. The paper recovery rate in Canada in 1999 has reached 42.4%.

Source: - Forest Industry in Canada 2000. PricewaterHouseCooper, July 2001
- Environmental Progress Report 2000-2001, Forest Products Association of Canada
- Gouvernement of Québec, Ministry of Environment, 1999
To learn more on the subject: visit the FPAC Web site: http://www.fpac.ca

◎ **Elimination**

Finally, when none of the above is possible, the product is considered worthless and must be eliminated.

5.2 Salvaging Measures, Classification and Variety

Wastes exist under a wide variety of forms: glass, paper, plastic, metal, renovating, building, maintenance, and food products, etc. But for each category of waste, there are ways for managers to save money and preserve the environment.

We have classified wastes into broad categories and for each category, we suggest some simple salvaging actions.

5.2.1 Paper

Printers, faxes, photocopiers, and computers have become essential equipment in today's business environment. It should therefore come as no surprise that paper currently represents more than half of office waste!

However, applying the 3R principles can easily reduce the amount of paper that is discarded. First, implementing simple rules and actions can reduce paper consumption.

Simple Actions

- ◎ Encourage double sided printing and copying of office documents. If only half the employees changed their old habits, significant progress would be made.
- ◎ Forego the distribution of personalized memos to each employee. Instead, print a single copy and circulate it with a distribution list.
- ◎ Whenever possible, try using e-mail and telephone conversations.
- ◎ Used paper, like bad photocopies for example, should be collected and distributed to employees. It can be reused as scrap paper or for fax transmission sheets.

Despite the efforts made by businesses to minimize paper consumption, they continue to generate paper waste. Thus, it is essential that businesses implement collection programs.

Installing Collection Bins

The first step is to provide collection bins in each of the strategic areas of your office environment (near photocopiers, printers, fax machines, etc.). Ideally, each workstation should be outfitted with a collection bin. Sorting paper from waste is a determining step in controlling the quality of recycled materials. Paper that has been adequately sorted can be delivered to the paper mill with minimal contamination. The traditional office trash bin can now be converted into a collection bin simply by hanging a miniature trash bin from its side. Waste such as old pens or tissues can be disposed of in the miniature trash bin while paper is placed in the newly converted collection bin. The use of blue paper collection bins is recommended to remind employees that paper, even once used, is not a waste.

Centralized Storage Depot

The next step is to locate and outfit a centralized storage depot. Collected paper can be transferred there daily or weekly, as needed. If the business is located in a building that is already serviced by selective collection, all this business needs to do is join the service. If this is not the case, a company specializing in the transport and resale of paper must be contacted. These companies, called salvagers, establish the offering price based on offer and demand. Volume and quality are two key factors in determining the financial value of mixed office paper (*office mix)*.

5.2.2 Containers

Paper is only part of the problem. Coffee breaks and snack bars generate their fair share of waste. This waste contains an assortment of containers used for packaging food. Be they made of glass, plastic or metal, these containers could often be reused or recycled.

How can the amount of containers being disposed of be reduced?

Some Simple Actions

Reduce Consumption

- The primary objective is to reduce the number of containers used in the business. Avoid using disposable dishes as well as individual cream containers and sugar packets. Replacing disposable coffee cups with reusable mugs is also one of the priorities.

Urge Employees to Recycle

- After reducing the use of containers, the next step is the implementation of a recycling program. Set up recyclable material collection points near high traffic areas such as the kitchenette, washrooms or next to elevators. All recycling bins should be clearly labelled so employees can easily identify what they can put in the bins.
- If the building already has a selective collection service, all that needs to be done is join the service. Otherwise, a company specializing in the collection and resale of recyclable materials must be contacted. By forming an association with other building tenants, it becomes possible to negotiate a better deal.
- Generally speaking, it is preferable to deal with a single company for the collection of all the waste. Because some wastes have a cost associated with their collection, it is possible to reduce costs when dealing with only one company. In some circumstances, building managers or tenants may have to pay for the collection of wastes such as plastic, metal and glass, but this is usually offset by the reduction in waste elimination costs. The trash container does not fill up as rapidly and pick up frequency is consequently reduced.
- Once the recycling system is operational, it is important to stay on top of new developments. For example, polystyrene coffee cups that were not recyclable a few years ago are now accepted by some installations. For more information, contact the *Polystyrene Recycling Association of Canada* at (905) 612-8290.

In an SME environment, plastic, glass and metal form are an easily collected group of waste.

5.2.3 Plastics

Plastic materials are used in the manufacturing of a wide variety of consumer products.

A plastic is essentially any material that can be heated and molded so that it retains the molded shape after it cools. The packaging, construction and automotive industries are the three largest users of plastics in Canada, consuming almost of resin production. We are in contact with plastics everyday. They make up about 8% by weight , 14% by volume of total waste landfilled in Canada.

Today, a wide variety of plastic polymers, also called resins, are derived from natural gas, crude oil or other naturally occurring building blocks. Six resins account for 97% of the plastics used in packaging:

List of the most commonly used resins in packaging

Resin name	Abbreviation Code	Typical use
Polyethylene terephtalate	PET 1	Soft drinks
High-density polyethylene	HDPE 2	Juice, beverages, laundry
Polyvinyl chloride	PVC 3	Film
Low-density polyethylene	LDPE 4	Grocery bags
Polypropylene	PP 5	Yogurt cups, margarine tubs
Polystyrene	PS 6	Coffee cups
All others	(OTHER) 7	

Source: Canadian Plastics Industry Association.. Answers to Your Questions About Plastics in the Environment. To learn more about plastics, visit the CPIA Web site: www.cpia.ca

Plastic waste is collected and recycled through the deposit system, municipal selective collection and private commercial collection services.

Simple Actions

- Install a sink in the kitchenette and encourage the use of durable utensils, mugs, cups, plates, and bowls by employees.
- Allow employees to borrow durable dishes from the kitchenette and label them clearly to ensure their return.
- In the kitchenette, provide appliances such as a toaster oven, a microwave oven, etc. to encourage employees to bring home cooked meals to work in reusable containers.
- Urge employees to purchase food products that are packaged in an environmentally friendly way.
- Make employees aware that they can recycle plastics bearing symbols 1, 2, 3, 4, 5 or 6.
- Set up multi material bins near washrooms, the kitchenette or elevators.
- Ask that maintenance staff not use plastic bags in trash bins containing dry waste.
- Create little information posters (for example: "Did you know that it takes 5 recycled PET bottles to make enough insulation for a winter jacket[2]?")

5.2.4 Glass

Glass is infinitely recyclable and can be reintroduced into the manufacturing process of products identical to those from which it originated. Four collection systems are used for glass waste: private deposit system (for multiple recycling of beer bottles), public deposit system (for single use containers), municipal selective collection and private commercial collection service.

Simple Actions

- Provide a refrigerator in the kitchenette so employees can keep larger, reusable containers.

[2] Source: Public Works and Government Services Canada (April 1998)

Form 1

List of targeted wastes
Office environment

See page 189

- Ask maintenance staff to use concentrated cleaning products, ideally in bulk format.
- Encourage employees to use durable cups and mugs.
- Encourage the collection of recyclable clear and coloured glass.
- Post simple messages in strategic areas, near the soft drink vending machine for example.
- Provide a multi material bin in all strategic locations.

5.2.5 Metals

Metals represent more than a third of all waste generated by the industrial, commercial and institutional sector (RECYC-QUÉBEC, 1999). The production of metal containers such as tin cans and aluminium cans is in large part responsible for keeping this number as high as it is. The three main collection systems are the deposit system for single use beer and soft drink containers, municipal selective collection and commercial selective collection.

Metals are infinitely recyclable. The resource savings tied to the use of these materials are impressive: a can manufactured from recycled aluminium requires 20 times less energy to produce than a can manufactured from raw materials.

Simple Actions

- Provide a refrigerator in the kitchenette so employees can keep larger, reusable containers.

Glass waste

A glass container is made of the simplest ingredients - silica sand, soda ash and limestone. When used glass is crushed, it returns virtually to its natural state. It is inert, non-toxic and can't contaminate the environment even when disposed of in landfill sites. But there is also no reason why glass containers should ever take up valuable landfill space when they can be used, over and over again.

Glass is 100% recyclable - it can be recycled indefinitely to make new glass. The goal should be the recycling of all glass food and beverage containers, so that the only new glass made is to meet increasing market growth for the products they contain.

Crushed recycled glass, called "cullet", is combined with virgin raw materials (silica sand, soda ash and limestone) in the glass manufacturing process. Since recycled glass is used as a direct substitute for raw materials, good quality recycled glass must be obtained - and this means used container glass which is colour sorted and doesn't include foreign materials such as heat-resistant glass cookware, ceramics, window glass, drinking glasses and light bulbs. All these materials are made of ingredients which are different from container glass and will cause problems in the glass making process. To make maximum use of collected glass, the containers must be sorted to separate the clear from coloured glass. Only clear recycled glass can be used to manufacture new clear glass containers.

Source: Glass Works, 2000
To learn more on the subject: visit http://www.glassworks.org

- Encourage the use of reusable containers by employees.
- Distinguish between materials that are recyclable and those that aren't and remove metals from the waste stream in order to sell them to salvagers.
- Post simple messages in strategic areas.
- Provide a multi material bin in all strategic locations.

Photographer: Sylvain Mageau

Cans

5.2.6 Computer Hardware

In addition to taking up lots of space in landfills, hardware such as computers, disks and printer cartridges can be toxic for the environment.

Computers

In Canada, it is possible to give a second life to old-fashioned computers through organisms that recycle and update them for the benefit of schools. The computer material no longer used by companies like 486 and up processors, colour screens, printers, and mice are among the equipment that is collected through these organisms. Computers are refurbished and distributed to schools and libraries. In addition, participating companies are issued a tax receipt A list of computer recycling organisms is available on the Internet at http://www.microweb.com/pepsite/Recycle/Can.html.

Disks

Whenever possible, old disks should be formatted, labelled anew and reused.

Printer Cartridges

It is important to make sure that printer cartridges are recyclable. Manufacturers often collect used cartridges to refill or recycle them. An effective means of reducing the number of cartridges ending up in landfills is the use of e-mail instead of faxes and letters. Finally, using the "economy" mode on laser printers is imperative when superior printing quality is not required.

5.2.7 Office Hazardous Waste

Some of the products commonly used in the office contain toxic substances and are considered hazardous to the environment. Some such products are correction fluid, markers, batteries, fluorescent lamps and photocopier toner. In small amounts of course, these products do not constitute a threat to the natural environment. However, the cumulative effect of a large amount, of this type of waste could have a significant environmental impact.

Storing Hazardous Waste in a Safe Location

All the hazardous waste produced in an office should be collected and stored in a safe location. If the amount collected is small, an employee can volunteer to bring the waste to the municipality's annual domestic hazardous waste collection. If a significant amount has been collected, a company specializing in hazardous material collection and transfer will have to be contacted. Section 3 of this Part of the Guide provides more information on this topic.

5.2.8 Cleaning Products

Many cleaning products are corrosive, flammable, reactive or toxic. When they are poured down the drain, they kill off the useful microorganisms of the sewage treatment plant and contaminate the environment.

What to buy?

When purchasing cleaning products, the ones bearing the following symbols should be avoided:

The purchase of a large quantity of product should be avoided. When the time comes to dispose of such products, one should find out about local depots or hazardous waste collection dates. If the company generates a significant amount of this waste, a company specializing in hazardous material collection and transfer will have to be contacted.

5.2.9 Industrial By-Products

In a majority of businesses, particularly industries, manufacturing processes generate by-products : waste water, manufacturing wastes, absorbent, oily sludge, filters, solvents, wood and dust. By-products often account for the majority of the volume, mass and management costs of a business' wastes. Optimizing by-product management can therefore substantially increase the generating business' environmental performance while affording disposal cost savings.

It must, however, be noted that by-product characteristics are directly related to the manufacturing process, the collection and storage processes and the characteristics of the raw materials used. This accounts for the initial perception of complexity regarding their management when compared to the wastes produced in the office, such as paper and plastic containers. The use of a structured approach easily provides pathways for improvement.

First off, the industrial by-product classification must be determined, based on regulations. There are three classes to choose from: "solid waste", "hazardous waste" or "special waste". The optimization strategy depends on this classification:

Solid Waste

Solid waste does not pose an environmental threat, which facilitates its management. The handling, storage and transportation of solid waste does not require any special permit or certificate. Unless a specific regulatory ban exists, solid waste can be disposed of in regular landfills in the same manner as domestic waste. If the disposal of a by-product classified as a solid waste requires safe destruction, management costs become prohibitive.

Hazardous Waste

Waste that falls into this category is very damaging to the environment when it is landfilled, incinerated or accidentally released. That is why regulations dictate the proper management of hazardous waste in such a way as to ensure the environment's protection.

Because of the environmental hazard it poses, precautions must be taken when storing, transporting and treating hazardous waste. These factors lead to increased management costs for the business producing the hazardous wastes.

Form 2
List of targeted wastes
Maintenance
See page 190

Information Technology (IT) and Telecommunication (Telecom) Waste in Canada

The Information Technology (IT) and Telecommunication (Telecom) Waste in Canada report was commissioned by Environment Canada to develop baseline estimates of the amount of IT and Telecom equipment waste that is currently being generated in Canada. The study is also designed to provide a broad overview of how such products are handled and to estimate the amounts of these products and materials that will enter the waste stream in the next few years. These tasks were accomplished through the development of a Waste Flow Tool that was modified slightly for each of the main streams of IT and telecom waste that are addressed in this report.

Information Technology Wastes

Based on the Waste Flow Tool, it is estimated that in 1999, approximately 33,972 tonnes of IT equipment waste (including PC monitors, laptops and peripherals, but excluding mainframes and other large equipment) was disposed, 15,592 tonnes was recycled, 24,507 tonnes was sent for reuse and 6,128 was put into storage. Some pieces of IT equipment which had been stored or reused in previous years entered the waste stream in 1999. Of the IT waste disposed, PCs and servers accounted for an estimated 10,833 tonnes, monitors accounted for an estimated 10,688 tonnes, peripherals (scanners, printers, etc.) accounted for about 11,474 tonnes and laptops accounted for about 977 tonnes. The Waste Flow Tools predict that approximately 67,324 tonnes of IT equipment waste (including PCs monitors, laptops and peripherals, but excluding mainframes and other large equipment) will be disposed in 2005, 47,791 tonnes will be reused, 11,948 tonnes will be stored and 43,428 tonnes will be recycled. Of the total IT waste that will be disposed, PCs and servers will account for an estimated 23,349 tonnes, monitors will account for an estimated 24,472 tonnes, peripherals (scanners, printers, etc) will account for about 17,396 tonnes and laptops will account for about 2,107 tonnes.

Telecommunications Wastes

The telecom sector Waste Flow Tools estimate that in 1999, approximately 2,961 tonnes of telephones, facsimile machines and mobile telephones were disposed, 2,256 tonnes were recycled, 2,253 tonnes were reused and 482 tonnes were put into storage in Canada. In 2005, the Waste Flow Models predict that approximately 4,328 tonnes of Telecom equipment waste (including telephones, fax machines and mobile phones) will be disposed in Canada, 3,729 tonnes will be reused, 786 tonnes will be stored and 4,087 tonnes will be recycled. The study did not include mainframe computers and other large equipment, such as Telecom switching stations.

Source : Environment Canada Web site: http://www.ec.gc.ca/nopp/docs/rpt/itwaste/en/summary.cfm

Organic Waste

Organic waste is not toxic in and of itself. However, its presence is the main cause of landfill contamination. When incinerated, its high water content lowers oven temperature and reduces the combustion quality for mixed waste, a situation highly favourable to the synthesis of highly toxic substances such as dioxins and furans.

In landfills, fermentation in an oxygen poor environment, results in the production of malodorous and explosive biogases. These gases can migrate and accumulate in neighbouring buildings, and they can also impact human health and vegetation. On top of this, they contribute to the greenhouse effect. Organic material decomposition is also accompanied by an acidification of the environment that facilitates the mobiliszation of other pollutants such as heavy metals. Decomposition of organic material is also a source of organic compounds whose presence in leachate is indicated by the BDO5 (5-day biochemical oxygen demand).

Source: Gouvernment of Québec, Ministry of Environment, 1999
To learn more on the subject: visit the ministère de l'Environnement's Web site
http://www.menv.gouv.qc.ca/matieres/index.htm

Special Waste

Some industrial by-products cannot be classified as either solid wastes or hazardous wastes. In other words, the by-product is too dangerous to earn the solid waste designation, but not dangerous enough to earn a hazardous waste designation.

In such a case, the authorities must be contacted to determine the business' obligations and exemptions regarding the storage, transportation and disposal of the special waste it generates. It is also possible that the by-product is specifically addressed in the regulations.

What approach should be used?

- Reassess the process to identify opportunities for reducing the number of by-products generated.
- Consider the possibility of replacing raw materials with alternatives that would reduce the toxicity of by-products.
- Assess the feasibility of modifying the process in order to reintroduce by-products into it.
- Investigate the possibility of supplying by-products to surrounding businesses that could use these by-products as raw materials.
- Commission research projects that will explore new uses for by-products.

Form 3 — List of targeted wastes — Production department

See page 191

Form 4 — List of targeted wastes — Warehousing, distribution and packaging

See page 192

5.2.10 Kitchen Waste

Kitchen waste makes up approximately 20% of the waste stream in office buildings. Food waste undergoes very little degradation in landfills because of the controlled conditions present. The Darmouth General Hospital's program (see Part I of this Guide) showcases this institution's efforts in the area of composting waste and organic materials generated by the employee cafeteria.

Simple Actions

Purchasing foods like cream and sugar in bulk can reduce the production of kitchen waste. Cafeteria operators can do likewise. Individual portions are more expensive and often lead to squandering.

To prevent kitchen waste from ending up in the landfill, composting is the method of choice. Many models of composters are available on the market. Some are designed for interior use; others must be set up outside. The choice of a suitable system must take into account the volume of waste to be composted and the available amount of space. A composting unit could also be shared with fellow building tenants or neighbouring building tenants.

In addition to the composter, small bins must also be purchased. These will be placed in the kitchenette, in plain view, for users to put in their waste. Every day, maintenance staff will be in charge of collecting bin contents and transferring them into the composter. Part 4 lists some relevant composting references.

5.2.11 Renovation Waste

Construction and demolition wastes take up a large amount of space in landfills. They are mostly composed of inert materials such as concrete, brick or asphalt. They also contain packaging waste as well as heterogeneous materials (gypsum, textile, glass, etc.). When exposed to humid and acidic conditions for prolonged periods of time, these materials can release contaminants that are hazardous to human health and the environment.

Demolition

Before demolishing a building, it is important to tour the site in order to identify salvageable materials that could fetch a good market price. Doors and windows, plumbing accessories and some electrical equipment are some of the things that could be salvaged.

After the demolition, dry materials must be sorted in order to facilitate salvaging efforts. Plastics, glass and metals can be recycled; wood can be used as fuel; concrete can be crushed for aggregate recovery. A classified add in the local paper is often a good way of finding someone who would be interested in the salvaged materials.

Construction

When buying building and renovation materials, suppliers should be asked to reduce packaging to a minimum and to provide, when feasible, reusable packaging that can be returned to them.

It is preferable to use building materials with recycled content or materials that are less

environmentally harmful. At the time of purchase, the supplier should be asked whether he will take back unused materials at the end of the construction project.

5.2.12 Energy

Getting onboard the environmental revolution requires adopting a responsible approach to energy management. There are many ways to preserve this precious resource.

Simple Daily Actions

When leaving the office, shut the lights off and shut down electrical equipment such as computers and photocopiers. Encourage employees to do the same. If necessary, hang signs next to major equipment reminding employees to turn it off after use.

Look into using compact fluorescent bulbs. They give off as much light as incandescent bulbs while using less energy. They are more

Construction and Demolition Waste

Dry materials make up one third of the waste produced in Canada.

Historically, dry materials have not been considered a source of pollution since they are essentially made up of slightly or non degradable materials that are not likely to contaminate surface or ground water or to release contaminants into the environment. Hence, concrete, cement, masonry, insulating materials, asphalt shingles, pavement, glass and plastics are not likely to release contaminants into the ground water.

When left in moist and acidic conditions for prolonged periods of time, wood, gypsum and metals release contaminants (e.g., phenols, iron oxides (rust), metallic salts, calcium sulphates) that are potentially harmful to human health or the environment. Also, harmful organic or toxic wastes can sometimes be found mixed in with the bulk dry materials destined for elimination. They are rarely spotted since landfill operators do not carefully screen the bulk materials. Construction and demolition waste are 90 % recyclable.

SALVAGED PRODUCTS	USES
Asphalt	Asphalt shingles, road repair material, fill material, drainage stone, aggregate for producing bituminous concrete.
Bituminous concrete	Fill material, drainage stone, aggregate for producing concrete or bituminous concrete, road repair material.
Concrete and cement	Fill material, drainage stone, aggregate for producing concrete or bituminous concrete
Reinforced concrete	Reebar, beams and framing.
Brick	Fill material, drainage stone, aggregate for producing concrete or bituminous concrete
Untreated wood	jointed lumber, fertiliser, composting material, plywood panelling, moulded presswood pallets, firelogs, litter, combustible granules, much, aggregates for concrete.
Gypsum	Fertilizer, litter, acoustic insulation, thermal insulation.
Wood chips	Insulating materials, shingles, sawdust, asphalt shingles, felt paper, interior-exterior cladding, acoustic panelling.

