DENSIFICATION AND RECYCLING OF POST CONSUMER POLYSTYRENE (PS #6) PACKAGING

IN ONTARIO MUNICIPALITIES

FEASIBILITY OF MOBILE PS RECYCLING SYSTEM AND OTHER PROCESSING OPPORTUNITIES

WASTE DIVERSION ONTARIO
CONTINUOUS IMPROVEMENT FUND PROJECT # 130

ACKNOWLEDGEMENTS

This report has been prepared for Waste Diversion Ontario and Ontario municipalities. We would like to acknowledge and thank all the municipalities and recycling proponents, who participated in this study.

The information provided reflects data gathered through interviews with various Ontario municipalities, manufacturers and individuals and has been provided and/or interpreted to the best of our abilities.

Technical information was provided by RecycleTech, New Jersey.

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1.0 Introduction

1.1 Background

This study was initiated by Waste Diversion Ontario's Continuous Improvement Fund Project #130 to examine the feasibility of designing and operating a Mobile Polystyrene Recycling Center for use at events, transfer stations and depots and review of other processing opportunities. This study interviewed the following municipalities:

- City of Kingston
- Quinte Region
- City of Ottawa
- City of Peterborough
- County of Peterborough
- Niagara Region
- Peel Region
- City of Hamilton
- Town of Markham
- York Region
- City of Toronto
- Durham Region
- Northumberland County
- City of Kawartha Lakes
- Waterloo Region
- City of London
- Essex Windsor
- City of North Bay
- Sault Ste. Marie

1.2 What is Polystyrene Packaging Scrap (PS)?

Polystyrene packaging (PS) is manufactured in two forms: expanded polystyrene (EPS) and rigid polystyrene (RPS). Both types are classified as #6 in a municipal blue box collection program. Stewardship Ontario 2007 data estimates the yearly generation of post consumer polystyrene packaging is approximately 4 kg or 9 pounds per residential household in Ontario. The data is included in Appendix A-1.

1.3 Expanded Polystyrene (EPS)

Expanded polystyrene scrap (EPS) is commonly referred to as Styrofoam™ and is made up of 98 percent air and 2 percent plastic. It is used for protection of valuable household goods; such as, electronics and for packaging of food products like grocery meat and restaurant takeout containers. EPS is light and bulky and has an average mass weight of approximately 100 kg/m3.

1.4 Rigid Polystyrene (RPS)

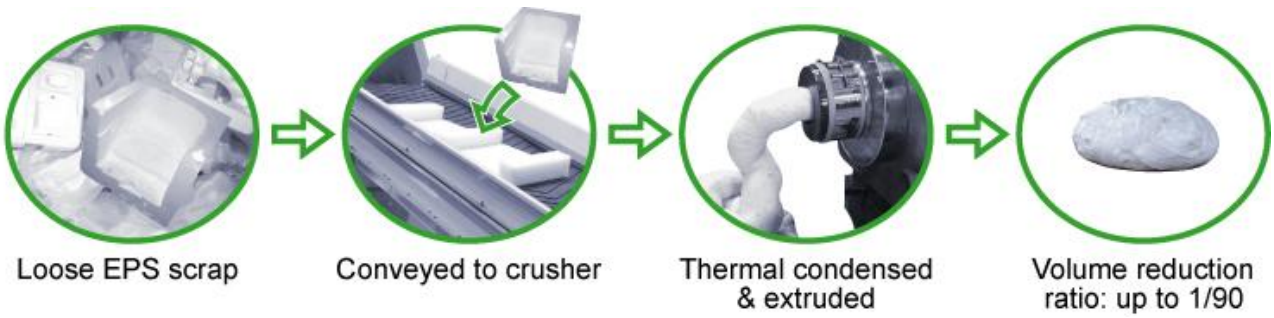
Rigid polystyrene (RPS) is most commonly used in food, horticultural and security packaging applications. It can be found as regular type containers/cups or clamshells to package items such as; fruit, muffins, plants, etc.. It is also used as security protection packaging for such items as small electronic devices. Many packaging manufacturers also make similar containers out of other resins (PET) and PS is becoming increasingly difficult for sorters/recyclers to identify.

