

# Alberta Post-Consumer Plastics Recycling Strategy

## Recycled Plastic Audit 2005



**An Initiative of:**      **The Alberta Plastics Recycling Association in  
Partnership with Alberta Environment**

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Terra 2000**

## Table of Contents

Executive Summary

Acknowledgements

Preamble

Purpose

Methodology

1.	Alberta Post-Consumer Plastics Recycling	13
2.	Alberta Post ICI Plastics Recycling	16
3.	Plastics Recycling as a Component of Alberta Solid Waste Management	19
4.	The Emergence of Recovery – the 4 <sup>th</sup> R	21
5.	2005 Estimated Inventory of Recycled Plastics in Alberta	23

Appendices

1. “Form A – Collection” Respondents
2. “Form B – Processing” Respondents
3. Survey Forms

## Executive Summary

### **Purpose**

The last, and only previous, strategy prepared for plastics recycling in Alberta was prepared in 1998 using data for 1997.

Much has changed in the 8 years since. More waste plastics, more municipal recycling participation and larger, more capable processors all contributed to a new and different landscape.

How had the 1998 strategies worked? Were some or all still valid? How much recycling activity was present?

This study, based on data from 2005, attempts to answer such questions and to propose new strategies to expand recycling opportunities where they could be identified.

**The strategies proposed cover a wide range of waste management activities. Clearly, some are likely to require additional study and will need to be costed before proceeding. Some are ambitious and involve actions and partners which may be beyond the scope of APRA's current structure and constraints.**

**This makes the strategies no less worthwhile. Tremendous gains have been made but Alberta can recycle or divert much more plastic waste if the ways and means become available.**

### **Methodology**

Waste plastics collectors, processors and other resources including NGOs were contacted in person or electronically. Their input was compiled and an inventory of recycled plastics was estimated.

The strategies, and the study findings, were delivered under 5 separate headings:

- Alberta Post-Consumer Plastics Recycling
- Alberta Post ICI Plastics Recycling
- Plastics Recycling as a Component of Alberta Solid Waste Management
- The emergence of Recovery – the 4<sup>th</sup> R
- 2005 Estimated Inventory of Plastics Recycled in Alberta

### **Alberta Post-Consumer Plastics Recycling**

Since 1990 Alberta post-consumer plastics recycling has gone from start-up to fact of life. By 2005, more than 95% of Albertans had access to some form of recycling. The milk jug program alone is available to more than 90% of Albertans.

Municipal collection programs nearly all feature some plastic capture but the programs vary widely in materials acceptance and capture rate.

There are opportunities for significant increases in capture driven by several factors.

***APRA endorses the strategies that;***

***In cooperation with Provincial, Municipal and NGO resources monitors and reports on the collection, baling and marketing of waste plastics by the depot network.***

***Could facilitate relationships between municipal depots and waste plastic processors to allow depot administrations to broaden the range of plastics accepted and encourage higher capture rates for the accepted plastic.***

### **Alberta Post ICI Plastics Recycling**

Waste plastics from Alberta's ICI can not be captured by the strategies proposed for dealing with post-consumer wastes.

ICI wastes and volumes differ. Many municipalities do not collect and therefore cannot direct ICI waste disposal. The ICI waste generation and plastic usage far exceed post-consumer patterns and represent the greatest opportunities for increased capture.

***APRA endorses strategies that;***

***Work with processors to identify ICI waste plastics that would be welcomed over time to establish continuous streams of desired plastics.***

***Encourage Provincial, Municipal and NGO resources in the development of a specific ICI focused education campaign that would bring more of Alberta's ICI generators into the recycling community.***

***Work with industry participants to identify for ICI generators and waste plastic processors, hauler / recycler contractors that are available to service the storage and transportation challenges of plastics recycling.***

### **Plastics Recycling as a Component of Alberta Solid Waste Management**

Landfilling still accounts for the majority of Alberta's waste disposal needs although the percentage of materials landfilled is dropping.

No single solution can alleviate our continuing need for landfill in the short term.

Landfill capacity is a valuable and costly community resource across Alberta and it should be used judiciously. Landfill life-cycle is determined by inbound volume not by inbound weight.

Plastics typically are light and bulky and tend to occupy a disproportionate amount of space once buried.

***APRA endorses strategies that;***

***With all available resources encourage a system of landfill management that focuses on and measures cubic meters buried in addition to tonnes buried.***

***With provincial landfill resources, identify at regional landfills, known sources of high volume plastics, especially from ICI generators, and when identified, foster relationships between generators and plastics processors.***

***With all available resources, increase awareness for landfill authorities and commissions of recycling options for all divertible materials so that existing programs could be expanded and new programs added.***

### **The Emergence of Recovery – the 4<sup>th</sup> R**

Latent energy is present in all wastes, but, of all commonly disposed materials, waste plastics represent the best opportunity to capture, store and make use of such energy.