Adapted from: RECYC-QUÉBEC, 1996. Bilan des matières récupérées et recyclées au Québec

Form 7
CHECKLIST OF ENERGY SOURCES USED
ENERGY RESOURCES
See page 195

expensive to purchase, but their increased lifetime is worth the investment. Halogen lamps are also effective. They produce a light that is similar to that of incandescent bulbs but last two to four times longer (Environment Canada, 1992).

Close the curtains at the end of the work day to reduce heat loss in winter and cooling costs in the summer.

When purchasing new equipment, it is important to look for models with a high energy rating. The *Guide to Buying and Using Energy-Efficient Office Equipment* and the *Équipements de bureau énergétiques: avoir le sens des affaires guide*, published by Natural Resources Canada, are full of interesting information on this topic. They are available free of charge from the Energy Efficiency (1-800-387-2000).

How much will I save on my electrical bill?

Typical computer, screen and laser printer, assuming 0.235 kW of electricity at a cost of $0.08/kWh.

Conventional model, never shuts down
Annual electricity cost : **$165**

Energy-efficient model, never shuts down
Annual electricity cost: **$84**

Energy-efficient model, shuts down at night
Annual electricity cost: **$28**

Source : Natural Resources Canada, 1996.

National Research Council Canada Industrial Research Assistance Program
Putting Innovation to Work for Canada

The National Research Council's Industrial Research Assistance Program (NRC-IRAP) provides Canadian small and medium sized enterprises (SMEs) with value added technological and business advice, financial assistance and a range of other innovation assistance. This assistance, customized to the needs of each client, is offered through IRAP's network of some 260 Industry Technology Advisors (ITAs) situated all across Canada. They help some 12,000 Canadian SMEs clients realize their full potential, turning knowledge and innovation into strategic opportunities, jobs and prosperity for all Canadians. For more information on the program and on its regional offices refer to the IRAP Web site at: http://irap-pari.nrc-cnrc.gc.ca/english/main_e.html.

NRC-IRAP's principal role is to stimulate the innovation capacity of SME. IRAP recognizes that this can be accomplished more effectively if it fosters, at the same time, the application of the principles of sustainable development. In this context IRAP encourages the SMEs to identify clearly the needs of their clients and to use a systematic approach in the design and development of products to respond to these client needs. This approach aims to avoid waste of all types, be it time, materials or energy. More specifically NRC-IRAP encourages SMES to minimize the production of waste materials and to develop new by products based on waste materials. For this reason, IRAP is pleased to collaborate in this Guide to Waste Management.

One tool that NRC-IRAP offers to its clients is the Web site dedicated to Design for Environment (DfE), http://dfe-sce.nrc-cnrc.gc.ca/home_e.html. Notable on this site is a vast repertory of Web references to the application of DfE strategies.

NRC-IRAP fosters as well, the important initiative, "The Lean Enterprise". A group of ITAs from across Canada works diligently to promote the principles of the lean enterprise. This notion goes well beyond lean manufacturing. NRC-IRAP fosters a systematic approach where the emphasis is put on a coherent and highly efficient process extending from design, development and procurement to marketing. Waste in all its forms is kept to an absolute minimum.

NRC-IRAP helps organize workshops on the application of lean principles across the country. IRAP facilitates the formation of consortia for those companies that aim to be exemplary in sustainable and efficient development. Within these consortia, the IRAP clients have the opportunity to put together economic training sessions, collaborate in identifying the best paths to success and in helping one another along these paths.

For more information on this initiative, you can contact Mike Barré at mike.barre@nrc-cnrc.gc.ca or at (613) 993-1227. For more information on high performance manufacturing, a good source of information is Industry Canada's Web site:
http://strategis.ic.gc.ca/epic/internet/incrghpm-gcrpfhp.nsf/vwGeneratedInterE/h_at01188e.html.

Environmentally Friendly Construction
PWGSC paving the way toward green buildings

As with all federal departments, Public Works and Government Services Canada (PWGSC) must develop a sustainable development (SD) strategy that is tailored to its operations. Because of its involvement in the realization of real estate projects (construction, renovation and demolition) and in response to international trends in this direction, PWGSC has set objectives for making its real estate projects more environmentally friendly. The Commissioner to Environment and Sustainable Development is tasked with verifying that PWGSC respects its SD strategy.

Making real estate projects more environmentally friendly requires that construction and renovation be performed in a more environmentally friendly manner. Georges Mezzetta, Regional Manager, Environment, Centre of Expertise PFMS/AES, Real Property Services Branch, Quebec Region, is quick to point out the difference between environmentally friendly construction and the green building. "In fact, environmentally friendly construction involves planning ahead to include the five elements of a green building," which are:

1. energy and the application of new energy technologies for buildings;
2. green materials (recycled or with minimal environmental impacts);
3. the management of construction and demolition (C&D) waste in order to promote reuse and recycling;
4. the quality of the indoor environment (air and layout), on the one hand, to answer the occupants' needs and promote productivity, and on the other hand, to facilitate effective rearrangements of the living space; and
5. the integration of conceptual criteria such as the building's position, access to public transportation, outdoor layout, integration with the urban landscape, light penetration, the creation of a roof top garden, etc.

Georges Mezzetta, ing. , MScA
Regional Manager, Environment,
Centre of Expertise PFMS/AES,
Real Property Services Branch,
Quebec Region

"We must remain realistic" states Mister Mezzetta, environmentally friendly construction is subject to financial constraints. Every environmentally friendly construction project must be economically feasible. European studies have demonstrated that investing between 10 and 12% more for a green building can reduce operating expenses by 25 to 30%. Fundamental to sustainable development, a global and long term vision – in other words, life cycle analysis – proves to be essential to a full appreciation of the benefits.

Environmentally friendly construction represents a change of mentality that, as always, doesn't become mainstream overnight. That is why PWGSC's SD strategy has allotted four years (2006 being the target) for the full integration of this ecological dimension in its real estate projects. During the transition phase, a growing number of real estate projects will have to incorporate the 3Rs hierarchy (reduce, reuse

and recycle). Once the integration is complete, all eligible real estate projects, i.e. economically feasible projects, will integrate the C&D waste management principles developed by PWGSC.

The change of mentality must also make its way to the building contractors. The construction industry is open to adjusting its thinking. Consultations seem to indicate that if PWGSC generates demand for services that include a green dimension, the construction industry will provide the offer. However, cautions Mr. Mezzetta, "the demand must appear to constitute a genuine business opportunity, not the whim of the client". Environmental conscience does not have precedence over economic feasibility, especially in the absence of regulatory obligations.

Then why not promote environmentally friendly construction by regulatory means? "Each project having its own specifics, the elaboration of environmentally friendly construction regulations would prove difficult. Rather, the best approach involves promoting the benefits that environmentally friendly construction bestows upon all those involved: contractors, managers and even the population, who also carry out construction, renovation and demolition work".

Does the environmentally friendly construction concept apply even to small scale real estate projects? "It seems to depend on the CEO's attitude. Although financing an SME is difficult, environmentally friendly construction will appear beneficial to a person adopting a long term view of things".

Implementing the environmentally friendly concept necessarily involves that one or more of the green building elements detailed previously be integrated at the planning stage.

"Demolition work must make use of the deconstruction techniques, proven for many years. Basically, it means carefully removing as many materials as possible from a building (wood, sinks, brick, metal, etc.) before it is demolished. The materials that are recovered can then be reused or recycled", explains Mister Mezzetta.

Pilot projects headed by PWGSC aimed to develop the decision-making tools that could help determine the economic parameters to consider when assessing the judiciousness of environmentally friendly real estate projects. In doing so, PWGSC also wishes to identify the limits imposed by the concept, such that it can be effectively defended before the Treasury Council.

A few years from now, environmentally friendly construction will have given way to construction, period. And not only at PWGSC! "The calculation method must be reviewed and corrected", according to Mister Mezzetta, "rather than invest in a construction project, then manage it, construction should focus on providing more effective and economical management". This is what environmentally friendly construction is all about: produce a building of equal or even greater quality yet costs less in the long run and uses less resources.

Industry Canada
Partner of the Environmental Industry

Environmental Affairs Branch

The Goal of the Environmental Affairs Branch is to accelerate job growth and creation by assisting Canadian Environmental firms to become more competitive domestically and internationally. But we also promote good public environmental policy and corporate stewardship as part of Canada's Sustainable Development Strategy.

Technology Partnerships Canada (TPC)

Technology Partnerships Canada (TPC) is a technology investment fund established to contribute to the achievement of Canada's objectives: increasing economic growth, creating jobs and wealth, and supporting sustainable development. TPC advances and supports government initiatives by investing strategically in research, development and innovation in order to encourage private sector investment, and so maintain and grow the technology base and technological capabilities of Canadian industry. TPC also encourages the development of small and medium sized enterprises (SMEs) in all regions of Canada.

TPC supports research, development and innovation in :

- environmental technologies;
- enabling technologies (advanced manufacturing and processing technologies, advanced materials processes and applications, applications of biotechnology, and applications of selected information technologies); and
- aerospace and defence.

Environmental technologies are a key area for investment by TPC. These technologies advance sustainable development by reducing risk to human health and to the environment. They enhance the cost effectiveness of achieving environmental protection, improve process efficiency, and produce innovations that are environmentally beneficial or benign. The benefits of environmental technologies permeate a broad spectrum of industry sectors, including firms in the resource processing, manufacturing, industrial and transportation sectors. New technologies are evolving rapidly as issues such as sustainable development, climate change and pollution prevention increase in importance. Environmental competency is rapidly becoming an asset for every industry sector.

Environmental technologies include sustainable resource management technologies, pollution prevention and control technologies, remediation technologies, and monitoring and assessment technologies.

TPC investments in environmental technologies include:

- development of sustainable alternatives (better conservation of energy, water and non renewable resources);
- pollution prevention through the development of clean process technologies (including clean car technologies);
- pollution abatement (technologies that reduce waste or harmful emissions); and
- pollution remediation (clean-up and restoration technologies which address environmental degradation).

TPC gives priority to advancing environmental technologies that are innovative and sustainable, offer cost efficiencies over traditional methods, and where early and broad adoption in Canada promises tangible environmental benefits. Eligible activities for TPC funding include:

- industrial research;
- pre competitive development;and
- studies.

Le Centre d'expertise sur les matières résiduelles (CEMR)
Quebec's Centre for Waste Expertise

The Centre was created in Spring 2000, as a centre for waste expertise, by three major environmental players in Quebec: Réseau Environnement, ICI Environnement and the City of Montreal. This strategic partnership of private enterprise, the university milieu, and the municipal world is a key asset for accomplishing the mission of the Centre: to promote sustainable and responsible management of waste material.

The role of the Centre is to make the issues of waste management better known, by disseminating information and encouraging innovation and the development of Quebec expertise in this field. In two years, the Centre has made its mark on Quebec's environment through its accomplishments in three development strategies.

A Technology Showcase

The Centre opened a technology showcase where innovative Quebec technologies in waste management are displayed and demonstrated: from collection to elimination. Strategically located on the site of the Saint Michel environmental complex, the technology showcase is a valuable site for the trade and promotion of Quebec know how, with local and international visitors seeking innovative solutions for the treatment and use of their waste materials. The results of these first two years - nearly 1,200 visitors from 26 countries - show that Quebec expertise in the integrated management of waste materials has acquired an international reputation.

An Information Centre

The information centre is a centre for distribution and dissemination of information on issues related to the management of waste materials and solutions that have been applied to deal with them in a context of sustainable and responsible development. Staging an environmental cycling safari on the cycle path which surrounds the Saint Michel environmental complex is an example of the interpretation and public awareness role that the Centre is intended to play.

An R & D Forum

The R & D Forum of the Centre d'expertise sur les matières résiduelles is a meeting ground for actors, universities, public and private organizations working in the field of waste management. The advisory committee is responsible for knowing the strengths and weaknesses of the waste materials sector and discussing the trends and issues, in order to identify the priority areas for research and development in Quebec and specify action priorities in this field. The first mandate of the advisory committee has been to validate and approve a study made by two Quebec researchers on the state of research in Quebec from 1990 to 2003 in the domain of waste materials.

All of this action and these accomplishments confirm the integrating role played by the Centre with the actors of this sector. The Centre intends to play a leading role and to set a global standard of excellence in the field of waste management.

To visit the technology showcase or to be a part of it, and to obtain more information on the Centre, contact Christiane Bolduc, project coordinator, at (514) 728-3999.

Centre d'expertise sur les matières résiduelles

The Centre is located at 2525 Jarry Street East in Montreal and its Web site is at: www.cemr.ca.

VPA and Environmental Management

In the current economic situation, companies must set themselves apart from the competition by consistently delivering top quality products and services at the best price. Managers, therefore, look to continually improve their company's performance. An operational analysis, using the "value added production analysis" (VPA) technique, makes it possible to identify good performance elements, pinpoint areas where the activities carried out add no value for the company and optimize gains from value added activities.

Of the elements taken into account during a VPA, waste management is unfortunately often neglected, and this despite the fact that the associated costs and problems can have a major impact on overall process performance.

Let us analyze an activity that does not add value: glue, received in barrels, is poured into plastic containers for distribution to workstations. Once empty, these containers are refilled. The analysis shows that purchasing the glue in plastic containers would eliminate the handling and pouring operations and free up manpower. Unfortunately, the analysis did not consider the management of empty containers and their return to the supplier. Ultimately, the large increase in waste volume and the latter's disposal costs cancelled all the anticipated gains from eliminating an activity without added value.

Conversely, a sizing powder paint system, although initially more expensive, is more profitable than using liquid paint, since it allows for better recuperation of raw materials, requires fewer air filters and eliminates the use of dangerous organic solvents. Add to this a considerable decrease in the risk of environmental incidents (solvent spills into the sewer system) and the risk to workers (no longer exposed to carcinogenic solvent vapours).

These two examples show the inseparable link between the analysis of a process to increase its efficiency and the application of good environmental management practices.

Waste management must also be reevaluated on the basis of intrinsic added value. It is important to remember that the objective of this VPA analysis is to increase both the value of the product or service and customer satisfaction.

Basically, customers are looking for the best quality/price ratio. Other elements, such as the availability of the product at the right time, and the quality of after sales service, are also very important. Of late, another element is taking on a greater significance: the impact on their corporate image. Over the past few years, managers are questioning the impact of supplier selection on the image projected by their company. The implementation of the ISO 14001 environmental management international standard, and the existence of the *Dow Jones Global Sustainability Index*, which includes international corporations with the best environmental management practices, are good illustrations of this new philosophy. But don't be deluded: these managers have incorporated environmental aspects into their operating methods because consumers and as a result, shareholders, have become much more aware of environmental realities.

More than ever before, enterprises will favour establishing a relationship with suppliers that have a good corporate environmental image. In some cases, they will even accept higher prices in return for a reduction of the risks to their image.

In this type of situation, waste management becomes a value added activity. The very definition of waste is thus expanded from the notion of waste generated by the production process to now include:

- unused or nonconforming raw materials;
- packaging materials; and
- nonconforming products.

It is therefore important to review manufacturing processes from a new standpoint, incorporating the concepts of good waste management. The application of the 4Rs principle (**R**educing, **R**eusing, **R**ecycling and **R**ecovering) provides a very interesting basis for analysis in this regard.

Unfortunately, gathering all the information necessary to a relevant analysis of the impact of waste is not always easy. Assistance can be obtained from various government organizations and environmental departments, specialized recycling companies that will willingly provide information about their services, a company's suppliers, most of which will be very interested in participating in their customers' efforts and lastly, private consulting companies.

Apart from the difficulties in recognizing good opportunities, the success of any waste management process requires changing work habits and employee attitudes. Therefore, it is important to encourage employees to participate in the evaluation and implementation process, make them aware of the issues and keep them informed about the implementation of the elements selected, as well as the results obtained. Many solutions to problems that appeared complex at the outset, have emerged during conversations with employees or as a result of following their suggestions. And if, in addition to the environmental aspects, the analysis also helps solve problems related to the well being of employees, the success will be that much greater.

Including waste management as a core issue in value added analysis will help a company be more successful in any industry. It could improve profitability and enhance the company's image with customers, government organizations, employees and business partners.

Written by our consultant:
Daniel Latendresse, ing. M.ing.
Gestion de risques Éco-Management inc.
Business partner of BDC Consulting Group

BDC
Business Development Bank of Canada
Banque de développement du Canada

(888) INFO-BDC

Recycling Rechargeable Batteries

Today, we recycle newspaper, plastic, glass and aluminum. We do it because we understand the importance of preserving our natural resources and our environment. Rechargeable batteries, including Nickel Cadmium (Ni-Cd), Nickel Metal Hydride (Ni-MH), Lithium Ion (Li-ion) and Small Sealed Lead* (Pb) found in cordless power tools, cellular and cordless phones, laptop computers and camcorders can be added to the list of items to be recycled.

The Rechargeable Battery Recycling Corporation (RBRC) makes it possible. We are a non profit, industry sponsored organization working to educate rechargeable power users about the benefits and accessibility of rechargeable battery recycling and to implement recycling programs where none exist. RBRC provides a solution to meet your rechargeable battery recycling needs.

Rechargeable battery recycling? We'll do it for you!

Here's how it works.
RBRC provides three plans to collect, transport and recycle used rechargeable batteries.

Retail Recycling Plan: RBRC provides containers to retailers for in-store collection of used rechargeable batteries. Customers visit our Web site, www.rbrc.org, or call RBRC 's toll free battery recycling hotline,1-800-8-BATTERY, to locate the closest participating retailer. Customers return their used rechargeable batteries to the store and the retailer ships them to RBRC for recycling. RBRC outfits the store with point-of-sale materials and pays the cost of transporting and recycling the batteries. The program is absolutely free to retailers.

Community & Public Agency Recycling Plan: RBRC helps communities, municipalities and public agencies add used rechargeable batteries to their existing waste collection programs. There is no cost to participate.

Business Recycling Plan: RBRC assists businesses in structuring and managing the collection of non household rechargeable batteries in the workplace. RBRC pays all recycling costs.

What happens to the used rechargeable batteries? They are sent to a state-of-the-art recycling facility. Reclaimed materials are used to make new products. For example, cadmium is used in the production of new batteries while nickel and iron are used to make stainless steel products.

If you are interested in participating in RBRC`s *Charge Up to Recycle!* Program, please call us at 416-535-9210 or visit www.rbrc.org.

If it`s rechargeable, it`s recyclable!

*RBRC will only accept Small Sealed Lead rechargeable batteries weighing up to 2 lbs./ 1 kg each.

A Model for the Collective Management of Waste Generated by Businesses

Small and medium size enterprises (SMEs) usually make up more than two thirds of the businesses in an industrial park. Their operations are geared toward financial survival and fulfilling current orders. Even when there is some time to spare, it is rarely spent trying to improve waste management. Waste management must be quick and take up minimal staff time.

Not only do SME managers lack time and money, they also lack recyclable materials! They must generate a minimum amount of material in order to interest recyclers.

So how does one go about improving waste management for SMEs operating within an industrial park? A new Eco Industrial Park concept, currently being demonstrated by Montreal based NI Environnement, provides a modern solution that is tailored to SMEs. It is based on experiences from around the world and integrates green business notions as well as collective waste management principles.

The Eco Industrial Park model described herein is based on the greening of business practices as well as the networking of businesses within an existing industrial park. Based on the particular characteristics of the selected site and the types of waste generated by the participating businesses, a series of steps are taken to implement the foundations of collective management in an industrial area while making waste generating businesses accountable.

The cornerstone of this model involves the application of the 4Rs principle, including its hierarchy, to a business environment.

The project begins with a detailed site analysis, including an in-depth waste audit. This snapshot of the situation is used to determine the site's critical factors, namely source, quantity, profile and cost of waste management for the Industrial Park as a whole. Appropriate and harmonized corrective measures can then be implemented.

Introducing a new collective recovery program essentially allows for a reorganization of 4R measures. As part of this program, waste disposal and recycling contracts are combined to provide cost savings, optimal use of storage space and the downsizing of collection procedures.

It is essential that all current waste haulers and recyclers be invited to participate in the management process. The goal is not to exclude the partners with the know-how and experience, but rather keep them in the loop and share the benefits of the new experience with them in order to create a winning team.

At the heart of the proposed Eco Industrial Park model lies the optimization of the collection procedures for waste and recyclables and the reduction of related management costs. It is only with a substantial reduction of overall management costs that business owners, industrial park managers and municipal and governmental representatives will be convinced that the time and money invested in the industrial greening process are worthwhile. The change in management methods usually requires an initial investment, but the program's long term viability must be assessed with sustainable development in mind. Business owners who are already

paying something should for the same amount, receive additional services and come closer to achieving provincial recovery objectives.

ADDED SERVICES

The proposed Eco Industrial Park model showcases a simple and progressive operating structure. It promises to provide each participating business with the tools to maximize material use and minimize the production of waste destined for disposal.

During the entire implementation process, businesses receive training on the environment in general and on waste management in particular. The purpose behind the training is to teach business managers how to deal proactively with problems rather than react to them.