1.5 Densification of EPS

Densification of EPS involves the use of heat to cause the molecular polymer chains of EPS to retract from their expanded, foamed positions, resulting in a mass reduction of 90:1. See Picture 1.1. The average compression ratio of EPS in a conventional fibre/plastic baler is 15:1. The use of an EPS densifier can yield the following benefits:

- lower transportation costs to market
- enhanced value and broader market for densified material
- elimination of baling EPS, freeing up baling equipment for higher volume materials

Picture 1.1 Densifying Process



1.6 Baling of RPS

RPS can be baled in conventional fibre/container municipal balers and or small briquetters and vertical (cardboard type) balers.

1.7 Markets for Densified EPS and Baled RPS

Densified EPS and baled RPS are one of the main resources of manufacturers around the world. It is used to make picture frames, furniture, fences, electronics, electrical components, toys, CD jewel cases, clothes, carpets and more. The price of PS is closely related to the price of oil and will fluctuate. The current market price of densified EPS or baled RPS is currently between $0.04 and $0.12 lb, picked up (based on a full container load – 40,000 lbs) or $88.00 to $265.00 tonne, depending on scrap quality and F.O.B. location**.** In North America, there is estimated market potential for densified EPS or baled RPS of 5,000 to 10,000 tonnes monthy over the next 5 years in addition to Ontario's current markets.

1.8 Past Studies

The Environment and Plastics Industry Council (EPIC) has written two reports pertaining to PS recycling and densification of EPS: "Best Practices Guide for Depot Collection of Polystyrene Cushion Packaging" and "Densification of Post Consumer Expanded Polystyrene" The reports can be reviewed on the EPIC website, www.cpia/epic

2.0 Current Municipal PS Recycling

There are currently two types of municipal collection and recycling of PS: Depot Collection and Blue Box Collection/MRF Recycling.

2.1 Depot Collection

Many municipalities offer PS collection in public drop off depots. Municipalities either collect PS in roll off containers, see Picture 2.1 or large plastic bags. See Picture 2.2. The biggest cost associated with depot collection of PS, is transportation of loose PS to markets, because of low shipping weights ranging from 300 to 1200 pounds per load. Other costs may include storage container rental fees plastic bags and handling fees. Other challenges with municipal depot collection may be limited storage space, resident contamination and weather. (rain and wind)

Picture 2.1 Container Collection

Picture 2.2 Poly Bag Collection

2.2 Blue Box Collection and MRF Recycling

Several Ontario municipalities collect EPS and RPS in a blue box program. Recovery of PS is low and most municipalities attribute low recovery rates to the following reasons:

- residents don't have space in their blue box for EPS and will put it in garbage
- EPS is crushed in compaction recycling trucks and sorters are unable to pull off lines, see Picture 2.3
- MRF processing equipment crushes EPS and sorters are unable to pull off lines, see Picture 2.4
- the shape of some EPS packaging; i.e. meat trays, makes it hard for sorters to pull off lines
- no sortation and recovery program for collected EPS
- contractor loopholes that may discourage recovery of lighter PS recyclables in favor of heavier cost beneficial recyclables
- lack of markets for contaminated scrap

Currently, municipalities who process PS in MRFs, bale it in conventional fibre/plastic balers. Due to the composition of EPS, baling is time consuming and messy. Some municipalities estimate it takes 6-8 times longer to bale EPS than to bale a conventional fibre/container bale. Truck load shipping weights of baled EPS range from 2 tonne – 10 tonne per load.

In general, municipalities believe PS is a "problematic waste" which creates operational inefficiencies for municipal recycling programs and may increase costs.