Energy recovery should not be confused with simple incineration, a technique of burn-off where no use is made of the energy.

Gasification, an emerging technology of super heating wastes, converting the solids to gases, captures and stores the gases for future use.

Significant volumes of materials are left over at the end of all recycling processes. These residuals (up to 25% of the collected waste stream for plastics) are candidates for recovery or landfilling.

***APRA endorses strategies that;***

***Assist solid waste managers in understanding the difference between incineration and gasification and the role of gasification in energy conservation.***

*Compile and share information, project experience and innovation regarding gasification of residual plastics waste as it becomes established in Alberta.*

**2005 Estimated Inventory of Plastics Recycled in Alberta**

Tonnes of Plastics Recycled From Municipal Collections Systems 2005	11,095
Tonnes of Plastics Recycled From ICI Generators 2005	17,285
Tonnes of all Plastics Recycled 2005 -Total	30,277

**Table 1**

**Province of Alberta Tonnes of Plastics Recycled From Municipal Collection Systems 2005**

<b>Plastic Type</b>	<b>Tonnes Recycled</b>
Natural HDPE (includes milk containers)	1,402
Mixed (Coloured) HDPE	1,035
Rigid HDPE	0
Polyethylene Film	920
PETE Containers (includes deposit beverage containers)	7,706
EVA	0
Polypropylene	7
Expanded Polystyrene	0
Rigid Polystyrene	13
Urethane	0
PVC	12
<b>TOTAL</b> (does not include e-waste or used oil containers)	<b>11,095</b>

*Table 2*

**Province of Alberta Tonnes of Plastics Recycled From Industrial, Commercial and Institutional Generators 2005**

<b>Plastic Type</b>	<b>Tonnes Recycled</b>
Natural HDPE	3,805
Mixed (Coloured) HDPE	1,810
Rigid HDPE	6,130
Polyethylene Film	3,750
PETE Containers	455
EVA	790
Polypropylene	250
Expanded Polystyrene	80
Rigid Polystyrene	45
Urethane	0
PVC	170
<b>TOTAL</b> (does not include e-waste or used oil containers)	<b>17,285</b>

*Table 3*

**Province of Alberta Tonnes of Plastics Recycled 2005**

Post-Consumer	11,095
Post-ICI	17,285
E-Waste	320
Used Oil Containers	1,577
<b>TOTAL</b>	<b>30,277</b>

## **Acknowledgements**

The author would like to take the opportunity to thank the many contributors to this study. Municipal and contract employees as well as system managers gave willingly of their time, information and experience.

In particular, contributions by resources at APRA (Randall Conrad and Janet Altmiks), Doug Flood (Past President of APRA), Dennis Hambleton of AUOMA (Alberta Used Oil Management Association), Roberta Windrum of the Alberta Dairy Council Milk Container Recycling Program, Guy West of ABCRC (Alberta Beverage Container Recycling Corporation) and Tony Moucachen of Merlin Plastics are gratefully acknowledged.





## Preamble

In 1998, the Alberta Plastics Recycling Association (APRA), in partnership with the Capital Region Waste Minimization Committee and Alberta Action on Waste developed the Alberta Post-Consumer Plastics Recycling Strategy. The review focused on plastics recycling in 1997, largely in Alberta's capital region.

Since that time, and in part, as a result of Strategy recommendations and research, industry and government have come together in developing a number of successful plastics related collection and recycling programs for plastic oil containers (AUOMA), plastic milk containers (Alberta Dairies), and plastic computer casings (ARMA). At the same time, the Beverage Container Management Board has maintained excellent recovery rates and growing volumes for plastic containers through Alberta's beverage container deposit and refund collection system.

Today these programs continue to make positive strides in reducing plastic waste to landfill. However, APRA believes that more can be done. In early 2006, APRA recognized that factors such as provincial growth, improved commodity pricing, a changing face to recyclers and re-processors and last but not least, an emerging interest in waste to energy, heralded a need to re-estimate the recycled quantities occurring and the un-captured plastic waste and subsequent market opportunities that might exist.

This present research attempts to benchmark these quantities and provides a basis by which working strategies can be sustained or improved and new strategies can unfold.



## Purpose

In 1998 APRA, in conjunction with, Action on Waste and the Capital Region Waste Minimization Advisory Committee, developed “Post-Consumer Plastics Recycling Strategy – An Approach to Sustainability”. The proposed strategies saw many changes in Alberta plastics recycling. New municipalities added plastics to the spectrum of recyclables while others, already accepting some plastics, increased the range of plastics accepted.

The waste plastics processors began to stabilize and expanded in both capacity and types of plastics which could be processed.