Three components round out the program offerings:

1. An *Industrial Material Storage and Treatment Centre* (*Industrial Enviro-Centre*) to offer sales, temporary storage, sorting and/transformation services for waste materials produced within the industrial park;
2. A *Coordination Centre* within the Industrial Park to manage industrial greening operations and ensure a permanent presence on site; and
3. A *Centre for Research and Development on Trading and Marketing of Industrial By-Products.*

Once everything is in place, a second waste audit is performed to assess what has been accomplished and produce findings and recommendations. Care is taken to document every step of the process. A methodology involving review, maintenance and monitoring activities ensures continual improvement of the greening process.

These days, collective management and business networking practices are emerging throughout the world. The model described here proposes an integral approach, striving to achieve as closed an industrial system as possible in terms of resource use and disposal, and the least corrosive possible toward the environment.

Experience has shown the technical and economic feasibility of developing business networks aimed at helping businesses to reduce their waste management costs, and in so doing, to considerably reduce the Industrial Park's production of ultimate waste.

By promoting the application of the proposed model, industrial managers will be aware that a solution exists for improving their environmental performance, through networking and partnerships. It can only be hoped that Industrial Parks, through their representatives, will come to require this asset to demonstrate the economic and environmental merit of their territory on the world stage.

Frederik Richard, President
NI Environnement

Benoit Proulx, M. Env., Project Coordinator
NI Environnement

LaSalle's Eco Centre

Having completed the financial structure of its project, the City of Montreal's Borough of LaSalle is ready to set up an eco centre, which it wants to pattern along the lines of French industrial eco parks, where the collective management of waste from companies provides a critical mass promoting efficient utilization of waste or by products.

At the present time, Montreal has five eco centres, each one reaching approximately 100,000 people. LaSalle wants to attract an even larger clientele. Its eco centre would, of course, serve the residents in the Borough, but also industrial, commercial and institutional establishments (ICIs) on its territory. LaSalle's eco centre is even planning to offer its services to ICIs in neighbouring boroughs. In fact, its location near main highways makes it very accessible for any and all of its neighbours.

Courtesy of Air Imex

In keeping with the Quebec government's waste materials management plan designed to reduce landfill waste and efficiently utilize waste materials, an eco centre set up in an industrial environment would make it possible to reclaim dry matter from ICIs and therefore achieve a significant decrease in the percentage of waste sent to landfill sites, as ICIs are the biggest users of such sites.

At Montreal eco centres, services are free of charge at the present time. Residents don't pay for the disposal of their bulk materials in small quantities. LaSalle's eco centre would offer free service to residents, however, for institutional, commercial and industrial establishments that have to dispose of their bulky materials (wood, debris, etc.), it would offer a paid service, yet at lesser cost than what they have to pay for their waste disposal.

On the other hand, the quantity and quality of recyclables generated by the ICIs could eventually allow the eco centre to turn a profit on the services it provides (training and awareness of business establishments, optimization program for the collection of recyclables), and even partially finance the services provided to residents. The project would therefore support the ICIs in achieving the 80% waste reduction objectives under Quebec's waste management plan. Since the eco centre would be located near the Borough's public works building, it could also accommodate materials generated by municipal activities.

Management of the eco centre could be handled by a partner already working with the Borough of LaSalle in processing materials from manual and mechanized selective collections. It operates a sorting centre based on the sheltered workshop concept. This non profit organization called Récupéraction Maronniers has adopted the mission of providing the disabled with opportunities to access the labour market.

The Borough of LaSalle hopes to be able to open the eco centre to residents and businesses in 2004.

The recycling avenue: A sutainable development strategy that can no longer be overlooked

Sustainable development is gradually gaining acceptance from consumers and organizations as a new operational approach requiring a change of attitude, a hint of widespread effort and a long term outlook. In a certain way, sustainable development federates a collection of strategies, procedures and technologies by grouping them together under a global vision that makes sense. Among these strategies, materials recycling now pervades the fields of product design, conception and recovery.

Recycling's primary objective is to reinject into the industrial manufacturing process materials that were once disposed of without other consideration. Recycling also increases material lifespan. Some materials can be recycled numerous times. Glass, for example, can be recycled without any decrease in quality or any alteration of its physical characteristics given, of course, the absence of contaminants. The same applies to steel and aluminum. Other materials are less suited to this type of treatment because of modifications to their characteristics as they undergo more production cycles. Hence, paper can only be recycled 6 to 7 times, because each cycle shortens its fibers, thereby reducing its mechanical resistance.

From an environmental point of view, recycling makes it possible to dispose of materials with reduced environmental impacts. Hence, ferrous and non ferrous metal recycling can reduce energy consumption by 50 to 95% and air and water pollution by at least 76%, compared to production using virgin materials. Paper recycling also affords interesting reductions: energy consumption is reduced by one quarter, water consumption is down 60%, air pollution down 75% and water pollution down 33%.

This is gradually leading to the consideration, at the product design stage, of a material's recovery potential for recycling purposes. In fact, as they are working on creating a product, designers take into consideration the product's « death », knowing full well that all commodities have a finite lifespan. When the product reaches the end of its useful life, the materials that make it up will have to be reinserted into a manufacturing process, if at all possible. Considering the entire life cycle of a product from the design stage has a profound impact on the design criteria. In the automotive industry for example, these environmental considerations are expressed in the concern for a vehicle's ease of disassembly, reduced material mix and easily recyclable material content. All three of these strategies contribute to increased material recovery for recycling and simultaneously address both environmental and economic concerns.

However, recycling raises some questions with regards to practices, values and responsibilities, both from consumers and manufacturers. In fact, neither of these groups considers that post consumption recycling is THE solution to environmental problems. Recycling also forces us to confront the issues of manufacturing and consumption habits. Although it may be desirable to turn as much waste as possible into resources, it is just as important to consider these resources as a finite commodity : the widespread adoption of recycling should never be used to justify or legitimize increased

raw material use. Consequently, at the legislative level, Quebec has come to examine proposed Bill 102, which would extend this responsibility to manufacturers. And in Europe, as a result of a new guideline, scrapped cars will have to achieve 95% recoverability by weight by 2015. As a result, recycling unavoidably becomes a global market positioning and market development strategy.

Recycling certainly constitutes a relevant environmental strategy, but it must not be considered an end in itself. In fact, in the context of integrated waste management, it seems appropriate to reiterate that recycling comes in third in the 3Rs hierarchy (Reduce, Reuse, Recycle). Source reduction, with its goal of reducing raw material use, remains the primary issue.

Pierre De Coninck, Ph.D.
Associate Professor
Faculty of Urban Planning
Université de Montréal

The Canadian Council for Human Resources in the Environment Industry (CCHREI)

The Canadian Council for Human Resources in the Environment Industry has provided complimentary human resource services to the Canadian environmental sector since 1992.

Human resource services include:

- online Environmental Job Board;
- employee Recruitment & Retention Strategies;
- subsidized Employment Programs;
- environmental Certification;
- industry Human Resource Trends & Statistic Resources;
- career Change & Career Development Resources;
- national Occupational Standards for Environmental Employment;
- aboriginal Workforce Planning; and
- professional Development Resources.

Contact Information:

Phone: 403-233-0748
Fax: 403-269-9544
E-mail: info@cchrei.ca
Web site: www.cchrei.ca

Forms

Form 1:
List of targeted wastes – office environment

Form 2:
List of targeted wastes – maintenance

Form 3:
List of targeted wastes – production department

Form 4:
List of targeted wastes – warehousing, distribution and packaging

Form 5:
List of targeted wastes – renovation waste (demolition, construction)

Form 6:
List of targeted wastes – cafeteria, kitchen and snack bar

Form 7:
Checklist of energy sources used – energy resources

Notes:

Project Director: _____

List of targeted wastes – office environment

Location: _____

Period: from _____ **to** _____

List of wastes	Activities to set forth	Expected results	Results achieved
Paper			
Plastics			
Glass			
Metals			
Computer equipment: computers			
Computer equipment: cartridges			
Computer equipment: diskettes			
Photocopier: Toner cartridges			

Project Manager: _____

Signature: _____ Date: _____

Project Director: _____

List of targeted wastes – maintenance

Location: _____

Period: from _____ **to** _____

List of products purchased and used for maintenance	Degree of danger Hazard level	Suppliers' names	Expected results	Results achieved

Project Manager: _____

Signature: _____ Date: _____

Director in charge: _____

List of targeted wastes – production department

Location: _____

Period from _____ to _____ 2000

List of by-products	Class 1. Solid Waste 2. Hazardous Material 3. Special Waste	Amount Generated Annually	Annual Management Cost	Target Results	Achieved Results

Person in charge of the project: _____

Signature: _____ Date: _____

Project Director: _____

List of targeted wastes – warehousing, distribution and packaging

Location: _____

Period: from _____ **to** _____

List of warehoused products	Warehousing methods	Type of packaging	Handling methods (skids, etc.)	Expected Results	Results Achieved
Raw materials					
Semi-manufactured products					
Finished products					

Project Manager: _____

Signature: _____ Date: _____

Project Director: _____

List of targeted wastes – renovation wastes (demolition, construction)

Location: _____

Period: from _____ **to** _____

Product categories	Salvagers	Expected results	Results achieved
Brick			
Cement			
Wood			
Metals (steel, copper, etc.)			
Electric wiring			
Aluminium window frames			
Gypsum, plaster			
Composite materials			
Glass			

Project Manager: _____

Signature: _____ Date: _____

Project Director: _____

List of targeted wastes – cafeteria, kitchen and snack-bar

Location: _____

Period: from _____ **to** _____

Categories of products consumed	Achievable level of salvaging	Salvagers' names	Expected results	Results achieved
Paper / cardboard (plates, cups, hand towels)				
Glass				
Aluminium cans				
Rigid plastic				
Polystyrene				
Food scraps (organic waste)				

Project Manager: _____

Signature: _____ Date: _____

Project Director: _____

Checklist of energy sources used – energy resources

Location: _____

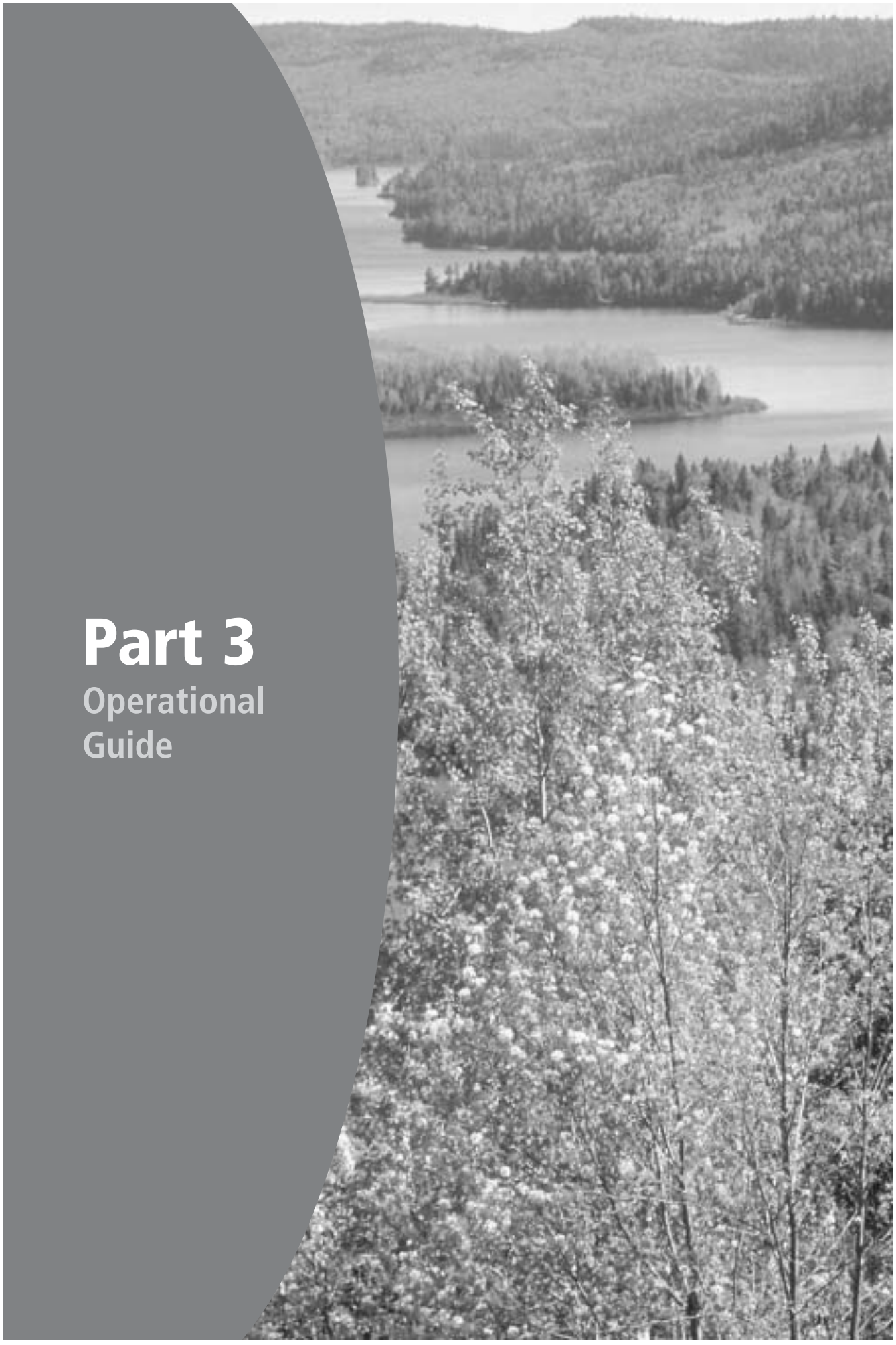
Period: from _____ **to** _____

List of energy sources used	Substitute products/ methods	How to save, optimise and rationalize	Expected results	Results achieved
Heating oil				
Heating oil for production				
Electricity for lighting				
Electricity for production				
Electricity for heating and ventilation				
Other sources				

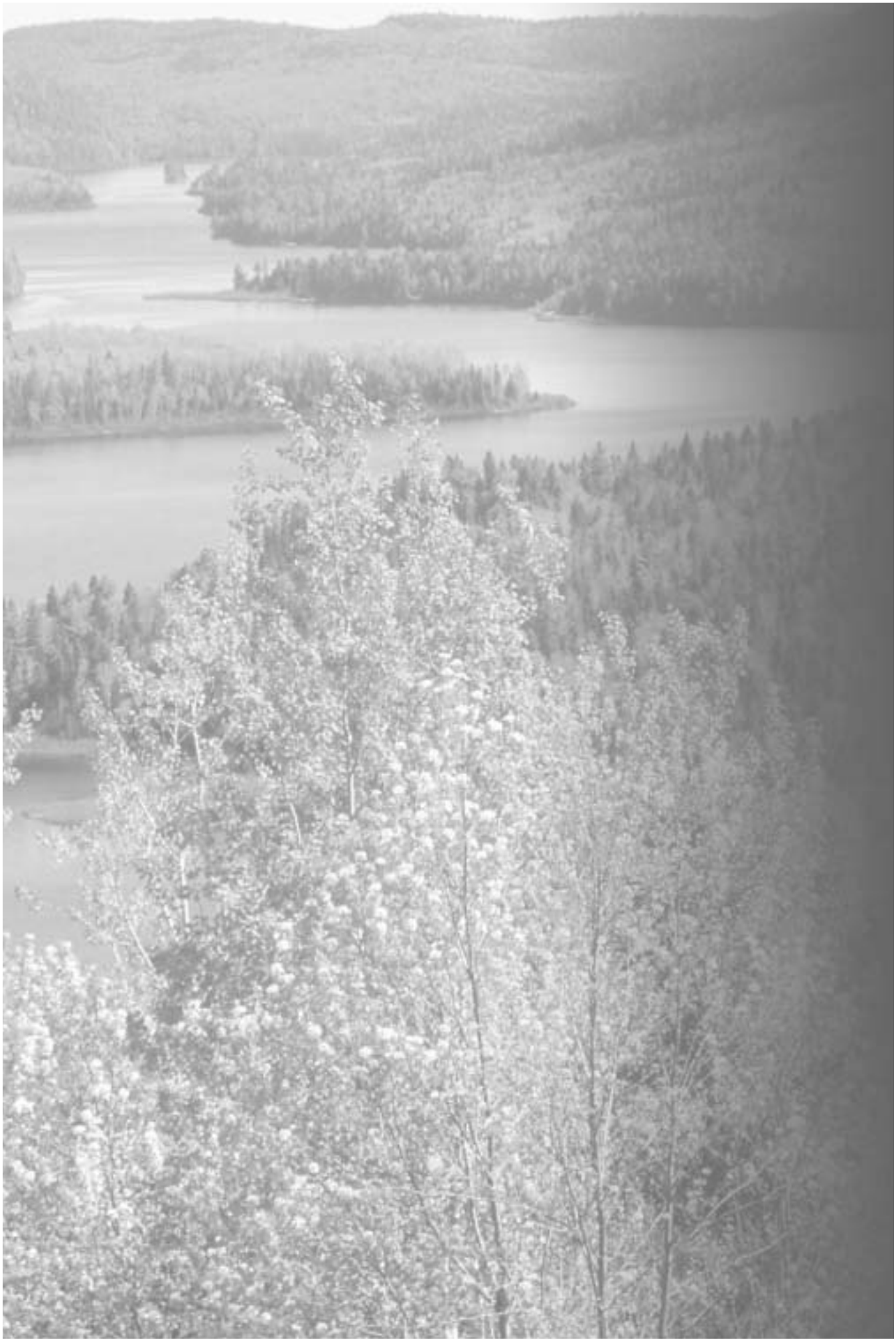
Person in charge of the project: _____

Signature: _____ Date: _____

Notes:



Part 3
Operational Guide



Part 3

The implementation of an effective and viable waste management program requires a structured approach that is adapted to the unique characteristics of the business.

This Guide proposes a simple, five-step process.

Management's commitment to such a program is the cornerstone of its implementation, no matter the type of business. Recognizing the need to act and demonstrating the will to do so are determining factors. Deciding to institute new management practices, to commit the necessary resources and to set deadlines for implementation: these are elements that authorise the process and set it into motion. These decisions must come from management as they serve to affirm its commitment to preserving the environment.

The second step, evaluating the current situation within the business, is a diagnostics-type operation. Its purpose is to draw an overall portrait of waste production to precisely determine the sources, quantities and types of materials.

The third step covers the development of a management program tailored to the needs that were identified. Objectives are defined and solutions are developed, which are not only adapted to the waste materials that were identified, but also take into account the operations and processes that generate these materials.

Program implementation is the fourth step. It focuses mainly on gathering the necessary material resources, mobilizing human resources and redefining and restructuring relations with business partners.

A waste material management program can only be as successful as are efficient the tools used to evaluate its performance and effect the necessary modifications. In this context, the purpose of the final step is to provide monitoring and control mechanisms that are adapted to both the program and the business's situation.

Operational Guide

1. Commitment

The management team's degree of commitment is the first determining factor in setting up a successful waste management program. The program's feasibility and viability depend on it.

In the case of a business that has been operating for a long time, designing and setting up a waste management program, even on a small scale, is a challenge. It corresponds to a change of orientation and the adoption of new objectives. It affects the entire business, involves short-term investments and forces the long-term commitment of the organization and its resources. In addition, implementing new waste management practices requires the full and unrelenting collaboration of employees.

Within a structured organisation, these types of changes and the allocation of the necessary resources rely on explicit and decisive choices being made. To put it another way, the entire process depends on a willingness to act and on management's commitment.

In practice, this commitment can take on a variety of configurations. It can be a simple statement of principle presented in the form of a text signed by management.

> The X company is committed to demonstrating leadership, innovation and excellence in carrying out its operations and promoting its services, all the while ensuring the protection of people and their environment.
>
> Signed by: ……., President of the Board of Directors
>
> Date : ……
>
> Source : Bell Canada

Two additional examples of commitment forms (see Forms 8 and 9) are presented in the appendices to this section of the Guide.

The commitment can also be an official and detailed statement by the General Manager, the owner or the President of the Board of Directors. Finally, management's commitment can also take on the form of a resolution passed by the Board of Directors.

Why am I getting involved in waste management?

I believe that waste management within my business could open the door to new business opportunities.

I believe that waste management could not only allow the improvement of certain management processes, but also simultaneously optimize resource use.

For me, both as a citizen and a business manager, waste management represents an opportunity to contribute to improving the quality of the environment that my children will inherit.

Forms 8 & 9 — COMMITMENT

See page 218 & 219

I believe that the competition has introduced, or is on the verge of introducing, waste management within their own businesses and I think it is time for me to act.

I think that governments are about to introduce a series of new regulatory requirements regarding waste management within businesses, and I wish to be prepared.

2. Current Situation Within the Business

Developing and setting up a waste management program requires good knowledge of the organization, its operations and processes, its business partner relations, as well as its operating environment. It also presupposes a good knowledge of the waste generated, as well as the operations that contribute to the quantity and diversity of these materials.

At this stage, a particular activity is required: describing the current situation. The process includes two complementary parts: the preliminary assessment and the solid waste audit.