Picture 2.3 Picture of Crushed EPS from Compaction Truck

Picture 2.4 Broken EPS Pieces from Processing Equipment

2.3 Current Markets for Scrap

In recent years, the markets for PS scrap in Ontario have been unstable. Today, there are two main markets/consumers of post consumer PS in Ontario: Grace Canada and CPRA. Grace Canada accepts clean, loose white packaging EPS and will pay $75 tonne delivered to Ajax, Ontario. CPRA recycles both rigid PS and EPS and will pay $75 tonne for baled PS and will accept loose PS for no charge, delivered to Mississauga, Ontario. CPRA can process densified EPS and will pay a premium relative to a baled price. Some municipalities, who have recycled PS in the past and discontinued programs due to market instability, fear a backlash from residents if they start a new program and markets remain unstable.

2.4 Waste Diversion Numbers and Landfill Costs

Due to the weight of PS, diversion will have minimal affect on municipal diversion rates or goals vs. heavier items like bottles and is therefore low on the target list. Several municipalities interviewed said 100% PS diversion will only increase their overall municipal diversion rate by 0.5%.

However, if one considers the volume of EPS at 100 kg/m3 v.s. regular garbage at 300 kg/m3 and the result that EPS takes up 3 times the amount of space as regular garbage in a landfill, the potential of diverting EPS from landfill is more beneficial. Not only does diversion extend landfill life, there is considerable financial incentive for a landfill operator because the required space for EPS can be used for 3 times the amount of garbage and associated tip fees.

3.0 The Numbers and Study Information

3.1 Estimates of Ontario Generation of Polystyrene Packaging and Volume Recycled

This study interviewed 19 Ontario municipalities to get an overall picture of PS recycling. Current municipal data and Stewardship Ontario projected polystyrene packaging household generation data from Appendix A-1 are detailed in Table 3.1.

The 2007 data projects there is 21443 tonnes of PS generated in Ontario and 258 tonnes recycled, which equals a diversion rate of 1 %. The 19 municipalities studied recycled 255 tonnes of PS in 2008 out of projected household generation of 14898 tonnes, which equals a diversion rate of 2%. Table 3.1 will also outline regional diversion numbers and comparison to projected municipal numbers based on 5% -50% of forecasted household generation.

The average diversion rate for blue box plastics in Ontario is 22%. The Ontario Government is working with stakeholders to increase the diversion rate to 50% over the next 5 years.

Table 3.1 Current Municipal Data and PS Projections

CURRENT MUNICIPAL DATA AND PS PROJECTIONS										
				100%	Actual	Actual	% of Estimated Generation			
	Households	Blue Box	Depot	(tonnes)	(tonnes)	%	5%	10%	20%	50%
EAST (2007)				3550	105	3%	(tonnes)	(tonnes)	(tonnes)	(tonnes)
KINGSTON	49337	*	*	210	58	28%	11	21	42	105
QUINTE	67494	*	*	287	10	3%	14	29	57	144
OTTAWA	360578			1535	0	0%	77	153	307	767
CITY OF PTB.	32603	*	*	139	19	14%	7	14	28	69
CTY OF PTB.	34279		*	146	0	0%	7	15	29	73
CENTRAL (2007)				12660	114	1%				
NIAGARA	183330	*	*	780	81	10%	39	78	156	390
PEEL	377000	*	*	1605	13	1%	80	160	321	802
HAMILTON	204391	*	*	870	16	2%	44	87	174	435
MARKHAM			*		22		0	0		
YORK	294022			1252	0	0%	63	125	250	626
TORONTO	1066318	*	*	4539	0	0%	227	454	908	2269
DURHAM	201720			859	0	0%	43	86	172	429
NORTHBLD	38848			165	0	0%	8	17	33	83
CKL	37986	*	*	162	21	13%	8	16	32	81
WEST (2007)				3977	6	0%				
WATERLOO	186350		*	793	11	1%	40	79	159	397
LONDON	158900			676	0	0%	34	68	135	338
ESSEX	150519			641	0	0%	32	64	128	320
NORTH (2007)				1256	33	3%				
NORTH BAY	22965			98	0	0%	5	10	20	49
SAULT	33378		*	142	4	3%	7	14	28	71
TOTAL ONTARIO				21443	258	1%				
TOTAL STUDY				14898	255	2%				