The continuing change-over in the packaging market to plastic as a replacement for glass, paper and tin continued. The 1997 Strategy focus was on the plastic in the waste stream and did not measure or project any province-wide plastic capture or recycled totals.

By 2002, only five years beyond the 1997 Strategy, the profile of plastics recycling in Alberta had been altered to the degree that no single source had ready numbers or even estimates of the total of plastics being recycled.

Individual programs like milk jug, used oil container and deposit beverage container recycling were tracked but tracking did not exist for plastics outside these streams making Alberta totals unknown.

Was the 1997 Strategy still effective? Were other strategies needed? By what order of magnitude had Alberta plastics recycling grown? What had changed in eight years? These questions and others could not be answered without knowledge of the total of Alberta plastics recycling initiatives.

This study, focused on province wide activity in 2005, was undertaken to provide a more recent snapshot of Alberta’s plastics recycling community.

**The strategies proposed cover a wide range of waste management activities. Clearly, some are likely to require additional study and will need to be costed before proceeding. Some are ambitious and involve actions and partners which may be beyond the scope of APRA’s current structure and constraints.**

**This makes the strategies no less worthwhile. Alberta can recycle or divert much more plastic waste if the ways and means are available.**

## Methodology

Terra 2000, the firm contracted to conduct the study developed an approach working with the resources at APRA. Forms were designed to profile different participants (pg. 28-35)

**Collectors;** municipal governments, contractors, independent subscription haulers and NGO's were interviewed to profile program structures and where possible, to document or estimate their captured plastic totals. Local recycling depots and collection systems were visited in twelve different municipalities and those forms were completed in person. The balance were returned electronically and followed-up by telephone.

**Processors;** all members of APRA and others currently processing, were visited on-site and forms were completed with those choosing to respond.

**Other Resources;** including NGO's actively fostering plastics recycling programs and others active in the recycling community were contracted for their assistance in describing the extent of plastics recycling in 2005.



## **1.0 Alberta Post-Consumer Plastics Recycling**

Alberta residents had limited opportunities to dispose of recyclables prior to 1990. Some recycling of paper fibres had been established, focusing on building products like shingles and insulation, and those initiatives continue. Metal recycling which, paralleled settlement, existed in most major centres. Beverage container recycling already had a long history of success, with Alberta's return rates among the highest in North America.

All of these programs had a positive impact on Alberta waste management practices and reduced burial rates at landfill but, with the exception of the deposit container system, the diversion rates were low. Alberta's landfills continued to bury or store tonnes of tires, metals, glass, paper fibres and plastics along with household waste.

Major centres had begun directing disposal but elsewhere, Alberta's landfilling practices prior to the 1990's had developed a network of smaller, conveniently located modified sanitary landfills which numbered in the hundreds. Waste screening and acceptance varied widely making waste diversion and recycling difficult to implement or monitor. Province-wide conversion to a system of engineered and regulated regional landfills fed by transfer stations allowed improved control of solid waste disposal. Although some areas of Alberta remained in transition from local to regional disposal by 2000, the majority of Alberta's population had been converted to regional systems. For the first time, recycling programs could be designed with some expectation of impact.

The 1990's were years of rapid change in recycling. Curbside recyclables collection started in some urban settings supplemented with public depots. Those cities which chose to delay curbside were quickly host to subscription collection of recyclables. In smaller centres, recycling depots, created with the assistance of Alberta Environment's Action on Waste program, provided new and convenient opportunities for Albertans to recycle. These curbside and depot programs typically focused on tin, glass and paper fibre at the outset.

By 1996, rural programs, like Recycle Plus in northern Alberta and the M.D. of Yellowhead's transfer of loose recyclables collection, began to store, then haul materials to depots with sorting and baling capability.

Early in the expansion of post-consumer recycling there was little focus on plastics. Emerging processors of plastics waste however, meant new markets for post-consumer plastic waste and plastic soon became a feature of some municipal systems.

Such was the "lay of the land" when APRA (Alberta Plastics Recycling Association) developed the "Post Consumer Plastics Recycling Strategy – An Approach to Sustainability" in 1998. Tremendous change was about to unfold and it continues apace.

Post-consumer plastics recycling is now available in nearly every area of the province. This study found that in excess of 95% of all Albertans had access to some form of recycling through the regional landfill / transfer station network. The Alberta Dairy Council estimated that in 2005

more than 90% of Albertans had access to milk jug recycling. Post-consumer recycling, including plastics will be expanded further as sorting, storage and transportation issues are resolved.