2.1 Preliminary Assessment

A systematically carried out preliminary assessment yields five key elements:

- a general overview of the business;
- a detailed description of its processes and operations;
- a detailed description of its purchasing habits;
- a detailed description of its customer relations; and
- a detailed description of its financial backer relations.

2.1.1 Business Profile

The general overview of a business is a precious management tool. It makes it possible to evaluate the situation, measure progress, settle on development, promotion and marketing strategies, and facilitate negotiations with financial backers.

Drawing up the business profile is relatively easy. It comes down to gathering some basic information on the mission, operations, products, number of employees, suppliers, customers, financial backers, etc. This exercise must also take into account strategic information regarding development projects, but it is of course not required to put this information down on paper.

2.1.2 Processes and Operations

Depending on the technology used, manufacturing processes and operations may contribute significantly to increased raw material use and waste generation.

A good overall knowledge of processes and operations is indispensable to pinpointing areas where resources are wasted and identifying potential avenues of solid waste reduction.

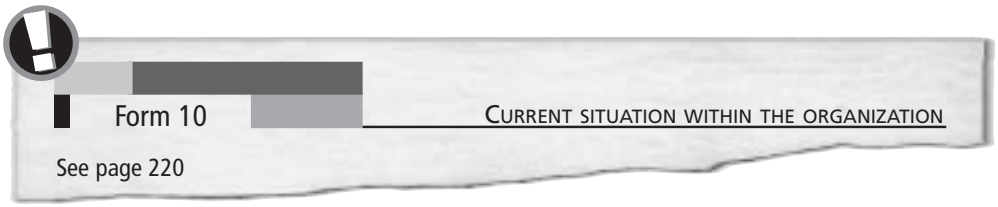
At this stage, the following questions can be used to draw up a table of the various areas where resources are wasted:

- What are the main processes and/or operations generating waste?
- What are the main steps of these processes and/or operations?
- What are the major pieces of equipment used in the processes and/or operations?
- Is the packaging used contributing to the volume of waste generated?

When compiling the inventory of the operations and processes, it is important to include all peripheral business units, such as machine shops, laboratories, the cafeteria, etc. Limited and occasional activities and/or operations must also be considered.

2.1.3 Purchasing Habits

Purchasing is a key aspect in the investigation of waste sources. This is the area where



decisions regarding raw materials (types, volumes and varieties), durable goods, and packaging and delivery requirements materialize. The information on administrative operations can prove to be precise and bountiful.

When examining purchasing habits, the following questions can be a good place to start:

- Does the organization have a purchasing policy? If so, does this policy consider environmental aspects?
- Do environmental concerns influence the purchasing process? If so, what are these concerns?
- Are suppliers required to adopt environmentally responsible business practices?
- Are your suppliers' allegations with regard to environmental compliance verified? How? By whom?

The following form can be used to perform the first stage of such an evaluation. By filling it out with the help of the purchasing officer, it is possible to quickly compile a precise portrait of the situation.

This relatively simple procedure involves:

1. compiling a complete listing of raw materials, supplies and other products purchased by your business in a given year;
2. determining, for each article, the annual amount required and the supplier;
3. determining whether or not the product is certified by the Environmental Choice program[1];
4. confirming that the supplier has developed environmental requirements for his own business; and
5. where certain products do not meet your environmental requirements, exploring alternatives with the supplier.

2.1.4 Customer Relations

The examination of customer relations includes two components: regular customer relations and new customer relations.

The following questions can be a good place to start:

- Is customer attitude toward environmental issues changing?
- Among the customers, are some of them multinational corporations that are currently or on their way to becoming ISO 14 000-certified? If so, will they become more environmentally demanding toward their own suppliers?
- Has the organization ever done, or is it planning to do business with international clients? If so, can environmental protection, and more specifically, waste management, become a competitive advantage?

[1] For more information : www.environmentalchoice.com.

2.1.5 Financial Backer Relations

These days, financial institutions tend to become more and more demanding regarding the environmental performance of their clients. In this regard, the Association of Canadian Bankers encourages its members to be vigilant and to pay particular attention to environmental matters in cases involving businesses seeking financing.

Under these circumstances, and also to prevent complications from arising during a financing deal, it is important not only to know current requirements, but also to predict or anticipate future ones.

- Have the financial institutions that deal with the organization expressed new environmental requirements, such as requiring an environmental report on the organization's operations?
- Have creditors begun to express concern regarding the environmental impacts of the organization's operations?
- Is eligibility to government funding programs tied to environmental requirements (like environmental compliance for example)?

The preliminary assessment must also take into account any particular elements, events, situations or problems related to wastes and environmental discharges. Obvious cases of resource waste, resource losses and pollution, as well as continuing environmental risks and the accident history, will all have to be looked at carefully.

Finally, because of the volatile nature of competitive advantages, the preliminary assessment would be incomplete without at least a cursory analysis of the attitudes and behaviours of competitors regarding environmental issues in general and waste management in particular.

2.2 Solid Waste Audit

A waste management program's efficiency is dependant on its capacity to use the required equipment to effectively manage the variety and amount of material produced by the organization in a one year period.

To precisely establish the main program parameters and develop clear operational objectives, the types and quantities of wastes must be determined for a typical operating period, namely a fiscal year. This implies that the types of wastes must be identified and that the volumes produced must be measured.

This process is called an audit, and it includes sampling, sorting and weighing.

2.2.1 Getting Started

Sorting operations involve certain preparatory steps, namely: equipment purchasing, team building, choosing a workspace, sample size determination, defining trash production zones and establishing a work calendar.

Equipment

The basic piece of equipment is a scale. Because it will be used to weigh samples, a numeric table scale with a precision of ± 0.005 kg is required. To carry out sorting operations, plastic bins or cardboard boxes are mandatory equipment. Each box is used for a different type of material. When a garbage bag has been completely sorted, the contents of the boxes are successively emptied onto the scale and weighed. It is important that the work surface be large enough to accommodate the boxes, allow for easy opening of the garbage bags and easy sorting of their contents.

Trash handling is a delicate operation with associated risks. It is important to take appropriate hygiene and safety precautions.

The following items are required when handling trash:

- plastic gloves;
- pliers;
- masks and overalls for handling foul-smelling or messy trash;

- germicide or other disinfecting agent for cleaning floors and bins at the end of a day of sorting;
- large rolling plastic bins for carrying trash to the sorting room;
- broom;
- garbage bags for disposing of the waste once sorted;
- camera for documenting the sorting process or noting the presence of unusual waste.

◎ Team Building

According to Public Works and Government Services Canada (1996), a team of three to five people should be able to sort the waste produced in one day by 100 to 150 employees. Depending on the type of waste, the number of team members can vary. When waste is homogeneous, the number of sorters can be reduced. When waste is heterogeneous, a larger team must be assembled.

With respect to sorters, it is important to ensure that they have received the necessary training regarding the safety measures applicable to waste sorting operations. This basic training makes it possible to obtain reliable and comparable results.

The definition and category of every item likely to be found inside a garbage bag must be provided to each member of the sorting team.

A list of the wastes typically produced by a business is appended to this Part of the Guide.

◎ Choosing a Workspace

Waste sorting must be carried out in a well-ventilated area. The room must be large enough to ensure the comfort of the sorters and equipped with the necessary equipment. Ideally, the workspace should be located near the garbage container or trash storage area in order to limit travel.

◎ Determining Sample Size

Sorting all the waste produced by an organization within a fiscal year is neither achievable nor necessary. Sampling is a simple and vastly adequate technique. It consists in selecting a sample that is representative of the trash generated.

The smallest recommended sample size is equivalent to the amount of waste produced within a 24-hour period. A sample covering a five-day work period or a timeframe equivalent to one week of activity would allow for a higher level of precision.

It is recommended to choose a time of year where the majority of employees are present and to steer clear of the Christmas and summer holidays.

During the course of the operation, it is imperative that the weight always be noted correctly for the chosen period. The annualized results are obtained through multiplication of the sample results by an extrapolation factor representing the number of days (250) or weeks (50) normally worked by an employee within a year[2].

◎ Defining Trash Production Zones

In order to facilitate sorting and results interpretation, it is preferable to divide the organization into trash production zones. These zones can correspond to the various departments of the organization, for

[2] Datas' Extrapolation factor is based on a worked year that includes an average of 2 weeks holiday/employee.

example, administrative offices, kitchen, merchandise receiving area, machine shop, and various manufacturing process stages, or they can correspond to specific sections of a building, such as a certain floor or area.

The following procedure can serve as a guide:

1. choose the most relevant zones given the organization's operational context;
2. assign a colour code to each trash production zone;
3. in the sorting room, assign a space to each of the chosen colours;
4. provide coloured stickers to the maintenance staff. On trash and recycling collection day, they will be tasked with identifying the origin and pick-up date (in the case of five-day samples) of each garbage bag;
5. in the sorting room, set the bags down in the appropriate zone; and
6. the trash container must be locked during the audit period. Only once trash has been identified, sorted and weighed will it be disposed of in the container.

◎ **Work Schedule**

For each of the zones defined in the previous step, a trash-sorting period must be established, a work schedule must be determined and the maintenance staff must be informed.

2.2.2 Sorting the Waste

◎ **Sorting**

In the sorting room, sorters gather all the bags produced in a given zone within a 24-hour period. The sorters then open each bag one by one and proceed to a primary sorting of the waste. At this stage, each item is classified into one of nine following categories: paper, cardboard, organic waste, clear glass, coloured glass, metal, aluminium, plastic, and waste. One additional category of materials can be included in the table of weighing data to allow for a particular analysis: this category is known as other recyclable materials and includes multi-composite materials, rubber, textiles and wood.

For more precise audit results, more detailed sorting can be used. For example, paper can be sorted into the following sub-categories: fine paper, kraft paper, newsprint, carbon paper, cardboard, etc.

The final stage involves classifying certain waste, based on their use, in order to reuse them or return them to the supplier. For example, cardboard could be sorted into the following categories: corrugated cardboard boxes, computer boxes, supply boxes, notepad backing, etc.

Solid waste make up for a typical garbage bag

Results obtained from solid waste audits performed in twenty-two office buildings

Waste streams	%
High-grade paper	23.5
Kitchen waste	18.7
Paper towels	10.1
Cardboard	6.5
Plastic	6.4
Newsprint	6.3
Art paper	4.8
Low-grade paper	4.5
Composite materials	3.9
Plastic film	3.2
Glass	2.7
Polystyrene	2.3
Rigid plastic	1.9
Cans	1.7

Source : Government of Canada, Public Works and Government Services Canada (1998).

Materials collected in recycling bins must be segregated at all times from recyclable materials found in garbage bags.

In addition to the regular solid waste, sorters must monitor the presence of hazardous waste and unusual waste found in garbage bags. Hazardous materials include batteries, paints, oils, cleaning products and other chemicals.

Unusual wastes (those resulting from a party, a move, the annual replacement of telephone books, or renovations) must be separated from the lot and become the focus of a distinct assessment.

◎ **Weighing**
Once waste and recyclable materials have been sorted, the sorters must weigh each group of materials and tabulate the results. The following form can be used to that effect.

◎ **Disposal**
After weighing, the waste can be re-bagged and disposed of through the organisation's regular waste disposal system. At all times, sorters must display environmental consciousness. Hazardous and toxic materials should be removed from the waste stream for safe disposal. Recyclable materials should be transferred to the appropriate area.

2.2.3 Data Interpretation

The results obtained from the sorting and weighing operations constitute the basis for defining the operational objectives of the planned waste management program.

◎ **Assessing Waste Make-Up**
The first step is to calculate, for each zone of the organization, the relative proportion of each type of waste generated. To obtain a percent value, simply divide the measured weight of a category of material by the total weight of waste collected in the audited building (or zone) and multiply this result by 100.

For example, if paper towels represent 40 of the 375 kg of waste, it can be determined that they represent 40 kg / 375 kg * 100%, which is 10.6% of the total weight of waste produced.

◎ **Estimating Annual Waste Production**
The annual waste production can be estimated for each category by multiplying the weighing results for a week by a coefficient of 50.

Using the previous example, during the week of the audit, the total weight of paper towels generated on site was 40 kg. This result can be annualized using the following formula: 40 kg / week * 50 weeks = 2,000 kg, which is to say that 2,000 kg of paper towels are eliminated every year.

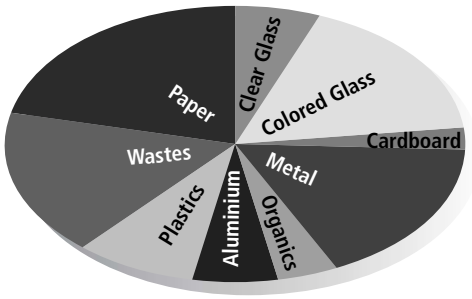
These results do not account for periods of lesser activity, but are more than satisfactory for elaborating objectives and setting up a waste reduction program tailored to the organization's needs.

2.2.4 Data Presentation

In order to have an easy-to-use portrait of the overall situation, the use of tables and graphics is highly recommended.

First, a graphic must be made that represents the waste generation of the entire organization. The model presented in Figure 1 can be used as a template. A similar graphic should then be produced for each trash production zone inside the organization.

Figure 1 :
Annual Waste Production at Organization X



Clear Glass: A kg
Colored Glass: B kg
Cardboard: C kg
Metal: D kg
Organics: E kg
Aluminium: F kg
Plastics: G kg
Wastes: H kg
Paper: I kg

Once this has been done, a more detailed breakdown of the waste can be produced and presented in tabular form. For each category, this table presents the amount generated annually, as well as the rate of recovery.

The rate of recovery is defined as follows:
It is the ratio of the total amount of material found in collection bins versus the sum of the total amount of material found in collection bins and the total amount of material found in garbage bags.

For example, if a business recycles 75 tons of paper a year and disposes of 25 tons, the rate of recovery is 75 / (75 + 25), which is 75%.

At the end of the operation, is it highly recommended that a copy of these documents be provided to everyone likely to show interest in these results, as well as to the people who participated in the various stages of the audit. These people could be the environmental services co-ordinator, the building manager or the maintenance supervisor.

2.3 Investigating Current Waste Management Practices

At this stage, the time has come to look at the procedures used to collect and/or dispose of the inventoried wastes.

The information can be obtained from the building manager or from the company that collects and hauls the waste to a sorting centre or landfill.

3. Creating a Waste Management Program

To be efficient, the waste management program must be designed and structured to suit the current size and function of the organization, but it must remain sufficiently flexible and be adaptable to future needs.

3.1 Organizational Prerequisites

Planning a waste management program is conceivable only if two prior conditions are met. These indispensable elements are, on one hand, management's commitment and support, and on the other hand, the creation of a working group or committee with a clear mandate.

Form 15 — CURRENT DIVERSION RATE
See page 226

Form 16 RECORDING OF WASTE COLLECTION PROCEDURES

See page 227

3.1.1 Employee and Management Support

At this stage, management's support is a reflection of the nature and breadth of its commitment to both implementing a waste management program tailored to the organization's needs and devoting the necessary resources to this undertaking.

Although a declaration of commitment is generally and logically associated with the formulation of an environmental policy, such a declaration is not a necessary condition to the launch of a waste management program. An environmental policy can be developed afterwards, as management sees fit, when the waste management program begins to show concrete results.

Employee collaboration and support are also indispensable to the success of a waste management program. This is primarily due to the fact that the tasks and activities carried out by the employees are what generate the major part of waste materials.

It is also due to the fact that, according to many studies, today's employees have high expectations in the area of environmental protection. Finally, field observations have revealed that businesses with effective waste management programs generally owed their success to employee support.

Knowing this, it becomes obvious that the organization needs to involve employees in the process, provide incentives to stimulate participation, and recognize their achievements.

In practice, employee contribution becomes precious in a number of ways. They can contribute to the identification of waste, waste production zones and material losses resulting from product handling. Their knowledge of processes, auxiliary services and the steps involved in the production of one or more products can also result in an effective co-operation toward either the elaboration of suggestions, the search for solutions or the implementation of management operations.

Generally speaking, appointing or electing persons to act as spokespeople for the program can be a great way to garner and maintain employee support. In addition to overseeing the implementation of the action plan, these people can set the tone and encourage fellow workers to participate in the program.

3.1.2 Forming an Environmental Committee

When launching a new program, business managers tend to entrust the mandate to one or two people rather than a committee or working group. Where a waste management program is concerned, leaders are advised to show good judgement.

Indeed, in a very small organization, two people can often be enough to get a program started. But when it comes to a medium sized organization, it is strongly recommended to rely on a much broader array of resources and to adopt a committee-based approach. In most cases, this group plays a determining role in the success or failure of the waste management program.

On this matter, an important step is the choice of the committee members. The people that are selected must first and foremost, be convinced that protecting the

environment is good for them, their family, and of course, the organization. It is preferable that these people adequately represent the different categories of employees on site, but also, if not more importantly, that they represent the different departments or services. The working group should include representatives from all of the organization's departments or groups that could directly or indirectly be concerned by the implementation of the program, especially people working in production, maintenance, quality control and waste disposal.

Some aspects of the program's development can be relatively easy to implement while others may require the help of many employees. The committee-based approach is promising, especially if it can include the director of operations, a purchasing clerk and a person responsible for maintenance and waste disposal.

Finally, having committee members that are perceived as legitimate leaders by their peers can prove a precious asset.

3.1.3 Committee's Mandate

Management must define the environmental committee's mandate. To improve effectiveness, it should outline the committee's objectives, clearly define responsibilities and provide a schedule.

3.1.4. Committee's Responsibilities

An environmental committee's main responsibilities are usually to:

- establish program objectives;
- analyse data produced by the preliminary assessment and audit;
- come up with ideas for waste reduction;
- conduct feasibility studies and select the appropriate measures;
- draw up a budget for implementing the action plan;
- obtain management's approval for the results obtained; and
- inform fellow employees about the main components of the management program.

Committee members must also ensure that program objectives are:

- acceptable to employees and other people involved in implementing the program;
- flexible and adaptable to the changing needs of the organization;
- measurable over time;
- motivating for employees;
- tailored to the corporate policy;
- understandable by one and all; and
- achievable given a reasonable amount of effort.

On this subject, one of the committee's most important tasks is to set realistic objectives that fit in with the corporate policy signed by management. Although objectives can be qualitative, such as " significantly increasing the proportion of paper collected for recycling," it is by far preferable to set quantifiable objectives. This makes it possible to determine progress with greater ease and precision. Hence, a quantifiable objective could be to " achieve a 5% yearly increase in the amount of paper collected for recycling ".

Valid arguments

Business leaders are particularly sensitive to the cost / benefit ratio. As a result, committee members will have to demonstrate clearly that the implementation of a tailored waste reduction program will yield positive returns exceeding both the required investments and the direct and indirect costs attributable to the absence of such a program.

For example, when calculating the cost / benefit ratio, it is important to take the following elements into account:

- savings afforded by reduced investments in waste elimination;
- advantages resulting from being compliant with environmental legislation;
- advantages tied to employee expectations and public opinion; and
- benefits reaped from reducing environmental impacts.

Identifying problem sources

The committee must keep an eye out for problem sources as well as for current and potential obstacles.

In some cases, employees can be somewhat apprehensive, usually because they anticipate an increased workload. In this type of situation, it is important to be capable of explaining the program's positive impacts in a way that takes employee perception into account. Fear of negative impacts on product quality can also be the source of some resistance. This obstacle can be overcome either by conducting a small-scale test or by looking at attempts made by other organizations.

3.2 Developing the Program

Once management has approved the objectives and parameters, the committee can move to developing the program. This process involves five steps, ranging from the examination of options and possible solutions, to the program launch per say.

3.2.1 Looking for Solutions

Data obtained from the preliminary assessment and audit are the place to start when looking for solutions. At this stage, the working committee uses its members' expertise, imagination and creativity to come up with a list of solutions.

Each solution must be written down, given a title, and include a brief description, the anticipated results and the name of the person who proposed it.

3.2.2 Pre-selecting Options

Assessing the technical and economic feasibility of solutions requires time and money. It is therefore preferable to limit this operation to the measures exhibiting the best waste and operating cost reduction potential, and to eliminate measures that seem unrealistic or poorly adapted to the organization's operating context.

The pre-selection procedure should answer the following questions:

- What is the main benefit of this measure?
- What are the odds of success?
- How much will this measure cost? Will it be economically viable?
- Do the measures under consideration comply with the regulatory framework applicable to the organization's operations?
- Will the proposed solutions allow the organization to comply with the current or future requirements of environmental regulations?
- Can the measure be implemented within a reasonable timeframe?
- Have other organizations adopted this measure? What was their success rate?

3.2.3 Assessing Technical Feasibility

Assessing the technical feasibility reveals whether or not a measure is applicable given the characteristics of the organization. A measure will be quickly implementable if it does not require the installation of significant equipment or major modifications to existing equipment.

The assessment must take into account the restrictions posed by the installations and the product. Service and equipment suppliers, as well as organizations that have already installed similar measures, can be invaluable sources of information.

Form 17 — List of possible initiatives for waste reduction

See page 228

The technical feasibility assessment should touch on the following points:

- Is the measure under consideration safe for workers?
- Will product quality be maintained?
- Is the required space available?
- Will additional labour be required?
- Are the necessary infrastructures available?
- Will a production slow down result from implementing the measure?
- Is particular expertise required in order to implement the measure?
- Does the supplier offer support?
- Will the measure cause other environmental problems?
- Adopting this measure can salvage how much waste?