4.0 PS Processing Opportunities

4.1 Mobile PS Recycling Center

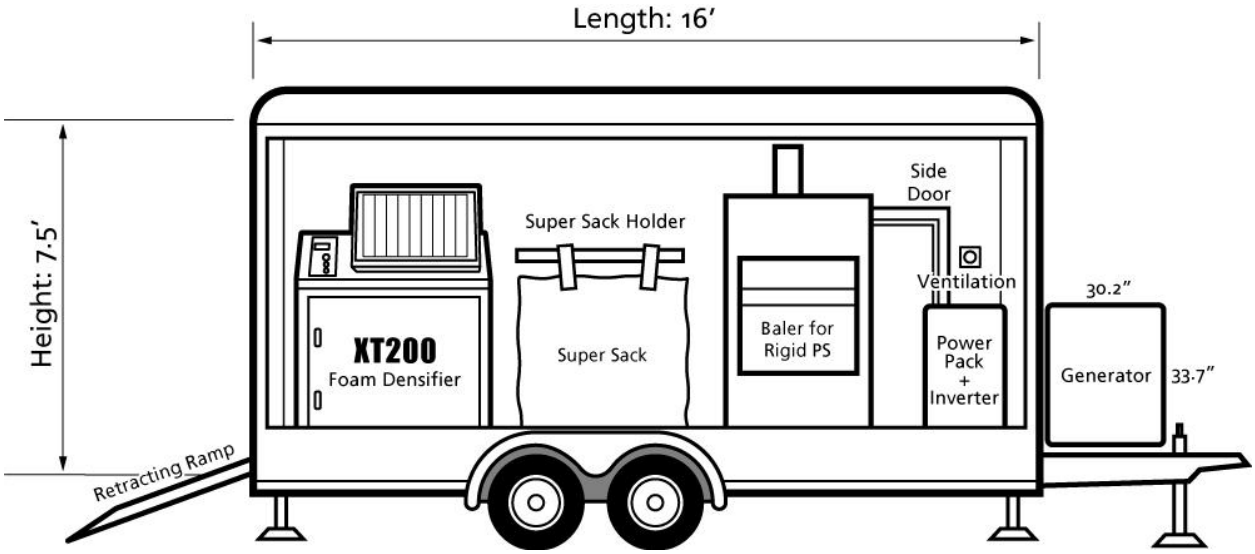
This section will provide a costing analysis for operation of a Mobile PS Recycling Center for small volume collection and Special Events Recycling. See Pictures 4.1 and 4.2. A mobile system will be capable of processing both EPS and RPS and will have projected capacity to handle 450 kg (1000 pounds) per day/event. A mobile system can provide the following benefits:

- system can be shared within smaller and rural, cities, towns, depots
- increases public awareness, through promotion and education

- enables municipality to trial EPS and RPS recycling programs before starting a full program
- gives residents opportunity to recycle both EPS and Rigid PS, who wouldn't otherwise be able to recycle

Picture 4.1 Picture of Outside of Trailer

Picture 4.2 Schematic of Inside of Trailer



4.1.1 Costing Analysis

A simple costing analysis is detailed in Table 4.1.1. The following assumptions have been made:

- capital budget cost of $95,000 is to be amortized over 5 years at 6% interest
- truck operation rate of $80.00/hr
- trucked operated 8 hours per day/event; including travel and 12 days/mth
- revenue for densified/baled PS is 110 tonne, picked up

Table 4.1.1 Daily Operating Cost

Hrs Required to Process Volume	8	
Operating Costs		
Truck and Driver	$	640
Maintenance	$	50
Capital Costs (5 years,6%)	$	154
Total Costs	$	844
Scrap Revenue	$	50
Daily Cost	**$**	**794**