The rate of expansion, as in the first decade, will not be linear, but will feature many sustainable increases and one time spikes in growth. These increases and spikes will be caused by several factors:

- ***Dissimilar Municipal Programs Will Become More Alike***  
Alberta's municipal recycling programs are dissimilar with regard to plastics, some collect only #2 natural in the form of milk jugs. Others collect milk jugs as a component of an "All Bottle Program" that also includes #2 colored containers. Still others, including the City of Edmonton collect all containers, HDPE, PETE and others as well as film. As markets for collected plastics expand, more communities will accept a wider spectrum of plastics increasing captured tonnage.
- ***City of Calgary Will Cause A One-time Wave That Will Affect Provincial Totals***  
The City of Calgary, which currently operates 50 depots supplemented by curbside subscription, will move to full curbside as soon as 2009. This will create a one-time increase and continuous growth thereafter.
- ***Use of Plastic in Packaging is Increasing***  
The market place is experiencing an on-going replacement of glass beverage and food containers. Plastics have tremendous advantage over glass because of their lighter weight, durability and related safety, moldability and lower manufacturing cost. Plastics also offer designers improvement over time through technology. Milk jugs are lighter than the plastic containers of just a few years ago. Grocery bags by 2005 typically used only 25% of the virgin material required a decade ago yet they are as strong and cheaper to ship. There were no indicators in 2005 that the increasing use of plastic packaging was slowing or about to.
- ***Alberta's Waste Plastics Processors are Stabilizing the Market***  
Stable processors exist in a market where false starts were common. Several early processors operated in the plastics recycling market in Alberta but failed over time, each for different reasons. The network of processors that had emerged by 2005 was much more capable of adapting to the rapid increases in collected materials and captured plastics were finding ready markets. The processing industry is now maturing and ready to accept products that were previously not recyclable in Alberta. Densification of expanded polystyrene began in Calgary in 2005 and this, along with other processes to come, will mean new opportunities for diversion.

**Table 1**

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*APRA endorses strategies that;*

*In cooperation with Provincial, Municipal and NGO resources to monitor and report on the collection, baling and marketing of waste plastics by the depot network.*

*Could facilitate relationships between municipal depots and waste plastic processors allowing depot administrations to broaden the range of plastics accepted and encourage higher capture rates for the accepted plastic.*

## 2.0 Alberta Post ICI Plastics Recycling

The focus of the 1997 Strategy developed by APRA was primarily but not exclusively on the post-consumer waste stream. ICI (industrial, commercial and institutional) plastic wastes were addressed but most initiatives contemplated beyond 1997 dealt with post-consumer wastes for several reasons:

- Municipal governments were already mobilized with recyclables collection and adding or increasing plastic capture was easier to plan and achieve through residential collection.
- Residential waste tends to be more alike, dwelling to dwelling, while ICI wastes vary widely in both volumes and material mix giving greater opportunities for broader but shallower early success in residential recycling. This similarity in residential outputs simplifies the task of public education, allowing municipal administrations, the Province and interested parties to get their message out to more addresses more effectively.
- Many municipal collection systems service the residential waste stream only, allowing commercial waste contractors to service the ICI waste stream as the market sees fit. Other than controls through landfill bans on specific streams (e.g. tires, corrugated cardboard and metals) and by-law, these waste administrations have little contact with ICI generators.
- Government tends to respond to public demand and in 1997 and during this current study period, the perception has been that the call for increased recycling, of plastics in particular, was coming from residents generating post-consumer waste.

For all the foregoing reasons, post-consumer plastics recycling is easier to track and information passes cooperatively from administration to administration allowing *followers* to replicate the results of *leaders* without reinventing the wheel.

**From a Provincial point of view however, this approach does not address the majority of plastics waste which is generated, not by residential waste, but by the ICI sector.**

Sometimes the waste management community tends toward simple formulae because they are easily understood. In some cases they become axiomatic to the detriment of overall planning. One such formula has Alberta's every man, woman and child generating an average of one tonne per capita. While Albertans number nearly 3.3 million persons and the Province of Alberta buries more than 3 million tonnes of waste the relationship is not nearly so simple as one to one.

The closing of hundreds of smaller sanitary landfills and the conversion to solid waste transfer to regional landfills has allowed tracking of waste streams from known populations across Alberta. Rural Albertans, especially, now create stable waste streams that vary between 225 kg and 300 kg / capita / annum. While their urban cousins may generate more based on lifestyle, no

residential population in Alberta generates a waste stream that approaches the “tonne per capita” number.

The balance, 500 kg to 700 kg are the waste created by activity in the ICI sector. The reference to one tonne per capita is not the result of a negligent, wasteful society; it is the result of a buoyant and expanding economy. Alberta welcomes the economic activity. The burial rate of these ICI wastes could be dramatically reduced by recycling but different strategies are required. The strategies must target ICI generators individually.