At this stage, it is important that employees affected by the proposed solutions be asked to comment on the technical feasibility of each of the measures being assessed.

3.2.4 Economic Feasibility Assessment

The costs and benefits associated with each of the options under consideration must be assessed.

Costs can be classified into three categories:

- **Capital costs**

They include the costs associated with the purchase of equipment such as recycling bins, hot air dryers, balers, compactors, etc. They also include investments required for building modifications or site preparation.

- **Start up costs**

These are the costs incurred for promotional material and raising employee awareness.

- **Operating costs**

They include all expenses tied to running the program. They can be expenses for employee training, equipment rental, program administration, increases in labour costs, maintenance, hiring consultants or contractors, etc.

As for benefits, they can also be classified into three categories:

- **Revenues**

Certain measures may actually constitute a source of revenue for the organization. One example of such a measure is the sale of paper to recyclers.

- **Purchasing savings**

An effective waste management program will reduce waste, and consequently, the purchases of supplies and raw materials. In fact, the main economic benefits attributable to a waste reduction program come in the form of purchasing savings.

- **Disposal savings**

Reducing the volume of waste sent for disposal or incineration will reduce the frequency and number of container Pick ups, and as a result, the associated container rental and transportation costs. These savings will vary along with the extent of the program.

On the subject of costs and benefits, it is important to consider all the possibilities and to communicate with knowledgeable people like suppliers and building administrators.

Afterwards, it is strongly recommended to put down on paper all the information that was collected. The following form can be used as an example.

When performing the cost / benefit analysis, it must be kept in mind that analyzing each measure individually yields very different results from analyzing the same measures as a whole. For example, recycling glass can be an expensive proposition on its own. However, adding paper recycling to the equation helps to amortize many of the costs. For one, the employee awareness campaign can be a combined effort, and additionally, paper sales revenues can be used to offset some of the expenses tied to glass recycling.

Finally, it is important that the possible savings afforded by combining different initiatives be noted throughout the entire cost / benefit analysis process.

3.2.5 Management Program Elements

At this juncture, the committee should normally be capable of putting together the various components of the management program.

The tentative program should include the following elements:

- an overview of the organization's current situation;
- the main conclusions drawn from the solid waste audit;
- a description of the program's main objectives;
- the methodology used to select the measures;
- the reasons justifying the choice of each measure;
- the program implementation plan;
- a work schedule;
- the expected results; and
- the predicted costs and savings resulting from the program.

The work plan must remain flexible and capable of being adapted to new market trends and to changes in the organization's orientation.

At this stage, management should be in possession of a report including the following elements:

- an overview of the organization's current situation;
- the results of the solid waste audit;
- the solutions proposed by the committee members; and
- the expected results of the waste reduction program.

By looking at the costs, benefits and savings afforded by the different measures, management will be capable of making some educated choices.

4. Implementing the Management Program

The implementation of the management program represents one of the most important steps in the process. This step ties planning to action, initiates organizational changes and creates a new management mentality. The main elements affecting implementation are the allocation of an operating budget, the mobilization of human resources and the new managerial attitudes that need to be adopted toward partners such as clients and suppliers.

4.1 Allocating an Operating Budget

Often, financing costs can be shared among the various building tenants or services. When this is the case, the sub-groups are usually asked to finance the initiatives that are tied to their operations.

With regards to external financing, two options can be considered: the private sector (bank loans or other traditional sources of financing) and government subsidy programs.

4.2 Communications and Mobilizing Human Resources

Experiments carried out in this area are conclusive: the main cause of poorly performing

Form 18

COST / BENEFIT ANALYSIS

See page 230

waste management programs is lack of employee participation. Each employee must grasp the importance of their participation and understand the program, its objectives and its implications. Success is dependent upon this.

To broadcast this information and other relevant details, a communications strategy must be developed.

Principles of Communication

The *National Five Phases Solid Waste Management Protocol* (Public Works and Government Services Canada, 1996) lists four basic principles for educating employees and raising their awareness on this matter, and they are:

- spend more time with the employees who will be more directly involved with the program (maintenance personnel, warehouse personnel, director of purchasing, etc.);
- give clear and precise instructions frequently;
- promote continual learning by employees on ways to improve measures and on identifying opportunities to implement new ones (a suggestions box, rewards for successful innovations and evaluation forms can all be used to this end); and
- keep employees informed of the results of their efforts, the amount of recycled materials and the environmental impacts.

Messages to pass on to employees

When it comes to the messages that should be passed on to employees, the *National Five Phases Solid Waste Management Protocol* gives precedence to the following elements:

- the program objectives and targets;
- the materials that can be reduced, reused or recycled;
- appropriate recycling procedures;
- available resources;
- the importance of employee participation;
- the financial advantages of the program;
- the recognition of participation;
- management's participation in the program; and
- the details of the program's success.

4.3 Behaviour to Adopt Toward Partners

In general, a series of questions must be answered regarding the habits that have been developed in dealing with economic partners. New terms of collaboration must then be adopted with these partners.

The following questions can serve as a starting point:

- How many maintenance employees are affected to the organization's premises? How many hours a week do these employees spend collecting the trash? How many hours do they spend recycling? Overall, how much does this service cost?
- Does the maintenance staff have suggestions regarding the improvement of trash collection or recycling?
- Are there a sufficient number of locations within the building for storing recycling bins or containers? If so, what are these locations and what are their dimensions?
- Do the other building tenants participate in a recycling program? Have neighbouring businesses in the industrial park undertaken to reduce their production of waste materials? In our business environment, is it possible to split the costs and resources associated with implementing a waste recycling process?

Form 19 — LIST OF COMMUNICATIONS TOOLS

See page 232

4.3.1 Choosing a Service Provider

Contracts with the building maintenance and waste transportation companies will almost certainly need to be renegotiated as a result of implementing the program.

During the meeting with maintenance staff, it is important to closely examine the current contract and to produce a detailed list of the additional requirements. Only then can a proposal be requested regarding the addition of terms to the existing contract.

4.3.2 Equipment Purchases

Of all the equipment, the collection bins are perhaps the most important and will have to be selected carefully. The following questions can be used to help plan the purchases:

- Can the bins be fixed or must they be portable?
- How will the remaining liquids in aluminium cans and glass bottles be dealt with?
- How important is the recycled content or recyclability of the bins themselves?
- How often will materials be picked up? How big will the bins have to be?
- Where will recyclable materials be stored between the time they are collected and the time they are picked up by the hauler?
- Are there any contractual limitations regarding management staff's working conditions (limits to the size or weight they can lift)?
- Does your organization have internal guidelines addressing fire safety?

4.4 Launching the Program

The launch of such a program is an important moment that is usually the object of an official ceremony. This approach allows management and employees to become involved with the work of the committee, understand the program objectives and expectations and realize the program's importance toward reducing waste in the organization.

5. Control and Monitoring: Measuring Results

The level of success of a waste management program is intricately linked to the control and monitoring procedures that are implemented. These operations make it possible to identify strengths and weaknesses and to better target any future efforts.

The project manager should measure results and produce a progress report at regular intervals, the recommendation being every quarter.

During transition periods, such as contract renegotiations or the end of a current contract with a salvager or waste elimination company, it is recommended to evaluate the economic impact of the new contract no less than one full quarter following the last effective day of the former contract.

5.1 Quantitative Results Assessment

There are many methods available to evaluate the reduction in waste generation or the increase in the rate of recovery of waste materials. They are briefly described hereafter.

5.1.1 Purchasing Register

The first option is to analyze the organization's purchasing register. The process involves picking a category of material, paper for example, and comparing the amount spent on paper for a period of time before the program was implemented with the amount spent on paper for a similar period following

Form 20

AUDIT RESULTS COMPILED BY ZONE

See page 233

program implementation. When possible, repeat the process with other materials.

This method provides an overview of waste reduction results. It does however, have certain flaws.

First, many of the products that show up in the waste stream are not purchased by the organisation, but rather by the employees who bring in their lunches and snacks.

Second, some products are in fact purchased by the organization but are disposed of elsewhere. This is the case for mailing envelopes and paper.

Third, analyzing the purchasing register does not reveal anything about recycling results. It is possible that your organization is buying just as much paper as it did in the years past, but that salvaging and recycling rates have gone up.

5.1.2 Transportation Registers

The second option involves analyzing the waste transportation register and the recycled material transportation register. In this case, the service providers must be able to supply data on the weight, volume and elimination costs of the waste and recyclable materials produced by your organization.

This method yields more precise data but does not allow the identification of the types of materials present in the waste stream. In addition, the weights found in the registers are more often than not average weights, rather than real weights.

5.1.3 Physical Assessment

When the budget allows it, a detailed solid waste audit can be carried out as per the method described in Section 2 of the Operational Guide. In order to carry out waste sorting, it is recommended to use a sample collected over 24 hours and to measure the total weight of a week's worth of trash production.

The total variation in trash production and the variation in the amount of waste sent for disposal can be calculated using the following formula:

(tonnage during the reference year – tonnage during the current year) / (tonnage during the reference year) * 100%

As for recycling performance, it can be evaluated by dividing the annual tonnage of recycled materials by the total amount of waste produced. However, these results should be interpreted cautiously. For example, it is possible for the paper recycling rate to increase from 80% to 90% in a year. But this does not mean that the absolute amount of paper waste has decreased. It could, in fact, simply be due to an increase in paper consumption resulting from an increase in activity or number of employees that year. It is imperative to always use the datum representing the total amount of waste produced during a period and to compare it with the reference period. Waste generation data can be compiled by zone, per employee and per year. This simple method allows results to be compared without having to use variation factors.

5.2 Qualitative Results Assessment

Measuring the qualitative results of a program is no easy thing. Evaluating employee participation and the organization's effectiveness is necessarily subjective. Despite

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these difficulties, interesting information can be learned in the process.

A mini survey can be an excellent way to collect employees' comments on the program, details on their personal involvement and their suggestions on how to improve the program. Analyzing the results of such a survey can also allow the identification of different problems relative to employee participation, if there are problems.

5.3 Annual Report

To evaluate the progress made from year to year, it is strongly recommended that a progress report be produced every year.

When assessing results, it is important to make a note of all the exceptional activities that took place within the organization that year. This could be spring cleaning, major renovations, an increase in production volume, a large increase in the number of employees, etc. These situations could be the cause of variations in the waste stream within a year.

5.4 Retrospective effect

Identifying and analyzing the strengths and weaknesses of the program make it possible to consider and implement corrective measures.

When the results are positive, it is important to quickly pass the information on to employees. When results are less encouraging, deficiencies must be identified and corrective measures must be developed and implemented.

A good way to tackle problems is to consult with organizations that have themselves adopted a waste reduction program.

Form 8:
Commitment – Framboisière de l'Estrie model

Form 9:
Commitment – adapted from USEPA, 1988

Form 10:
Current situation within the organization

Form 11:
Purchasing habits

Form 12:
List of waste material

Form 13:
Solid waste audit (garbage bags and collection bins)

Form 14:
Amount and percentage of each type of material found in garbage bags

Form 15:
Current diversion rate

Form 16:
Recording of waste collection procedures

Form 17:
List of possible initiatives for waste reduction

Form 18:
Cost/benefit analysis

Form 19:
List of communications tools

Form 20:
Audit results compiled by zone

Form 21:
Types of bins and containers

Form 22:
Waste management – Where are we now?

Commitment – Framboisière de l'Estrie model

The company commits to:

- respecting current environmental laws and regulations;
- using concrete means of continually improving its environmental performance by integrating the environment into everyday management;
- devising and maintaining objectives and targets that take environmental impacts into account;
- monitoring the performance of environmental programs and management systems;
- developing emergency response plans and keeping them up-to-date;
- preventing environmental degradation through the use of procedures, practices, materials, or products that prevent, reduce or control pollution;
- ensuring that all employees understand their environmental responsibilities and have the means of assuming them.

Signed by: _____, owner

Date: _____

Source: excerpt from Framboisière de l'Estrie's commitment

Commitment – adapted from USEPA, 1988

[Organisation's name] shall perform its activities respectfully of environmental best practices. The organisation shall develop training and motivational material for its employees in order to help them develop a responsible attitude toward the environment.

The organisation's preferred management methods are:

- The integration of waste minimization principles at every stage of the manufacturing process and throughout all of the organisation's other activities.
- The reuse and recycling of materials are always preferred.
  Waste disposal occurs only when neither of the preceding avenues is feasible.
- Environmental protection is a measure of employee performance.
- The organisation takes the necessary steps to ensure the continual improvement of its environmental performance.

The members of the organisation's management team are responsible for implementing this commitment. However, each employee shares this responsibility and must perform his tasks in a responsible manner.

Signed by: _____, owner

Date : _____

Source: USEPA,1988.

Project Director: _____

Current situation within the Organization

Location: _____

Period: from _____ **to** _____

Activities / What has been done	Expected results	Results achieved	Comments

Project Manager: _____

Signature: _____ Date: _____

Project Director: _____

Purchasing habits

Location: _____

Period: from _____ **to** _____

List of the products purchased	Quantity purchased	Degree of danger Hazard level	Suppliers' names	Environmental compliance of suppliers	Expected results / alternatives	Results achieved

Project Manager: _____

Signature: _____ Date: _____

Project Director: _____

List of waste material that can be found in an SME (checklist)

Items

- ❑ Acetate
- ❑ Aerosol
- ❑ Plastified signs
- ❑ Staple
- ❑ Light bulb
- ❑ Telephone directory
- ❑ Metal packaging strap
- ❑ Nylon packaging strap
- ❑ Cardboard drum
- ❑ Metal drum
- ❑ Glue stick
- ❑ Battery
- ❑ Milk carton
- ❑ Wood
- ❑ Tin can
- ❑ Corrugated cardboard box
- ❑ Flat cardboard box
- ❑ Plastic binding coil
- ❑ Plastic bottle
- ❑ Glass bottle
- ❑ Wooden crate
- ❑ Plastic box
- ❑ Aluminium can
- ❑ Rubber
- ❑ Photocopier toner cartridge
- ❑ Ink jet printer cartridge
- ❑ Laser printer toner cartridge
- ❑ Videocassette
- ❑ File folder
- ❑ Cleaning product container
- ❑ Plastic container
- ❑ Fast food packaging
- ❑ Wooden pencil
- ❑ Felt pen
- ❑ Leather
- ❑ Office hazardous waste (waste related to DHW): batteries, paint, glue, etc.
- ❑ Production hazardous waste: dry and aqueous chemicals, solvents, oils, sludges, etc. (see note 1)
- ❑ Alkaline detergent
- ❑ CD, CD-ROM and DVD
- ❑ Computer diskette
- ❑ Rubber band
- ❑ Appliance
- ❑ Styrofoam packaging
- ❑ Envelope with a window
- ❑ Padded envelope
- ❑ Cardboard envelope
- ❑ Paper envelope
- ❑ Office equipment: fax machine, copier, etc.
- ❑ Computer equipment: computer, printer, etc.
- ❑ Reprographic film
- ❑ Metal office supplies: scissors, stapler, etc.
- ❑ Multi-material office supplies: calculator, cellular phone, clock, etc.
- ❑ Plastic office supplies: sleeve, divider, etc.

Note 1: Read the info capsule dealing with hazardous materials in Part 1 of this Guide.

List of waste materials that can be found in an SME (checklist)

Items (cont'd)

- ❑ Eraser
- ❑ Tar
- ❑ Grease
- ❑ Soiled rag
- ❑ Herbicide
- ❑ Cooking oil
- ❑ Book, magazine, catalogue, brochure
- ❑ Lubricant
- ❑ Marker
- ❑ Composite material
- ❑ Absorbent material
- ❑ Organic material
- ❑ Medicine and medical object
- ❑ White metal
- ❑ Heavy metal
- ❑ Office furniture: table, desk, shelf, filing cabinet, etc.
- ❑ Production equipment: machinery, conveyor, tank, etc.
- ❑ Oxidising material
- ❑ Wooden skid
- ❑ Plastic skid
- ❑ Self-adhesive paper
- ❑ Carbon paper
- ❑ White office paper
- ❑ Coloured office paper
- ❑ Hand towels
- ❑ Newsprint
- ❑ Paper tissue
- ❑ Packaging material
- ❑ Pesticide
- ❑ Small appliances: shredder, micro-wave oven, sharpener, etc.
- ❑ Cellular phone battery
- ❑ Battery (sizes: A, AA, C and D)
- ❑ Plastic (category: 1, 2, 3, 4, 5 and 6)
- ❑ Tire
- ❑ Multi-purpose bags: packaging bags and garbage bags
- ❑ Plastic briefcase
- ❑ Cleaning product
- ❑ Hygiene product
- ❑ Production waste
- ❑ Renovation wastes: gypsum, wallpaper, nail, insulation, etc.
- ❑ Paint container
- ❑ Electric relay
- ❑ Compostable food waste
- ❑ Non-compostable food waste
- ❑ Laboratory waste
- ❑ Adhesive tape
- ❑ Printer ribbon
- ❑ Brown paper bag
- ❑ Solvent and wash water
- ❑ Pen
- ❑ Carpet
- ❑ Thermometer
- ❑ Thermostat
- ❑ Fabric
- ❑ Paper clip
- ❑ Fluorescent tube
- ❑ Plastic utensil
- ❑ Vegetable
- ❑ Waxed paper coffee cup
- ❑ Polystyrene coffee cup
- ❑ Coloured glass
- ❑ Clear glass
- ❑ Worn work clothes

Project Director: _____

Solid waste audit (garbage bags and collection bins)

Audit period: from _____ to _____ (5 workdays)

Sampling day: _____ / _____ / _____

Zone (origin)	Department /service:		Department /service:		Department /service:		Department /service:		Department /service:		Department /service:	
	Garb. bags	Coll. bins	Garb. bags	Coll. bins	Garb. bags	Coll. bins	Garb. bags	Coll. bins	Garb. bags	Coll. bins	Garb. bags	Coll. bins
Recyclable paper	Weight in kg											
Cardboard												
Organic material												
Non-returnable glass												
Returnable glass												
Metal												
Aluminium can												
Rigid plastic												
Polystyrene												
Waste												
Total weight per zone												
Number of bags												

Project Manager: _____

Signature: _____ Date: _____

Project Director: _____

Amount and percentage of each type of material found in garbage bags

Audit period: from _____ to _____ (5 workdays)

DATA COMPILATION TABLE

Material	Daily (kg)	%	Annual (kg)
	A	= A / B x 100	= A X cœfficient
Recyclable paper			
Cardboard			
Organic material			
Non-returnable glass			
Returnable glass			
Metal			
Aluminium can			
Rigid plastic			
Polystyrene			
Waste			
Total weight	B	100,0%	

A = Total weight of this material for days 1 through 5 (Monday to Friday)
Coefficient: 50 is the recommended annualization coefficient.

Project Manager: _____

Signature: _____ Date: _____

Project Director: _____

Current diversion rate

Audit period: from _____ to _____ (5 workdays)

DATA COMPILATION TABLE

Material	Amount generated (kg)		Amount salvaged	Amount found in waste	Diversion rate
	(kg)	% total	(kg)	(kg)	%
Recyclable paper	A	C	D	E	F
Cardboard					
Organic material					
Non-returnable glass					
Returnable glass					
Metal					
Aluminium can					
Rigid plastic					
Polystyrene					
Waste					
Total	B	100,0%			G

A = Total daily weight, including salvaged amounts, for this category of material from days 1 through 5 (Monday to Friday).
C = A / B (total weight)
D = Amount of material collected daily (relevant only if a collection program is in place)
E = Amount found in garbage bags during the audit
F = Diversion rate per category = D / A * 100
G = Overall diversion rate

Project Manager: _____

Signature: _____ Date: _____

Project Director: _____

Recording of waste collection procedures

Location: _____

Period: from _____ to _____

Residual material	Hauler	Pickup frequency	Amount collected annually	Annual cost/ annual revenue

Project Manager: _____

Signature: _____ Date: _____

Project Director: _____

List of possible initiatives for waste reduction (PWGSC, 1996)

INITIATIVES	☑
Glass	
1. Use durable glasses and mugs	❑
2. Use eco-efficient light bulbs	❑
3. Encourage employees to reuse drinking glasses	❑
4. Set up glass recycling bins in a visible area nearby	❑
5. Raise employee awareness toward the recycling program	❑
Ferrous metals and aluminium	
1. Use a vending machine for soft drinks and juices	❑
2. Use durable glasses and mugs	❑
3. Repair broken metal equipment	❑
4. Set up metal collection bins in a visible area nearby	❑
5. Encourage employees to use durable cups and mugs	❑
6. Collect and redistribute items that can be salvaged	❑
Organic material	
1. Improve meal planning at the cafeteria	❑
2. Use smaller plates in buffet-style cafeterias	❑
3. Give patrons the opportunity to order smaller portions	❑
4. Freeze leftover food immediately	❑
5. Donate surplus food to food banks	❑
6. Compost fruit and vegetable waste	❑
Corrugated cardboard	
1. Deal with suppliers that provide reusable packaging	❑
2. Use the smallest box possible for packaging	❑
3. Reuse cardboard boxes for shipping, moving, etc.	❑
4. Set up cardboard collection bins in a visible area nearby	❑
5. Purchase a baler	❑
6. Raise employee awareness toward the recycling program and the dangers of contamination	❑
Fine paper	
1. Reduce the use of fax cover sheets	❑
2. Transfer documents electronically	❑
3. Use a circulation sheet for documents instead of printing additional copies	❑
4. Provide information on diskettes	❑
5. Use the telephone or electronic means to transfer and make corrections to documents	❑
6. Use smaller envelopes	❑
7. Remove your building's name from indiscriminate mailing lists	❑
8. Develop guidelines on what really needs to be photocopied	❑
9. Use the photocopier's reducing feature whenever possible	❑
10. Use double-sided printing and photocopying	❑
11. Use the backside of paper that was printed on a single side only	❑
12. Reuse envelopes	❑
13. Set up fine paper collection bins in a visible area nearby	❑
14. Raise employee awareness toward the recycling program and the dangers of contamination	❑

Low-grade paper

1. Keep a few copies of the most popular papers; urge people to circulate these copies ❑
2. Revise the subscription list; cancel unnecessary subscriptions ❑
3. Encourage the use of recyclable plates and cups (to prevent the use of paper lids) ❑
4. Substitute warm air hand dryers for paper hand towels in washrooms ❑
5. Substitute cloth towels for paper hand towels in washrooms ❑
6. Purchase reusable coffee filters ❑
7. Reassess the need to use carbon paper for creating multiple copies of forms ❑
8. Use cloth towels in the cafeteria ❑
9. Subscribe to live information services ❑
10. Redistribute magazines once read ❑
11. Set up low-grade paper collection bins in a visible area nearby ❑
12. Raise employee awareness toward the recycling program and the dangers of contamination ❑

Newsprint

1. Keep a few copies of the most popular papers; urge people to circulate these copies ❑
2. Remove your building's name from indiscriminate mailing lists ❑
3. Subscribe to live information services ❑
4. Use shredded newsprint as packing material or as compost amendment ❑
5. Set up newsprint collection bins in a visible area nearby ❑
6. Raise employee awareness toward the recycling program and the dangers of contamination ❑

Plastic

1. Buy refillable cartridges for the photocopier and fax. ❑
2. Demand that the use of plastic packaging be reduced (replace it with reusable shipping containers). ❑
3. Use durable spoons for coffee preparation ❑
4. Urge employees to use durable utensils and cups ❑
5. Purchase carpeting made from recycled material ❑
6. Use rubber bands and reusable envelopes to prevent excessive packaging ❑
7. Reuse polystyrene packaging for shipping ❑
8. Set up plastic collection bins in a visible area nearby ❑
9. Raise employee awareness toward the recycling program and the dangers of contamination ❑

Fabric

1. Substitute warm air hand dryers for cloth hand towels in washrooms ❑
2. Reassess cleaning needs and methods in order to identify inefficiencies ❑
3. Donate old clothes to charities ❑
4. Use old fabrics as cleaning rags ❑
5. Repair, rather than dispose of, uniforms ❑
6. Collect fabrics in order to recycle them ❑

Wood

1. Determine the exact amount of wood necessary for renovation projects ❑
2. Purchase products made with recycled wood ❑
3. Collect renovation wastes and distribute them to people who could use them ❑
4. Reuse skids within safety standards ❑
5. Do not discard doors, window frames, mouldings and reusable materials ❑
6. Collect wood from renovation projects to recycle it ❑
7. Buy a wood chipper ❑

Source: *National Five Phase Solid Waste Management Protocol*, PWGSC, 1996.

Project Manager: _____

Signature: _____ Date: _____

Project Director: _____

Cost / Benefit Analysis (PWGSC, 1996)

Type or category of waste: _____

Initiative : _____

Costs	System design and action to carry out	Total $
Annual operating costs		
Building modifications / site preparation		
Internal collection and storage equipment (bins, bags, others)		
Internal handling equipment (examples: presses, compactors, carts, others)		
External collection equipment		
Total capital costs (C)		
Start-up costs		
Promotional and awareness-raising material		
Billboards / permanent labels		
Total start-up costs (D)		
Annual operating costs		
Equipment rental (examples: bins, bundle containers)		
Program administration		
Increases in labour costs		
Replacement costs		
Equipment maintenance		
External contractors		
Professional fees		

Type or category of waste: _____

Initiative : _____

Costs	System design and action to carry out	Total $
Promotion / awareness-raising (examples: updates, replacements)		
Others		
Total operating costs (F)		
BENEFITS		
Annual income		
Annual purchasing savings		
Annual waste elimination savings		
Total benefits (B)		
Net benefit		
Costs	Capital (C)	
	Start-up (D)	
	Operating (F)	
	TOTAL COST (C + D + F = R)	
Gross benefits	Benefits (B)	
Net	**B - R = Net Benefit**	

Source: *National Five Phases Solid Waste Management Protocol*, PWGSC, 1996.

Project Manager: _____

Signature: _____ Date: _____

Project Director: _____

List of communications tools (checklist)

TOOL . . . . . ☑

Training session

The training session is a widely used communications tool. It can be offered by an executive, an upper manager, a specialist or an internal or external consultant. . . . . ❑

Articles in the in-house bulletin

The in-house bulletin is an effective way to report progress, reiterate the importance of employee participation in the program or announce a new initiative. . . . . ❑

E-mail

E-mail can be an effective way to report progress, announce a new waste reduction initiative or reiterate the importance of employee participation in the recycling program. . . . . ❑

Posters

Posters can be used to advertise an upcoming event or a new initiative. They are particularly useful when the message includes visual elements. . . . . ❑

Screen savers

Easy to develop, a screen saver is an effective means of presenting a series of useful messages, scrolling one after the other across the screen. This tool reminds employees that the program exists and that participation is important. . . . . ❑

Special events — launches, environmental exhibits, etc.

Special events such as launches and exhibits are original ways of raising employee awareness and arousing their curiosity, enthusiasm and participation. . . . . ❑

Information centres or workshops

The organization of booths, conferences and seminars can serve to inform employees and make them aware of the program's importance. . . . . ❑

Memos

For added impact, memos should be signed by a high-ranking member of management and printed on both sides. . . . . ❑

Promotional material

A sleeve containing waste reduction program information – flyers, technical specifications, brochures, etc. – can prove quite useful. It can be used for special events and training sessions, as well as in response to employee information requests. . . . . ❑

Contests

Holding contests offers employees an opportunity to work closely with the program, either by designing awareness campaign posters or determining new ways of reducing waste production. . . . . ❑

Meetings with personnel

Regular personnel meetings offer an occasion to share progress results and inform project managers and directors of on-going projects and/or of upcoming improvements. . . . . ❑

Source: *National Five Phases Solid Waste Management Protocol*, PWGSC, 1996.

Project Manager: _____

Signature: _____ Date: _____

Project Director: _____

Audit results compiled by zone, per employee, per year

Audit carried out: from _____ to _____

	Department/ service: _____	Department/ service: _____	Department/ service: _____	Other	Total
Building area (m^2)					
Number of employees					
Total waste kg / empl. / yr.	A				
Disposal kg / empl. / yr.	B				
Total recycling kg / empl. / yr.	C				
Total recycled kg / empl. / yr.	D				
% contamination	E				

A = Total waste (Including recyclable materials) generated within a year, divided by the number of employees
B = Total amount of waste eliminated in a year, divided by the number of employees
C = Total recyclable materials (recycled and not currently recycled) generated within a year, divided by the number of employees
D = Annual total of recycled materials, divided by the number of employees
E = Percent contaminants found in recyclable materials

Project Manager: _____

Signature: _____ Date: _____

DESKSIDE CONTAINERS		
	EZ-Sorter™ Waste Basket (2 or 4 litres)	
	Two Streams Recycling Container (Paper and Waste)	
	26.6 itre Paper Container	
	Recycling Box	
CENTRALIZED CONTAINERS		
	Bullseyes Container	
	Slimline Container	
	Recycled Recycler Container (100% recycled)	
	Roll Out Carts (80 to 360 litres)	
	Indoor Unit (3 to 6 compartments)	
	Outdoor Unit (2 to 6 compartments)	

COMPOSTING		
	Compostainer Cart for Organic Material	
	Backyard Composter	
OUTDOOR STORAGE		
	660 and 1100 litres with casters	
	Depot Container for Drop Offs	
 Source : Durabac/Durapac	Rear End Loading Container	
 Source : Durabac/Durapac	Front End Polyethylene Container	
 Source : Durabac/Durapac	Front End Metal Container	
 Source : Durabac/Durapac	Open Top Roll Off Container	
BALERS AND COMPACTORS		
 Source : Durabac/Durapac	Vertical Baler	
 Source : Durabac/Durapac	Stationary or Self-Contained Compactor	
 Source : Durabac/Durapac	Warehouse for Hazardous Wastes	

Project Director: _____

Waste management – Where are we now? (checklist)

Date: _____

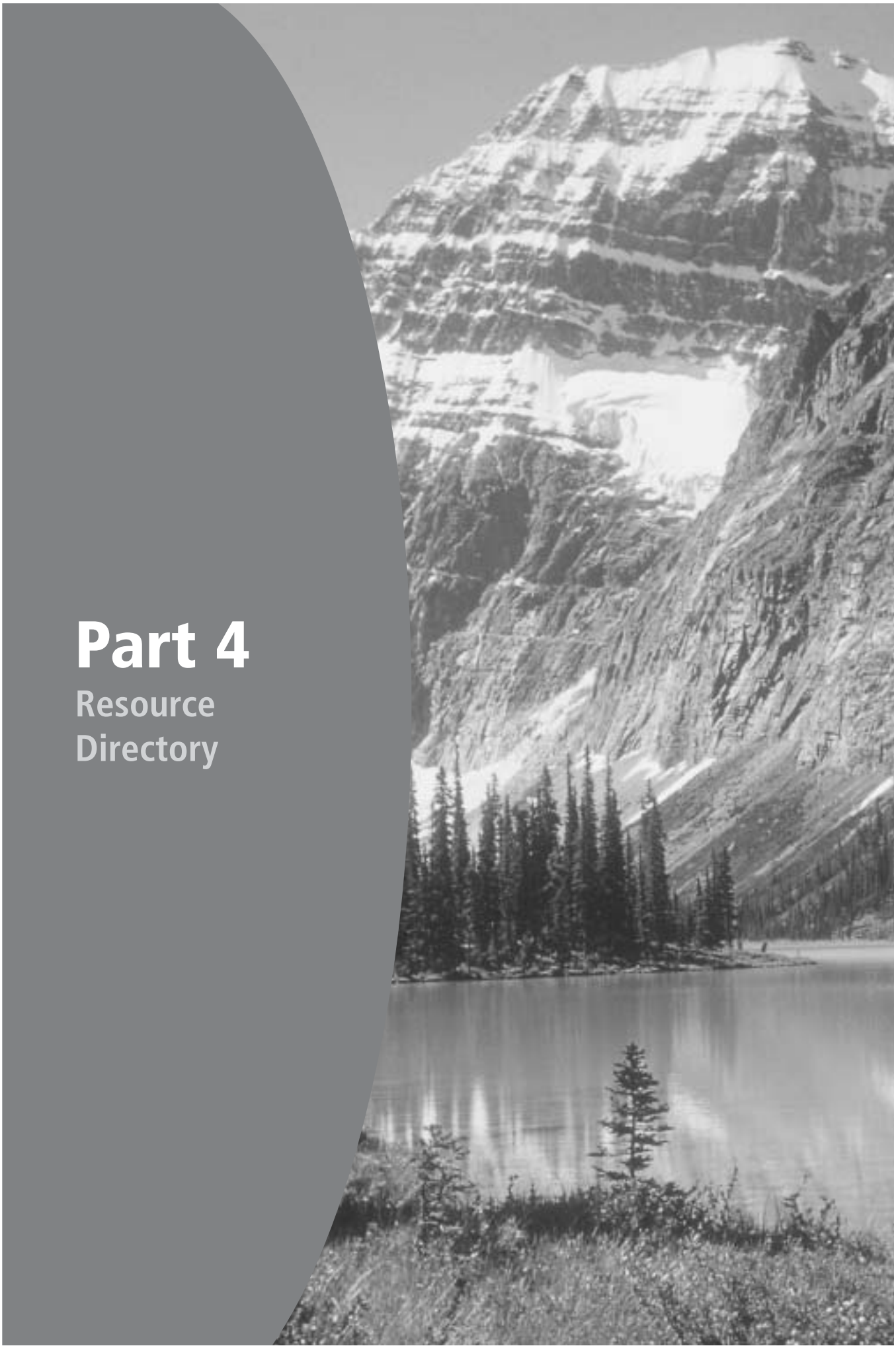
Step	What have we done so far?	Who is in charge?	Objectives	Work schedule	Priority
1- Commitment					
Formal statement: by whom?					
2- Current situation					
• *Preliminary assessment*					
Processes and activities					
Purchasing habits					
Customer relations					
Financial backer relations					
• *Solid waste audit*					
Preparations - Equipment - Team - Sample - Zones - Schedule					
Waste sorting - Sorting - Weighing - Elimination					
Data interpretation - Assessment - Production estimate					
Data presentation					

Step	What have we done so far?	Who is in charge?	Objectives	Work schedule	Priority
• *Waste management*					
Hauler Pick-up frequency Amount Annual cost					
3- Designing an action program					
• *Prerequisite*					
Support Committee formation Committee's mandate Responsibility					
• *Process*					
Solutions Options Technical feasibility Economic feasibility Program management					
4- Implementation					
Budget allocation Resource mobilization Employee actions Supplier selection Equipment purchases Program launch					
5- Results assessment					
Quantitative assessment Purchase register Transport register Qualitative assessment Annual report Retrospective effect					

Project Director: _____

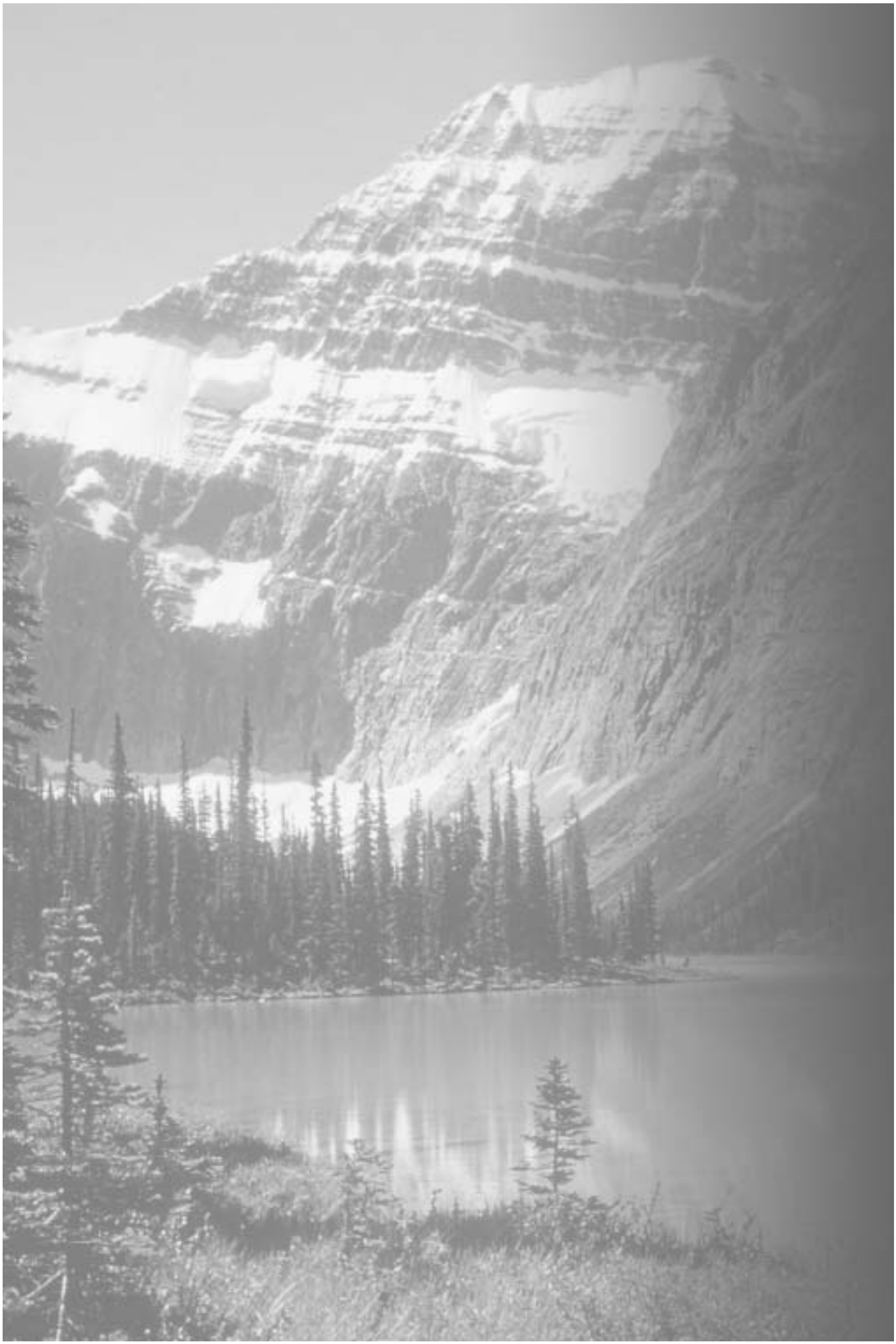
Signature: _____ Date: _____

Notes:



Part 4

Resource Directory



This resource directory is intended to be a starting point to find an answer to your questions about the environment in general and solid waste management in particular. Emphasis has been directed to the identification of governmental resources and to major provincial or territorial environmental organizations.

Most of the sites presented have a selected list of links to other sites of interest. For more detailed information, the reader is invited to use an Internet search engine or to either contact its government or one of the provincial or territorial organizations cited in the following pages.

1. International

Amazing Environmental Organization Web Directory

www.webdirectory.com

World's widest environment search engine. Contains thousand of links accessible by way of logiCal and intuitive classification. Covers all environmental topics.

California Integrated Waste Management Board

www.ciwmb.ca.gov/default.asp

Organization responsible for California's solid waste management. The " Publications " section is packed with detailed and up-to-date information regarding any solid waste management topic.

Environmental Yellow Pages

www.enviroyellowpages.com

World wide search engine by country, province, business type, etc.

EPA – Office of Solid Waste

www.epa.gov/osw/

USEPA's section dedicated to solid waste management.

Global Recycling Network

PO Box 24017
Guelph, Ontario
N1E 6V8
Help Line: 519-658-9580
www.grn.com

This gigantic portal stands as an electronic information exchange that specializes in the trade of recyclables reclaimed in Municipal Solid Waste (MSW) streams, as well as the marketing of eco-friendly products. Links to sites dedicated to the exchange of a particular material and to directories listed in alphabetical order.

Greenpeace

www.greenpeace.org

Greenpeace is an independent, campaigning organization that uses non-violent, creative confrontation to expose global environmental problems, and force solutions for a green and peaceful future. Greenpeace's goal is to ensure the ability of the Earth to nurture life in all its diversity.

From the home page, choose your language and your country. For National Offices around the world, link to www.greenpeace.org/contact/ index-int

Solid Waste Association on North America SWANA

Postal Address:
PO Box 7219
Silver Spring, MD 20907-7219

Street Address:
1100 Wayne Ave.
Silver Spring, MD 20910
Tel.: 1-800-GO-SWANA
(1-800-467-9262),
Fax: 301-589-7068,
E-mail: info@swana.org.
www.swana.org
SWANA is a non-profit, educational organization serving individuals and communities responsible for the management and operation of municipal solid waste management systems.

United States Environmental Protection Agency

www.epa.gov

Very large information source on all environment topics. A search engine is accessible from the home page. This site is a precious tool for any environmental question.

Google's Internet Directory of Links about Solid Waste Management

http://directory.google.com/Top/Business/Energy_and_Environment/Waste_Management/

Look's Internet Directory of Links about Solid Waste Management

www.look.com/searchroute/directorysearch.asp?p=191485

Yahoo!'s Internet Directory of Links about Solid Waste Management

http://ca.dir.yahoo.com/Society_and_Culture/Environment_and_Nature/Waste_Management/

2. Canada

Government of Canada

Communication Canada
Ottawa, Ontario K1A 1M4 CANADA
1-800 O-Canada (1-800-622-6232)
www.canada.gc.ca

The Green Lane of Environment Canada

351 St. Joseph Boulevard
Hull, Quebec K1A 0H3
Tel.: 819-997-2800 or
1-800-668-6767 Fax: 819-953-2225
E-mail: enviroinfo@ec.gc.ca
/www.ec.gc.ca/envhome.html
Consult links listing at
www.ec.gc.ca/links/index_e.html

Aboriginal Canada Portal : Environment and Natural Resources

www.aboriginalcanada.gc.ca/abdt/interface/interface2.nsf/engdocBasic/7.html
Single window to Canadian Aboriginal on-line resources, contacts, information, and government programs and services. Includes links to aboriginal resources in each province and territory.