**Table 2** indicates the significant capture and recycling of post ICI waste by 2005. Processors indicated in responses to survey questions that huge gains are still available. The list of waste and generators could include:

- **Film** – shopping centres, bakeries, beverage producers, home furnishing stores, construction / renovation, drycleaners
- **Plastic Hangers** – clothing stores
- **Expanded Polystyrene** – business machine retailers and service outlets, home appliance and furnishing stores, construction / renovation
- **Manufacturing Culls and Rejects** – pipe manufacturers, bottlers, fabricators, extruders, container manufacturers
- **Beverage and food containers not included in deposit return** – restaurants, hotels, hospitals, schools and other in the food and beverage industry, camps, food and beverage packagers

Business will divert and recycle if diversion is as cheap or cheaper than alternative waste handling and if the programs are well described and easy for staff to follow. In 2005 nearly all of the ICI plastic waste inventoried in this study were programs created one business and one processor at a time.

Only industry specific strategies can impact the ICI stream with the success achieved in the post-consumer sphere. Municipal, Provincial bodies and NGO’s need to engage in the challenge of ICI waste reduction.



*Table 2*

**Province of Alberta Tonnes of Plastics Recycled From Industrial, Commercial and Institutional Generators 2005**

<b>Plastic Type</b>	<b>Tonnes Recycled</b>
Natural HDPE	3,805
Mixed (Coloured) HDPE	1,810
Rigid HDPE	6,130
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PVC	170
<b>TOTAL</b> (does not include e-waste or used oil containers)	<b>17,285</b>

*APRA endorses strategies that;*

*Work with processors to identify ICI plastics that would be welcomed over time to establish continuous streams of desired plastics.*

*Encourage Provincial, Municipal and NGO resources in the development of a specific ICI focused education campaign that would bring more of Alberta's ICI generators into the recycling community.*

*Work with industry participants to identify for ICI generators and waste plastic processors, hauler / recycler contractors that are available to service the storage and transportation challenges of plastics recycling.*

### **3.0 Plastics Recycling as a Component of Alberta Solid Waste Management**

Landfilling has been the waste management option of choice in Alberta for decades. Prohibition of urban incineration, common until the 1960's, increased the volumes buried.

The 4R's, reduce, reuse, recycle and recover all have or will increasingly impact the burial rate but in 2005, burial of MSW (municipal solid waste) was still the manner in which most Alberta wastes are disposed. The City of Edmonton's municipal composting initiative is an outstanding exception to the rule but this example is focused only on residential waste.

Recycling is now well established as an alternative to burial and plastics are an important component of diversion through recycling.

The cost to establish a new regional landfill in Alberta is considerable. Land acquisition for regional systems serving populations under 50,000 is both costly and challenging. Engineering and construction costs vary from one site to another but the range in Alberta by 2005 was \$1,500,000.00 to \$2,500,000.00 per new facility. Once the sites are opened new cell construction ranges from \$40,000.00 to \$50,000.00 per cell. Fuel and staff costs are rising. The value of one cubic meter of landfill space in Alberta is now no less than \$20.00 and may be much higher at many sites. Landfill administrations are not motivated to accept more waste. They seek greater revenues or cost reductions.

All recycling programs impact landfilling at the local level. Diversion from burial reduces the inbound volumes. When the diversion is significant, (10% or more of the stream) it can provide economic benefit to landfilling operations. Reductions in cover requirements, savings in fuel and manpower, delays in cell and surface construction and improved litter control are advantages that recycling can provide to Landfill Authorities or Commissions.

The forces of diversion and recycling are not in competition with the practice of landfilling. In fact, many of the most successful diversionary programs were not driven by the forces of recycling but the practical needs of landfilling.

The three most obvious examples are tires, white metals and corrugated cardboard, all common in the waste stream prior to 1990.

Tires and white metals are rigid odd-items which do not push or crush well. Both prevent optimum compaction. Tires percolate post burial, rise through other materials and cause long term settlement problems.

Cardboard cushions the surrounding material, causes compaction equipment to float over disposed wastes and recoils after crushing further reducing final compaction rates. It lowers the weight to volume ratio of buried wastes.

For these reasons, tires, white metals and cardboard are diverted at most regional landfills as a matter of course. The “pull” may have come from proponents of recycling but the “push” started with the practice of modern landfilling.

With landfill space at 20.00 / M \_ or higher, diverting these recyclable products not only reduced operational headaches, it also helped reduce and control landfilling costs.

Landfills do not reach capacity over time because they accept too much weight. Lifecycle ends when they have accepted their maximum volume.

Advocates of plastics diversion have non-landfill related arguments to advance the cause. Plastics are created from non-renewable resources. Individual recyclable plastics have market value and processing captured streams provides employment. Waste plastics represent recoverable energy. The arguments have been persuasive and plastics recycling is growing. However, another argument exists based on the properties of manufactured plastics when landfilled.