Canadian Council of Ministers of the Environment

123 Main Street, Suite 360
Winnipeg, Manitoba R3C 1A3
Tel.: 204-948-2090 Fax.: 204-948-2125
E-mail: info@ccme.ca
www.ccme.ca

The major intergovernmental forum in Canada for discussion and joint action on environmental issues of national and international concern.

Canadian Environmental Network

300-945 Wellington Street
Ottawa, Ontario K1Y 2X5
Tel.: 613-728-9810 Fax: 613-728-2963
info@cen-rce.org www.cen-rce.org/

CEN's Mission Statement is to support, facilitate and advance the work of its member groups to protect the Earth and promote ecologically sound ways of life.

Composting Council of Canada

6 Northumberland Street
Toronto, Ontario M6H 1P7
Tel.: 416-535-0240 Fax: 416-536-9892
E-mail: ccc@compost.org
www.compost.org

National non-profit organization which serves as a forum to advocate and advance the use of composting to government, industry and the public as a means of reducing Canada's waste stream while reclaiming the organic fraction for beneficial purposes.

CSR: Corporations Supporting Recycling

26 Wellington Street East
Suite 601
Toronto, Ontario M5E 1S2
Tel.: 416-594-3456
or toll free 1-888-277-2762
Fax: 416-594-3463
info@csr.org www.csr.org

A Canadian, not-for-profit, private sector organization that represents the packaging stewardship interests of consumer products and packaging industries.
Participates in recycling initiatives in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec and Nova Scotia.

Earth Day Canada (EDC)

296 Richmond Street West, Suite 500
Toronto Ontario M5V 1X2
Tel.: 416-599-1991 Fax: 416-599-3100
www.earthday.ca
A national charitable environmental communications organization. EDC is mandated to improve the state of the environment by empowering Canadians to take action and achieve local solutions.

Round Table on the Environment and the Economy

344 Slater Street, Suite 200
Ottawa, Ontario K1R 7Y3
Tel.: 613-992-7189 Fax: 613-992-7385
E-mail: admin@nrtee-trnee.ca
www.nrtee-trnee.ca/

Independent advisory body that provides decision makers, opinion leaders and the Canadian public with advice and recommendations for promoting sustainable development

Rechargeable Battery Recycling Corporation

1000 Parkwood Circle, Suite 450
Atlanta, GA 30339
Tel.: 678-419-9990 Fax: 678-419-9986
corporate@rbrc.com

For Canada
Susan Antler
16 Northumberland
Toronto, Ontario M6H 1P7
Tel.: 416-535-6710 Tel.: 416-536-9892
santler@utopia.on.ca www.rbrc.org
The Rechargeable Battery Recycling Corporation (RBRC), a non-profit company, can help you recycle your portable rechargeable batteries. These batteries are commonly found in cordless power tools, cellular and cordless phones, laptop computers, camcorders, digital cameras, and remote control toys. RBRC recycles the following portable rechargeable battery chemistries:

- Nickel Cadmium (Ni-Cd)
- Nickel Metal Hybride (Ni-MH)
- Lithium Ion (Li-ion)

- Small Sealed Lead (Pb) (weighing less than 2 lbs./1 kg.)

Target Zero Canada

296 Richmond Street West, Suite 500
Toronto, Ontario
M5V 1X2
Tel.: 416-599-1991 Ext.122
Fax: 416-599-3100
info@targetzerocanada.org
www.targetzerocanada.org

A new program of Earth Day Canada is taking aim at promoting Zero Waste solutions, that reduce the burden placed on our environment, communities and taxpayers, and facilitate corporate waste reduction, increased efficiency, and fiscal growth establishing the foundation for economic, environmental and community sustainability.

Waste Reduction Week in Canada

www.wrwcanada.com/
This site contains resources and contacts to assist your community, school or business with waste minimisation and conservation initiatives.

Wasteweb.ca

www.wasteweb.ca
Canada's waste management Web site. It connects waste generators with waste receivers word that can dispose of your industrial waste, chemical waste, toxic waste, biomedical waste, food and agricultural waste, and any type of hazardous or regulated waste.

Solid Waste & Recycling

www.solidwastemag.com
Canada's Magazine on Collection, hauling, processing and disposal

Hazardous Materials Management

www.hazmatmag.com
North America's Publication of Pollution Prevention and Control

The First Nations Environmental Network

PO Box 394
Tofino, B.C. V0R 2Z0
Tel.: 250-725-2996 Fax: 250-725-2527
councilfire@hotmail.com
www.fnen.org/
Canadian national organization of individuals, non-profit groups and Indigenous Nations who are actively working on environmental issues. We are also an affiliate network of the Canadian Environmental Network.

3. Newfoundland

Government of Newfoundland

Communications and Consultation Branch
10th Floor, East Block
Confederation Building
St. John's, Newfoundland
A1B 4J6
Attention: Doris Walsh
info@mail.gov.nf.ca
www.gov.ns.ca

Department of Environment

4th Floor, West Block
Confederation Building
PO Box 8700
St. John's Newfoundland
A1B 4J6
Tel.: 709-729-2664
Fax: 709-729-6639
www.gov.nf.ca/env/default.asp

Pollution Prevention Division, Solid Waste Management Section

Pollution Prevention
Department of the Environment
PO Box 8700
4th Floor, West Block
Confederation Building
St. John's, Newfoundland
A1B 4J6
709-729-5782/2556/2555
Fax: 709-729-6969
www.gov.nf.ca/env/Env/PollPrev/waste_management.asp

Newfoundland and Labrador Environmental Industry Association

www.neia.org/

NEIA's mission is to promote the growth and development of the environmental industry of Newfoundland and Labrador. The site includes a directory of its members (about a hundred).

The Newfoundland and Labrador Environment Network (NLEN)

35 West Street,
PO Box 944
Corner Brook, Newfoundland
A2H 6B9
Phone/fax: 709-634-2520
www.cornet.nf.ca/web/nlen

A non-profit, non-government organization with a mandate to improve communication links and facilitate joint initiatives among groups and organizations to Newfoundland and Labrador which share a concern for the quality of the environment.

4. Prince Edward Island

Government of Prince Edward Island

Island Information Service
PO Box 2000
Charlottetown, PEI
C1A 7N8
www.gov.pe.ca/

Fisheries, Aquaculture and Environment

Jones Building, 4th and 5th Floors
11 Kent Street PO Box 2000
Charlottetown, PEI
C1A 7N8
Tel.: 902-368-5000
Facsimile: 902-368-5830
www.gov.pe.ca/fae/index.php3

INFOPEI

www.gov.pe.ca/infopei/Environment_and_Land/index.php3

Environmental subjects index to learn more, including contacts and links to provincial resources where possible.

Island Waste Management Corporation

Customer Service Centre
PO Box 271
Slemon Park, PEI
C0B 2A0
Tel.: 1-888-280-8111
Fax: 902-436-8401
E-mail: info@iwmc.pe.ca
www.iwmc.pe.ca

Island Waste Management Corporation (IWMC) is the provincial Crown Corporation that administers and provides solid waste management services throughout Prince Edward Island. IWMC's mandate is to deliver a cost effective and environmentally responsible provincial waste management system to both the residential and commercial sectors of PEI.

The Prince Edward Island Eco-Net (PEIEN)

126 Richmond St.
Charlottetown, PEI
C1A 1H9
Tel.: 902-566-4170
Fax: 902-566-4037
peien@isn.net
www.isn.net/~network/

A not-for-profit, non-governmental network of groups on Prince Edward Island who care about our environment. The PEIEN is non-advocacy and thus does not take stands on particular issues. Instead, it tries to help its member groups with the work they do through the sharing of information and provision of administrative and technical support.

5. New Brunswick

Government of New Brunswick

C.P. 6000
Fredericton, NB
E3B 5H1
www@gnb.ca www.gnb.ca/

Ministry of the Environment and Local Governments

Postal Address
PO Box 6000
Fredericton, NB
E3B 5H1
Canada
Tel.: 506-453-2690
Fax: 506-457-4991
www.gnb.ca/0009

New Brunswick Environment Industry Association

PO Box 637 Station A
Fredericton NB
E3B 5B3
Tel.: 506-455 0212
Fax: 506-452 0213
nbeia@nbnet.nb.ca
www.nbeia.nb.ca

The New Brunswick Environment Industry Association (NBEIA) is a non-profit organization dedicated to promoting the growth of environmental business in New Brunswick, Canada. Founded in 1994, NBEIA represents members from all facets of the environment sector, ranging from technology development and manufacturing to consulting, engineering, financial, and legal services.

NBEIA promotes the growth and development of the environment industry in New Brunswick by helping our members to maximize opportunities, improve competitiveness, save costs, expand regional activities and participate in industry developments.

New Brunswick Environmental Network

167 Creek Road,
Waterford, NB
E4E 4L7
Tel.: 506-433-6101
Fax: 506-433-6111
homepage@elements.nb.ca

nben@nbnet.nb.ca
www.web.net/nben/

The New Brunswick Environmental Network (NBEN) was formed in 1990 as a non-profit regional network of citizen environmental groups in New Brunswick. The NBEN presently has 70 member groups. It is affiliated with the Canadian Environmental Network (CEN), a nation-wide umbrella organization of more than 640 environmental groups across Canada with over 1000 members. Through membership in the NBEN, environmental activists are linked with services and other environmental activists nation-wide.

The role of the NBEN is to improve communication and co-operation among environmental groups and between these groups, government and industry.

New Brunswick Solid Waste Association

PO Box 21, Station A
Fredericton, NB
E3B 4Y2
Chairman : James Porter
Tel.: 506-778-6646 Fax: 506-778-6642
northumberlandswc@nb.aibn.com
www.nbsolidwaste.com

Click on "commissions" or "Map" to access the 12 local organizations.

6. Nova Scotia

Government of Nova Scotia

www.gov.ns.ca

Nova Scotia Environment and Labour

Mailing Address:
5151 Terminal Road PO Box 697
Halifax, Nova Scotia B3J 2T8
Tel.: 902-424-5300 Fax: 902-424-0503
www.gov.ns.ca/enla/

Environmental Monitoring and Compliance Division Solid Waste Resource Management Branch

www.gov.ns.ca/enla/emc/wasteman/

Responsible for a number of initiatives including, recycling, composting, disposal bans, and the Nova Scotia Solid Waste Strategy.
For Regional & District Offices :
www.gov.ns.ca/enla/offloc.htm
For a list of contacts :
www.gov.ns.ca/enla/emc/wasteman/contacts.htm

Clean Nova Scotia

126 Portland St.
Dartmouth, Nova Scotia B2Y 1H8
Main phone number: 902-420-3474
Fax number: 902-424-5334
Waste Reduction Centre Hotline number: 1-800-665-LESS
www.clean.ns.ca/

A non-profit environmental organization providing information to all Nova Scotians, helping them to make positive decisions about the environment. This organization also delivers numerous environmental programs province wide. For over 10 years, Clean Nova Scotia has worked cooperatively with individuals, families, businesses, government and other organizations to secure a sustainable, environmentally healthy society for future generations to enjoy.

Directory of Solid Waste Management Contacts in Nova Scotia

www.gov.ns.ca/enla/emc/wasteman/contents.htm

Directory of solid waste, reuse, recycling and composting contacts for the industrial, commercial and institutional sector in Nova Scotia.

Nova Scotia Environmental Industries Directory

www.nseia.ns.ca/directory/

Profiles on Nova Scotia companies and organizations that provide environment related products and services.

Nova Scotia Environmental Network (NSEN)

PO Box 33070
Halifax, Nova Scotia B3L 4T6
Tel.: 902-454-6846 Fax: 902-454-6841
E-mail: nsen@web.net
www.web.net/~nsen/home/

The purpose of the NSEN is to provide support for its members in their efforts to achieve their goals, by facilitating information exchange and by providing a medium for coordinated action plans. The NSEN is a society of individuals and organizations whose common purpose is the conservation and enhancement of the environment.

Resource Recovery Fund Board inc.

14 Court Street, Suite 305
Truro, Nova Scotia
B2N 3H7
Tel.: 902-895-RRFB (7732)
Toll Free RRFB Solid Waste Hotline:
1-877-313-RRFB (7732)
Fax: 902-897-3256
E-mail: Info@rrfb.com
www.rrfb.com

RRFB Nova Scotia is in business to be a commercially viable company providing responsible management for Nova Scotia's Solid Waste-Resource Management Strategy. Paramount will be our initiatives to protect the long term environmental and economic good of Nova Scotia.

7. Quebec

Government of Quebec

Ministère des Relations avec les citoyens et de l'Immigration
Communication Quebec
1056 Louis Alexandre Taschereau Street, 4th floor
Quebec, Quebec
G1R 5E6
Tel.: 418-646-2061
Fax: 418-643-5190
communication-quebec@mrci.gouv.qc.ca
www.gouv.qc.ca/

Ministère de l'Environnement du Quebec (in French)

Information Centre
Marie-Guyart Building, ground Floor
675 René Lévesque Blvd. East
Quebec, Quebec G1R 5V7
Tel.: 418-521-3830 or 1-800-561-1616
Fax: 418-646-5974
E-mail: info@menv.gouv.qc.ca
www.menv.gouv.qc.ca

Agence de l'efficacité énergétique du Quebec

5700 4th Avenue West, Suite B405
Charlesbourg, Quebec
G1H 6R1
Tel.: 418-627-6379 or 1-877-727-6655
Fax: 418-643-5828
E-mail: aee@aee.gouv.qc.ca
www.aee.gouv.qc.ca

The mission of the Agence de l'efficacité énergétique, within the perspective of sustainable development, is to promote the efficient use of all forms of energy in all sectors of activity for the benefit of all regions of Quebec.

Bureau d'audiences publiques en environnement (BAPE) (in French)

Quebec Office
Lomer-Gouin Building
575 Saint-Amable Street, Suite 2.10
Quebec, Quebec
G1R 6A6
Tel.: 418-643-7447
Fax: 418-643-9474
Toll free : 1-800-463-4732
communication@bape.gouv.qc.ca

Montreal Office
2 Complexe Desjardins
East Tower, 18th Floor, Suite 1817
PO Box 245
Station Desjardins
Montreal, Quebec
H5B 1B4
Tel.: 514-873-7790
Fax: 514-873-5024
www.bape.gouv.qc.ca

Organization mandated by the Ministère de l'Environnement to recommend, following public audiences, which position should be taken regarding projects that could threaten the quality of the environment. Some reports are available online, while only the abstract of others is available.

RECYC-QUEBEC (in French)

Headquarters
675 Saint-Amable Street, Suite 300
Quebec, Quebec
G1R 2G5
Tel.: 418-643-0394
Fax: 418-643-6507
Toll free: 1-800-807-0678
communications@recyc-quebec.gouv.qc.ca
www.recyc-quebec.gouv.qc.ca

Montreal Office
7171 Jean-Talon Street East, Suite 200
Montreal, Quebec
H1M 3N2
Tel.: 514-352-5002
Fax: 514-873-6542
Statutory Corporation whose mission is to promote, develop and encourage the reduction, reuse and recycling of containers, wrapping, material or products and their reclamation in a resource conservation perspective.

RÉSEAU environnement (in French)

911 Jean-Talon Street East, Suite 220
Montreal, Quebec
H2R 1V5
Tel.: 514-270-7110
Fax: 514-270-7154
info@reseau-environnement.com
www.reseau-environnement.com

A non-profit organization that ensures the development of science and technologies, the promotion of expertise and the support of environmental activities by regrouping specialists, businessmen, municipalities and environmental industries. Member's directory is available online by activity sector.

Enviro-Access

85 Belvédère Street North, Suite 150
Sherbrooke, Quebec
J1H 4A7
Tel.: 819-823-2230, 514-270-1724, 418-659-9900 Fax: 819-823-6632
enviro-a@enviroaccess.ca
www.enviroaccess.ca/eng/index.html

Enviro-Access fosters the emergence and supports the development of innovative projects and companies contributing to the improvement of the quality of the environment and to sustainable development on a local, national and international scale. An online environmental business directory is available at www.enviroaccess.ca/entreprises/index_eng.html.

Collecte sélective Quebec (in French)

Place du Parc
300 Léo-Pariseau Street,
Suite 2516
Montreal, Quebec
H2X 4B3
Tel.: 514-987-1491
Fax: 514-987-1598
csq@coselective.qc.ca
www.coselective.qc.ca

Collecte sélective Québec is a non-profit organization whose mission is promoting the implementation of residential recycling systems while financially helping municipalities.

ENvironnement JEUnesse (ENJEU) (in French)

4545 Pierre-de-Coubertin Avenue
PO Box 1000, Station M
Montreal, Quebec H1V 3R2
Tel.: 514-252-3016
Fax: 514-254-5873
infoenjeu@enjeu.qc.ca
www.enjeu.qc.ca

ENvironnement JEUnesse's actions are aimed at stimulating the development of youth's ecological conscience and to support youth in their environmental actions.

Équiterre

2177 Masson Street, Suite 317
Montreal, Quebec
H2H 1B1
Tel.: 514-522-2000
Fax: 514-522-1227
info@equiterre.qc.ca
www.equiterre.qc.ca
Équiterre (from the French words for equity and earth) is a not-for-profit organization dedicated to promoting ecological and socially just choices through action, education and research from a standpoint that embraces social justice, economic solidarity and the defence of the environment.

Regroupement québécois des groupes écologistes (in French)

4200 Adam Street
Montreal, Quebec H1V 1S9
Tel.: 514-392-0096
Fax: 514-396-7896
info@rqge.qc.ca www.rqge.qc.ca
Not-for-profit organization rallying Quebec's ecological groups. Member of the Canadian Environmental Network.

Regroupement national des CRE (RNCREQ) (in French)

1255 University Street, Suite 514
Montreal, Quebec H3B 3V8
Tel.: 514-861-7022
Fax: 514-861-8949
philippe.bourke@rncreq.org
www.rncreq.org

The RNCREQ's objectives are to contribute to the development and the promotion of a global vision of sustainable development in Quebec, to help CREs have popular environment education tools and finally, to represent all CREs and take position on their behalf. Find every CREs contact information on this site.

Réseau des ressourceries du Quebec (RRQ) (in French)

4200 Adam Street
Montreal, Quebec
H1V 1S9
Tel.: 514-875-5869
Fax: 514-396-7896
info@reseauressourceries.org
www.reseauressourceries.org

The RRQ has been working since 1997 to consolidate links between ressourceries by supporting them technically and by supporting soon-to-be ressourceries projects. The RRQ wishes to help Quebec reach the provincial solid waste reduction target established by the Government.

8. Ontario

Government of Ontario

1-800-267-8097
416-326-1234
www.gov.on.ca/

Ministry of the Environment

135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5
Tel.: 416-314-6378
Fax: 416-314-6396
or 416-314-6409
www.ene.gov.on.ca/

Association of Municipal Recycling Coordinators

25 Douglas St.Guelph, Ontario
N1H 2S7
Tel.: 519-823-1990
Fax: 519-823-0084
amrc@albedo.net
www.amrc.guelph.org

The Association of Municipal Recycling Coordinators (AMRC) is an incorporated, not-for-profit organization formed in 1987 by municipal waste management professionals to facilitate the sharing of municipal waste reduction, reuse, composting, and recycling information, expertise and experience among municipalities.

Municipal Waste Integration Network (MWIN)

PO Box # 1116
704 Glen Morris Rd. W.
Ayr, Ontario
N0B 1E0
Tel.: 519-620-9654
Fax: 519-620-9678

meetinglogistics@on.aibn.com
www.mwin.org

A group of concerned municipal and industry representatives from all sectors of the waste management business have come together to build the Municipal Waste Integration Network. Or as, we like to call it, M-WIN!

MWIN is for everyone responsible for delivering waste management services in our municipalities. MWIN provides municipalities with a strong base of stakeholders from within the municipal waste management industry ready and willing to provide an effective voice to government.

Ontario Environment Business Directory

www.envirodirectory.on.ca/directory2002/Default.asp

The Ministry of the Environment has contracted EcoLog Information Resources Group to prepare the Ontario Environment Business Directory which showcases Ontario expertise for domestic and international environment business opportunities. Online search by company, city, category.

Ontario Environment Network

Main Office Mailing Address:
PO Box 1412, Station Main
North Bay, Ontario P1B 8K6
Phillip Penna, Office Coordinator
Tel.: 705-840-2888 Fax: 705-840-5862
E-mail: oen@web.ca www.oen.ca

The Ontario Environment Network (OEN) is a non-profit, non-governmental network serving Ontario's environmental non-profit, non-governmental community. Ontario has over 500 environmental groups that range from national to neighbourhood-based and focus on a wide range of issues. The OEN seeks to increase awareness of these organizations and encourage discussions about means to protect the environment. OEN is a non-advocacy network and therefore does not take positions on issues.

Recycling Council of Ontario

PO Box 250 Station A
Toronto, Ontario M5W 1B2
Tel.: 416-657-2797
Fax: 416-960-8053
rco@rco.on.ca www.rco.on.ca

To inform and educate all members of society about the generation of waste, the avoidance of waste, the more efficient use of resources and the benefits and/or consequences of these activities. The site includes many links to businesses or to sites on a voluntary registration basis, and an online database about the 3Rs.