Pipe and other rigid plastics, including large containers, perform in landfill like tires and white metals.

Smaller containers, bags, expanded polystyrene are more malleable and nest with other materials but are among the lightest wastes buried. Like cardboard, plastics lower the weight to volume ratio in landfill.

These properties cause plastic, typically 7% to 10% of Alberta’s waste stream by weight to occupy 2 to 2.5 times more space than the average material mix. Diverting 100% of the buried plastic could reduce landfill impact by 14% to 25% of total landfill. This is of course, not achievable but diverting 50% (a realistic target) could result in a reduction of 7.5% to 12% of total buried waste.

Such a target would certainly work as an advantage to landfill and should be pursued through active cooperation between advocates of plastics recycling and the administration of Alberta landfills. In many cases, landfill authorities currently fund both landfilling and recycling on behalf of their partners. This natural fit should encourage recycling of more plastics.

***APRA endorses strategies that;***

***With all available resources encourage a system of landfill management that focuses on and measures cubic meters buried in addition to tonnes buried.***

***With provincial landfill resources, identify at regional landfills, known sources of high volume plastics especially from ICI generators, and when identified, foster relationships between generators and plastics processors.***

*With all available resources, increase awareness for landfill authorities and commissions of recycling options for all divertible materials so that existing programs could be expanded and new programs added.*

#### 4.0 The Emergence of Recovery - the 4<sup>th</sup> R

The promise of recovery of energy through waste is not a new concept but was not a component of Alberta waste management except experimentally in 2005. This will change. Plastics will be a significant component of energy recovery along with other suitable carbon based wastes.

Latent energy is present in all waste materials disposed. Of all of the waste materials from which energy could be recovered, plastics represent the best opportunity for conversion of solid to gas and these gases could be captured, stored and used for process heat, electrical generation or other conventional fuel replacement.

This process must not be confused with incineration. Simple burning of wastes in a controlled fire is incineration. Because it achieves a 95% to 98% volume reduction, incineration often is proposed as an option to divert some wastes from landfilling but it does not offer any opportunity to capture, store or reuse the energy.

Gasification is an emerging technology that allows super heating of materials without the presence of oxygen, converting the materials from solid form to a capturable gas.

Recovery, through gasification, does not represent a threat to recycling and should not be viewed as such. Recycling will continue to be the option of choice where market forces including transportation costs and demand favour recycling.

Recycling however, is not able to deal with all of the currently collected materials. Three factors in recycling leave a portion of the materials homeless.

**Rejects** are plastic materials which cannot move through a MRF (materials recover facility) because of contamination by food, oils, dirt, broken glass, sharps or other materials. Often, an entire blue bag is rejected for these reasons even though the plastic content may be acceptable but other content causes rejection.

**Non-Recyclables** are plastics that generators place in the recyclables collection system that are not recyclable with current local technologies. They may be laminated or combined with paper products, metal or other materials. EPS (expanded polystyrene) is a plastic which could easily be directed to recovery until recycling options are established.

**Residuals** are plastic materials which pass through the waste sorting or composting system and are not identifiable as candidate materials for recycling.

Review over time at large MRF's, including the City of Edmonton, estimates that reject, non-recyclables and residuals make up 22% - 25% of the collected plastics stream. If only these materials were diverted to recovery through gasification or similar technologies an environmentally sound waste management alternative to burial in landfill would become a predictable source of energy for immediate use.

These materials are currently stored and / or landfilled. The start-up of any recovery program would bring about immediate and continuing diversion not available through other means. The captured energy could power-up or heat waste management facilities like MRF's, offices, maintenance buildings or recycle processing.

*APRA endorses strategies that;*

*Assist solid waste managers in understanding the difference between incineration and gasification and the role of gasification in energy conservation.*

*Compile and share information, project experience and innovation regarding gasification of residual plastics waste as it becomes established in Alberta.*

## 5.0 2005 Estimated Inventory of Plastics Recycled in Alberta

APRA, Action on Waste and the Capital Region Waste Minimization Advisory Committee developed the “Alberta Post-Consumer Plastics Recycling Strategy – An Approach to Sustainability” in February 1997 to represent a master plan for plastics recycling in the Edmonton Capital Region.

How has Alberta plastics recycling fared since that 1997 Strategy? What has worked? What hasn't worked? What challenges remain?

The answers to these questions must start with an inventory, to that end, collectors and processors of recyclable plastics were surveyed both by one on one interviews and electronically. Survey forms (index) were provided to the administrations of municipal collection and recycling systems across Alberta representing nearly 90% of Alberta residents. Nearly all responded, detailing shipped or stored inventories for an estimated 2,580,000 residents of an Alberta population of 3,277,000 in 2005 or 79% of the total. (see Appendix B for contributing municipalities) All Alberta waste plastic processors were surveyed and most, including the largest, responded (see Appendix A for contributing processors)

Three inventories were estimated:

- Alberta post-consumer tonnes recycled in 2005. *Table 1*
- Alberta post-ICI tonnes recycled in 2005. *Table 2*
- Alberta gross tonnes recycled in 2005. *Table 3*

The figures in all tables are based on estimates provided by respondents exclusively and involved no independent measurement of transportation or market documentation.

*Table 1*

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E-Waste	320
Used Oil Containers	1,577
<b>TOTAL</b>	<b>30,277</b>

## **APPENDICES**

*Appendix A*

**List of Recyclables Collectors and Resources Responding to “Form A – Collection” or Providing Supplemental Information**

Note that many municipal or contract collectors service more than one jurisdiction. Respondents provided data from 110 Alberta municipal recyclables collection systems, in addition to the ongoing programs of:

- Alberta Recycling Management Authority
- Alberta Beverage Container Recycling Corporation
- Alberta Used Oil Management Association

**List of Respondents**

Alberta Beverage Container Recycling Corporation  
Alberta Dairy Council Milk Container Recycling Program  
Alberta Environment, Action on Waste  
Alberta Recycling Management Authority  
Alberta Used Oil Management Association  
Athabasca Regional Waste Management Services Commission  
Centra Cam Vocational Training Association (Camrose)  
City of Calgary  
City of Edmonton  
City of Red Deer  
Drumheller and District Solid Waste Management Committee  
Edson and District Recycling Society  
GPS Recycling Ltd. (Lethbridge)  
Mountainview Regional Waste Management Commission  
Municipality of Jasper  
Recycle Plus (Grande Prairie)  
Recycling Council of Alberta  
Town of Hinton  
Town of Okotoks

***Appendix B***

**List of Waste Plastic Processors and Resources Responding to “Form B – Processing” or Providing Supplemental Information**

***Alberta Used Oil Management Association***

1050, 10060 Jasper Avenue  
Edmonton, AB T5J 3A8  
Phone: 780-414-1510  
Contact: Dennis Hambleton

***Alternative Plastic Products Mfg.***

1610 Lakeside Rd. S.  
Lethbridge, AB T1K 3G8  
Phone: 403-329-1713  
Contact: Grant Harrington

***Amity Plastics Ltd.***

Box 59  
Clyde, AB T0G 0P0  
Phone: 780-348-5355  
Contact: Dwight Smith-Gander

***Merlin Plastics***

616 – 58<sup>th</sup> Ave. S.E.  
Calgary, AB T2H 0P8  
Phone: 403-259-6679  
Contact: Tony Moucachen

***NPI***

4746 Riverside Drive  
Red Deer, AB T4N 2N7  
Phone: 403-343-8222  
Contact: Rocky Saufert

***Plastic Resources International***

Bay D, 8815 – 44<sup>th</sup> St. S.E.  
Calgary, AB T2C 2P5  
Phone: 403-236-4485  
Contact: Kevin Kernaghan

***Raydar Recycling***

Bay 10 & 20, 5000 – 64<sup>th</sup> Ave. S.E.  
Calgary, AB T2C 4V3  
Phone: 403-236-0010  
Contact: Helen Chu

**Alberta Post Consumer Plastic Recycling Strategy Waste Update 2005**

**Form A: Collection**

Thank you in advance for your cooperation in this update. The process seeks both hard data and anecdotal observations. For any response category, if the space provided is not adequate, please feel free to answer in an expanded manner and attach those observations to the interview form provided. Please **print** all responses.

Organization: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

Respondent: \_\_\_\_\_ Title: \_\_\_\_\_

Your organization is best described as (more than 1 box may apply)

- \_\_\_ Municipal Government
- \_\_\_ Collector
- \_\_\_ Depot Operator
- \_\_\_ MRF (materials recovery facility) Operator
- \_\_\_ Other ( \_\_\_\_\_ )

Your organization directs, collects and / or redirects recyclable post-consumer plastic.  
Who are the generators / sources? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

What is the population base served by your collection network? \_\_\_\_\_

In what form do you collect or receive these materials? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

What are your feedstock challenges? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

This update is focused on calendar 2005. The figures most vital to the process concern intake activity only in 2005. However, if you have figures for 2003 and 2004, we would like to review those as well to establish recent trend lines and identify ongoing market changes.