Waste Diversion Ontario (WDO)

26 Wellington Street East, Suite 601
Toronto, Ontario M5E 1S2
Tel.: 416-594-3456
Toll Free: 1-888-277-2762
Fax: 416-594-3463
www.wdo.on.ca

The key objective of the WDO is "to develop, for the Ontario government's consideration, a sustainable funding formula for the Blue Box and other waste diversion initiatives" and "to help the province fulfill its commitment to achieve a 50% diversion of waste from disposal and to recommend options to provide funding support to Ontario's residential recycling system."

9. Manitoba

Government of Manitoba

Tel.: 204-945-3744
Fax: 204-945-4261
Toll free in Manitoba:
1-800-282-8060
E-mail : mgi@gov.mb.ca
www.gov.mb.ca/

Manitoba Conservation

www.gov.mb.ca/natres/

Pollution Prevention Branch of the Manitoba Conservation

123 Main Street, Suite 160
Winnipeg Manitoba
R3C 1A5
Tel.: 204-945-8443
Toll free: 1-800-282-8069 (ext. 8443)
Fax: 204-945-1211
www.gov.mb.ca/conservation/pollutionprevention

Manitoba Association for Resource Recovery Corp. (MARRC)

35, 1313 Border Street
Winnipeg, Manitoba R3H 0X4
Tel.: 204-632-5255
Fax: 204-633-9380
Toll free: 1-888-410-1440
marrc@icenter.net
www.usedoilrecycling.com/html/about_man.htm

A non-profit organization incorporated under The Corporation Act of Manitoba formed April 1, 1997 by manufacturers and marketers of oil products in Manitoba and managed by a Board of Directors comprised of industry and public representatives. Its mandate is to develop, implement and administer a cost-effective, sustainable, user-financed and province-wide stewardship program for used oil, used oil filters and used oil containers on behalf of its members.

Manitoba Eco-Network Inc.

#2 - 70 Albert Street
Winnipeg, Manitoba R3B 1E7
Tel.: 204-947-6511
Fax: 204-989-8476
mbeconet@mts.net
www.web.net/men/

Provides its environmental and social reform member groups with services which include networking, public education on environmental issues and coalition building in response to municipal, provincial and federal government initiatives. Many of these are small, grassroots groups without staff or offices of their own. The Eco-Network supports them with timely information, space, equipment, research material and an opportunity to access other groups across the country through the Canadian Environment Network (CEN) of which it is a regional office. An electronic newsletter is available online.

Manitoba Product Stewardship Corporation (MPSC)

280-530 Kenaston Blvd
Winnipeg Manitoba R3N 1Z4
Tel.: 204-989-6222
www.mpsc.mb.ca/

MPSC is an independent, non-profit organization representing the interests of all sectors of Manitoba, including consumers, industry, municipalities and governments to encourage the expansion of convenient and efficient recycling services across Manitoba.

MPSC is a statutory corporation that operates at "arm's length" from the provincial government, and is currently funded solely by the 2 cent levy on all beverage containers (excluding dairy) sold in Manitoba.

Resource Conservation Manitoba

2nd Floor - 70 Albert Street
Winnipeg, Manitoba
R3B 1E7
Tel.: 204-925-3777
E-mail: rcm@mb.sympatico.ca
www.resourceconservation.mb.ca

A non-profit, non-governmental organization directed by an elected community board. RCM's mission is to promote ecological sustainability through environmental education and to develop alternatives to current practices.

10. Saskatchewan

Government of Saskatchewan

www.gov.sk.ca

Saskatchewan Environment

www.serm.gov.sk.ca
For information on recycling, hauling and waste exchange:
1-800-205-7070

Saskatchewan environment emphasis is on decentralised service delivery, so check out this link to find out about services available in your region:
www.serm.gov.sk.ca/corporate/regions/

Recycling in Saskatchewan

www.serm.gov.sk.ca/environment/recycle/

SARCAN Recycling

111 Cardinal Crescent
Saskatoon, Saskatchewan S7L 6H5
Tel.: 306-933-0616 Fax: 306-653-3932
E-mail: contact@sarcan.sk.ca
www.sarcan.sk.ca/sarcan.htm

SARCAN Recycling is the recycling division of the Saskatchewan Association of Rehabilitation Centres (SARC), which strives to provide employment for people with disabilities, protect the environment, and contribute to the economic development of our province. SARCAN has a network of over 70 depots to provide a comprehensive provincial collection, processing, transportation, and marketing system to recycle most ready-to-serve beverage containers. SARCAN has an exclusive contract with Saskatchewan Environment to provide these services.

Saskatchewan Association for Resource Recovery Corp. (SARRC)

2366 Avenue C North
Saskatoon, Saskatchewan
S7L 5X5
Tel.: 306-652-7217
Fax: 306-652-1705
Toll free: 1-877-645-7275
E-mail : info@sarrc.com
www.usedoilrecycling.com/html/about_sask.htm

A non-profit organization whose mandate is to develop, implement and maintain a single, cost-effective, province-wide Used Oil Materials Recycling Program for used oil, used oil filters and used oil containers on behalf of its members.

Saskatchewan Eco Network

203-115 2nd Avenue North
Saskatoon, Saskatchewan
S7K 2B1
Tel.: 306-652-1275
Fax: 306-665-2128
sen@the.link.ca
www.econet.sk.ca/index.html

Connects environmentalists with each other, both within the province and across Canada, promoting active networking among member groups. SEN publishes a quarterly newsletter and distributes information from many sources by e-mail.

Saskatchewan Environmental Directory

www.serm.gov.sk.ca/corporate/whoswho/

Comprehensive list of non-government organizations, government and private agencies and offices which offer services or are involved in activities that pertain to the environment.

Saskatchewan Waste Reduction Council

#203 - 115 Second Avenue North
Saskatoon, Saskatchewan
S7K 2B1
Tel.: 306-931-3242
Fax: 306-665-2128
info@saskwastereduction.ca
www.saskwastereduction.ca

A non-profit organization striving to promote waste reduction to all sectors of the province in order to help Saskatchewan and its people attain the environmental, economic and cultural benefits that come from reducing waste.

The site includes a provincial database of organizations in recycling and reuse, and in household hazardous waste disposal.

11. Alberta

Government of Alberta

www.gov.ab.ca/home
PO Box 1333
Edmonton, Alberta

T5J 2N2

To be connected to any Alberta Government office,
call 310-0000 toll free anywhere in Alberta. Outside Alberta, call long distance 780-427-2711.
Fax: 780-422-2852 or
toll free fax within Alberta,
dial 310-0000 then 780-422-2852

Alberta Environment

Main Floor, Petroleum Plaza South Tower
9915-108 Street
Edmonton, Alberta
T5K 2G8
Tel.: 780-944-0313
Fax: 780-427-4407
env.infocent@gov.ab.ca
www3.gov.ab.ca/env/

Action on Waste

4th Floor, 9820-106 Street
Edmonton, Alberta T5K 2J6
1-800-463-6326 or 427-6982
Fax: 780-422-5120
E-mail: WasteNot@gov.ab.ca
www3.gov.ab.ca/env/waste/aow/index.html

Action on Waste promotes the reduction of wastes going to municipal landfills throughout Alberta.

Alberta Beverage Container Recycling Corporation

Container Recycling Fee hotline at
1-888-400-9588
www.abcrc.com/code/home_page/frameset_home

Alberta Beverage Container Recycling Corporation represents all beverage manufacturers selling products in Alberta. Our mission is to collect and recycle regulated beverage containers in Alberta.

Alberta Environmental Directory

www.pembina.org/aed/aed.html

Online database of organizations and agencies listed in the 9th edition of the Alberta Environmental Directory. This database contains over 400 listings

Alberta Environmental Network

10125 - 97th Avenue
Edmonton, Alberta T5K 0B3
Tel.: 780-433-9302
Fax: 780-433-9305
aen@web.ca
www.web.net/~aen/

The AEN is a non-profit, non-partisan, apolitical, grassroots umbrella organization dedicated to helping Albertans achieve and maintain a healthy environment.

The Alberta Milk Container Recycling Program

Alberta Dairy Council Milk Container Recycling Program
PO Box 3452
Leduc, Alberta
T9E 6M2
Tel.: 1-877-414-JUGS
or 780-418-1400
Fax: 780-418-1600
info@milkjugrecycling.com
www.milkjugrecycling.com/

An industry stewardship initiative through which Alberta's dairy industry supports the voluntary collection and recycling of High Density Polyethylene (HDPE) plastic milk jugs and polycoated gable top milk cartons. Under the initiative, the Alberta Dairy Council established a Container Recovery Fund to provide 'top-up' support payments to registered

municipalities or their recycling designate to supplement the revenues they receive for densified plastic milk jugs and polycoated milk cartons.

Alberta Plastics Recycling Association

#703, 10611 - 98 Avenue,
Edmonton, Alberta
T5K 2P7
Tel.: 780-426-1493
Fax: 780-424-4391
jbarr@cpia.ca
www.plasticsrecycling.ab.ca/

An Alberta not-for-profit industry association, dedicated to sustainable plastics recycling and to minimizing plastic waste to landfill.

Alberta Used Oil Management Association (AUOMA)

Suite 1050, Tower 1, Scotia Place
10060 Jasper Avenue
Edmonton, Alberta
T5J 3R8
Tel.: 780-414-1510
Fax: 780-414-1519
Toll free: 1-888-922-2298
albertausedoil@compusmart.ab.ca
www.usedoilrecycling.com/html/about.htm

A not-for-profit organization whose mandate is to develop a policy platform and guiding principles for use across the four western provinces.

Recycling Council of Alberta

PO Box 23
Bluffton, Alberta
T0C 0M0
Tel.: 403-843-6563
Fax: 403-843-4156
info@recycle.ab.ca
www.recycle.ab.ca/

The Recycling Council of Alberta (RCA) is a not-for-profit, non-political organization formed in 1987, and approved as an official charity in 1995. The RCA's mission is to promote and facilitate waste reduction, recycling, and resource conservation in the Province of Alberta.

The site includes links towards governmental sites, associations and resources at the provincial, national and international level.

Tire Recycling Management Association of Alberta

PO Box 189
Edmonton, Alberta
T5J 2J1
Tel.: 780-990-1111 or
toll free 1-888-999-8762
Fax: 780-990-1122
trma@trma.com
www.trma.com

The Tire Recycling Management Association of Alberta (TRMA) is a not-for-profit association that operates as a "Delegated Administrative Organization" (DAO), under the auspices of the Alberta Minister of Environment. DAO's allow industry and stakeholders to participate in environmental stewardship initiatives that protect the quality of air, land and water for the benefit and enjoyment of all Albertans.

12. British Columbia

Government of British Columbia

In Victoria call: 387-6121
In Vancouver call: 604-660-2421
Elsewhere in BC call:
1-800-663-7867
EnquiryBC@gems3.gov.bc.ca
www.gov.bc.ca

Ministry of Water, Land and Air Protection

PO Box 9339 Stn Prov Govt
Victoria, BC V8W 9M1
Tel.: 250 387-1161 Fax: 250-387-5669
E-mail:
www.wlapmail@gems5.gov.bc.ca
www.gov.bc.ca/wlap/

British Columbia Environmental Network

610 – 207 W. Hastings Street
Vancouver, BC V6B 1H7
604-879-2279 Fax: 604-879-2272
info@bcen.bc.ca
www.bcen.bc.ca/

Network of community-based British Columbia environmental organizations. Organizations within the Network advocate for environmental responsibility and community participate in activities leading to ecological sustainability

Milk Jugs Recycling program

Hotline : 1-800-667-4321
or 604-732-9253
(Greater Vancouver Area)

Recycling Council of British Columbia

#10, 119 West Pender Street
Vancouver, BC V6B 1S5
Tel.: 604-683-6009 Ext 301
Fax: 604-683-7255
www.rcbc.bc.ca

Canada's oldest recycling council, RCBC facilitates and administers multi-stakeholder processes as a means of providing information and feedback to government on policy issues. As well, RCBC offers information and research services to public and private sector clients.

The site includes a small directory of its members (private, public, governmental, associations, etc.)

13. North West Territories

Government of the North West Territories

Box 1320
Yellowknife, NT X1A 2L9
Canada
Tel.: 867-873-7817
Fax: 867-873-0104
www.gov.nt.ca

Environmental Protection Service

Department of Resources, Wildlife and Economic Development
PO Box 1320
Yellowknife, NT
X1A 2L9
Tel.: 867-873-7654
Fax: 867-873-0221
lisette_self@gov.nt.ca
www.gov.nt.ca/agendas/land/index.html

14. Yukon

Government of Yukon

C.P. 2703
Whitehorse, Yukon
Y1A 2C6
Tel.: (867) 667-5811
Toll free in Yukon
1-800-661-0408
information@gov.yk.ca
www.gov.yk.ca/

Department of Environment

10 Burns Road
Whitehorse, Yukon
Y1A 4Y9
Tel.: 867-667-5652
Toll free (in Yukon):
1-800-661-0408, local 5652
Fax: 867-393-6213
E-mail: environmentyukon@gov.yk.ca
www.environmentyukon.gov.yk.ca/

The Raven Recycling Society

100 Galena Rd.,
Whitehorse, Yukon Y1A 2W6
Tel.: 867-667-7269
Fax: 867-668-5744
E-mail: raven@yknet.yk.ca
www.ravenrecycling.homestead.com

Raven is an organization of employees, board members, volunteers and concerned citizens. We are an employee operated, not-for-profit society governed by a volunteer board of directors. The mission of the Raven Recycling Society is to promote and implement, in a socially responsible manner, the 3R (Reduce, Reuse, Recycle) philosophy of waste and resource management.

15. Nunavut

Government of Nunavut

Iqaluit NU Canada
Tel.: 867-975-6000
www.gov.nu.ca

Department of Sustainable Development

Senior Management Division
Iqaluit
Tel.: 867-975-5925
Fax: 867-975-5980
www.gov.nu.ca/Nunavut/English/phone/sd.shtml

The Nunavut Planning Commission (NPC)

http://npc.nunavut.ca/eng/index.html
(Consult the website for contact information)

Established under the Nunavut Land Claims Agreement, the NPC is responsible for land use planning and various aspects of environmental reporting and management in the new Territory.

Wildlife and Environmental Protection

Tel.: 867-975-5902
Fax: 867-975-5980

Terminology

A

Audit
Assessment of the overall environmental performance of an organization, manufacturing process or transformation process.

B

Binder
Mineral compound causing mortar to harden. Binders (e.g., limestone and plaster) are used for the chemical treatment of hazardous domestic wastes.

Biodegradable
Quality of a substance or product susceptible to being completely decomposed by living organisms.

Biogas
Gas produced by the decomposition of organic waste in an oxygen poor environment. Biogas is made up of one part methane to each part carbon dioxide, with traces of other organic compounds (sulphurous anhydride).

BOD5
Analytical method used to measure, under controlled physical, chemical and biological conditions, the oxygen consumption of micro-organisms performing the biological oxidation of organic materials present in water. The concentration of dissolved oxygen present in a body of water or watercourse, is one of the main indicators of the degree of pollution. Biochemical oxygen demand. Amount of dissolved oxygen necessary to the bacterial degradation of organic waste present in water, measured over a period of five days.

C

Cement
Powdered substance obtained from the burning of silicates and limestone. When mixed with water, it forms a binding paste that hardens in the presence of air or water.

COD
Chemical oxygen demand. It represents the entire range of things that might require oxygen, especially mineral salts and the majority of organic compounds, biodegradable or non biodegradable.

Coliform
Bacterium from the Escherichia coli group present in coastal and continental waters polluted by fermentable organic materials. To be considered drinkable, water must contain less than five coliforms per millilitre.

Compost
Organic material decomposed by micro-organisms in the presence of oxygen until it becomes more or less stabilized. Compost has a dark-brown colour and the look and smell of mulch.

Composting
Biochemical treatment method consisting of the use of aerobic micro-organisms for the accelerated and controlled decomposition (aeration, temperature, humidity) of organic material into an organic, biologically stable, hygienic, humus-rich amendment called compost.

Contaminant
Solid, liquid or gaseous substance likely to alter a product's quality. A contaminant decreases waste homogeneity and makes reuse or recycling more difficult.

Creosote
Oily, transparent tar extract. Creosote contains naphthalene and phenol and it is mainly used for wood preservation.

Cumbersome wastes
Wastes whose large size prevents their disposal along with household wastes (appliances, furniture, etc.).

D

Decomposable
That which can rot and break down.

Deposit
Salvaging method calling for the perception of an amount of money at the time of purchase, to be returned partially or in full, in order to encourage post-consumption salvaging.

Disposal
Final treatment (or combination of such treatments) aiming to render waste environmentally harmless.

Disposal sites
Locations for the treatment or permanent disposal of solid wastes.

Domestic Hazardous Waste (DHW)
Any household waste exhibiting hazardous properties (leachable, flammable, toxic, corrosive, explosive, oxidizing or radioactive) or contaminated by such a substance, be it in a solid, liquid or gaseous state.

Dry materials
Crushed or shredded debris that are unlikely to ferment and do not contain hazardous wastes (wood scraps, rubble, chunks of concrete and masonry, chunks of pavement, etc.).

Dry materials disposal site
Disposal site for solid waste generating no liquids or gases (for example, construction materials).

Dump
Any site that would be used for permanent landfill or surface waste disposal.

Dumping
Process of putting trash in a site dedicated to this activity (former quarry, soil, excavation) without any precautionary measures being taken.

G

Garbage
Waste destined for disposal.

Groundwater
Generic term applicable to all underground waters. Groundwater is the largest component of freshwater reserves.

H

Hazardous waste
Includes all materials designated as hazardous, due to their nature or quantity, and requiring special handling techniques as specified by legislation or regulation.

Heavy metals
Metals whose organic and inorganic compounds are often toxic. The most common heavy metals are cadmium, mercury and lead.

I

Incineration
Waste disposal using combustion equipment almost exclusively dedicated to this task (incinerator).

L

Landfilling
Operation consisting of the compaction of waste into layers prior to their covering by a layer of soil.

Landfills
Locations where solid wastes are buried.

Leachate
Liquid resulting from the percolation of rain water through the decomposing waste of a landfill. Leachate usually contains toxic contaminants.

M

Methane
Colourless, odourless, flammable gas forming an explosive mixture with air. Methane is released by the anaerobic decomposition of rotting materials. Its synthesis through industrial fermentation has turned it into a new energy source.

P

pH
Measure of the level of acidity or alkalinity of a solution, soil, etc. It is, in fact, the inverse decimal logarithm of the H+ ion concentration.

R

Recyclable material
Material that can be reintroduced into the manufacturing process from which it was produced or in a similar process using the same material.

Recycled material
Material that has been recycled and can now become a partial or exclusive input material in the manufacturing of a new product.

Recycling
Using a secondary material (or by product) in a manufacturing process instead of a raw material.

Reuse
Repeated use of a product or packaging without deterioration of its appearance or properties.

S

Salvaging
The sorting, collection and conditioning activities that make it possible to enhance the value of waste.

Secondary material or by-product
Salvaged refuse, conditioned or unconditioned, that can be used in a construction project or manufacturing process.

Selective Collection
Salvaging method making it possible to collect waste in order to enhance their value. Selective collection can operate through voluntary contributions made at a drop-off point (sales outlet, recycling bins, waste salvaging centre or thrift centre) or door-to-door (Curbside Collection).

Sorting centre
Physical location where domestic waste is received and sorted before it is shipped to a recycling centre.

Source separation
Operation whereby recyclable materials are collected in the same location as where they are produced or used.

Source reduction
Behaviour that can prevent the generation of waste during the manufacturing, distribution and use of a product.

T

Thrift centre (in Québec: "Ressourcerie")
Location specially designed for the selective reception and temporary storage of waste that require special treatment or that cannot or should not be disposed of through regular trash disposal. The materials salvaged in this way are then destined to reuse, recycling, value enhancement or safe disposal.

Transfer station
Location where waste are shipped in order to transfer them from the collection trucks to the trucks that will take them to a treatment or disposal site.

Treatment
Any physical, chemical, thermal, biological, or mechanical process that can transform a waste into a secondary material or a manufactured product, a less hazardous material, a material that is easier to transport or handle, or a material that can be safely reintroduced into the environment or disposed of.

V

Value enhancement
Generic term encompassing the group of techniques allowing the reuse, recycling or regeneration of waste.

W

Waste or refuse
Any used, discarded or otherwise rejected object or material that can be value enhanced or disposed of.

Waste salvaging centre
Physical location where waste is received mainly for recycling purposes. The waste salvaging centre is different from the sorting centre in that it accepts not only materials such as those from curbside collection, but also all other domestic wastes not collected by the regular trash collection service, including hazardous domestic waste, cumbersome wastes (appliances, tires, etc.), dry materials, etc.

Wild disposal site
Sites where various materials are illegally disposed of.

Wood
Wood waste is mostly made up of lumber and plywood. It also includes pieces of wood, presswood, sawdust, wood chips, branches, posts, various furniture, finishing, cabinet debris, etc.

Source: extract and adapted from RECYC-QUÉBEC, 2000.

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FOR SMALL AND MEDIUM ENTERPRISES

" **Learning** through **EXAMPLE** is the underlying **principle** of this guide. Accounts of actual past **EXPERIENCES** of various **organizations** should inspire **SME**'s to implement improvements for **waste management**. "

Jean-Pierre Gilardeau, President, Alcoa
Primary Metals, Canada

PHOTO: AIR IMEX

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