In kilograms, please list your shipped or inventoried volumes for:

Recycled Plastic Audit 2005

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	<b>2005</b>	<i>If Available</i> 2004	<i>If Available</i> 2003
Natural HDPE  <i>Shipped to / Inventoried in 2005</i>			
Mixed HDPE  <i>Shipped to / Inventoried in 2005</i>			
Rigid HDPE  <i>Shipped to / Inventoried in 2005</i>			
Polyethylene Film  <i>Shipped to / Inventoried in 2005</i>			
Polyethylene Containers  <i>Shipped to / Inventoried in 2005</i>			
Polystyrene  <i>Shipped to / Inventoried in 2005</i>			
Urethane  <i>Shipped to / Inventoried in 2005</i>			
Other  <i>Shipped to / Inventoried in 2005</i>			

## Recycled Plastic Audit 2005

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The 2005 update will compare with 1997 APRA (Alberta Plastics Recycling Association) study figures. The 8 year gap between updates has been a time of rapid change in Alberta waste management and recycling. With regard to plastic recycling only, how do you regard:

What has been the biggest gain(s)? \_\_\_\_\_

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What has been the biggest disappointment? \_\_\_\_\_

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We can't increase our plastic capture rate at present because \_\_\_\_\_

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We could increase our capture rate if \_\_\_\_\_

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To solidify or increase the recycling rate of the most desirable plastic waste we need the following action steps from:

Provincial Government: \_\_\_\_\_

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Recycled Plastic Audit 2005

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Municipal Government: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Plastic Packaging and Manufacturing: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Processors who receive our captured materials: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

If any organization were to establish more regular updates, perhaps every one or two years would your organization participate?  Yes  No

Are you aware of any recyclable plastic feedstock source that currently is diverted from Alberta landfills but that has not been included in the plastic recycling dialogue to date?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Other comments not covered above: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Thank you for your participation.**

***Contact Information:***  
***Alberta Plastics Recycling Association***  
***Mission Hill Plaza, P.O. Box 65066***  
***St. Albert, AB T8N 5Y3***  
***Phone: 780-939-2386***  
***E-mail: [plasticsrecyc@lincsat.com](mailto:plasticsrecyc@lincsat.com)***



**Alberta Post Consumer Plastic Recycling Strategy Update 2005**

**Form B: Processing**

Thank you in advance for your cooperation in this update. The process seeks both hard data and anecdotal observations. For any response category, if the space provided is not adequate, please feel free to answer in an expanded manner and attach those observations to the interview form provided. Please **print** all responses.

Organization: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Respondent: \_\_\_\_\_ Title: \_\_\_\_\_

Your organization is best described as (more than 1 box may apply):

\_\_\_ Collector

\_\_\_ Processor

\_\_\_ Manufacturer

\_\_\_ Broker / Shipper

\_\_\_ Other

Please describe your process to finished product \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Or:

\_\_\_ Manufactured item \_\_\_\_\_

\_\_\_ Pellet / granule \_\_\_\_\_

\_\_\_ Shippable bale or \_\_\_\_\_

\_\_\_ Other \_\_\_\_\_

This update is focused on calendar 2005. The figures most vital to the process concern process activity only in 2005. However, if you have figures for 2003 and 2004, we would like to review those as well to establish recent trend lines and identify on-going market changes.

## Recycled Plastic Audit 2005

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In kilograms, please list your processed or shipped volumes for:

	<b>2005</b>	<i>If Available</i> 2004	<i>If Available</i> 2003
Natural HDPE			
Mixed HDPE			
Rigid HDPE			
Polyethylene Film			
Polyethylene Containers			
Polystyrene			
Urethane			
Other			

## Recycled Plastic Audit 2005

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The 2005 update will be compared with the 1997 APRA (Alberta Plastics Recycling Association) study figures. The 8 year gap between updates has been a time of rapid change in Alberta waste management and recycling. With regard to plastic recycling only, how do you regard:

What has been the biggest gain(s)? \_\_\_\_\_

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---

---

What has been the biggest disappointment? \_\_\_\_\_

---

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We can't process more feedstock at present because: \_\_\_\_\_

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We could increase our process rate if: \_\_\_\_\_

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To solidify or increase the recycling rate of (category) \_\_\_\_\_ plastic we need the following action steps from:

Provincial Government: \_\_\_\_\_

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Municipal Government: \_\_\_\_\_

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Collectors / Depot – MRF Operators: \_\_\_\_\_

Plastic and packaging manufacturers: \_\_\_\_\_

If any organization were to establish more regular updates, perhaps every one or two years would your organization participate?  Yes  No

Are you aware of any recyclable plastic feedstock source that currently is diverted from Alberta landfills but that has not been included in the plastic recycling dialogue to date?

Other comments not covered above: \_\_\_\_\_

**Thank you for your participation**

***Contact Information:***  
***Alberta Plastics Recycling Association***  
***Mission Hill Plaza, P.O. Box 65066***  
***St. Albert, AB T8N 5Y3***  
***Phone: 780-939-2386***  
***E-mail: [plasticsrecyc@lincsat.com](mailto:plasticsrecyc@lincsat.com)***  
**Please fax responses to 780-452-8611**