4.1.2 Conclusion

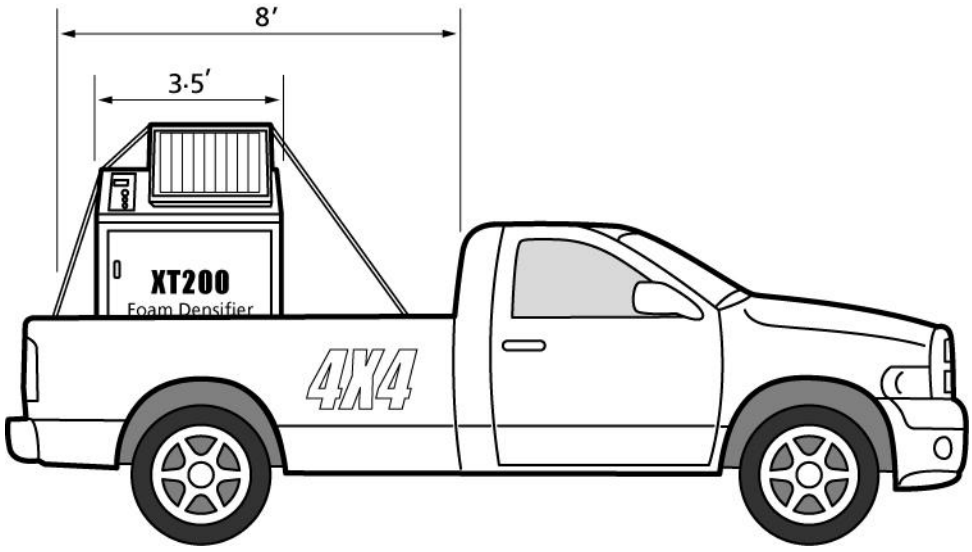
After analysis, it is determined the daily operational cost of a mobile system is $794. If a municipality is currently shipping loose PS to a recycler in a van trailer with equivalent weight of 450 kg (1000 pounds) and their current costs (handling, storage, bags) are higher than $794, then there may be a benefit to use a mobile service.

4.2 Small Depot or Packaging Return Center Processing

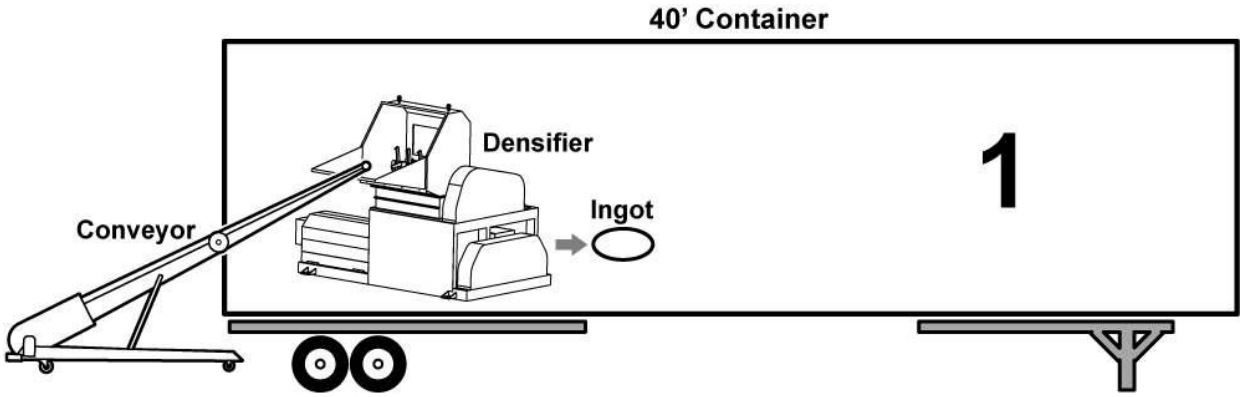
Several companies manufacture PS recycling equipment which may be suitable for a Small Depot or Packaging Return Center. A small EPS densifier, see Picture 4.2.1 can be combined with a small vertical baler or briquetter to bale rigid PS and provide a total PS recycling solution. The machines, due to their light weights and small footprint, can be shipped between depots in a small ½ ton truck with lift gate, see Picture 4.2.2 or van trailer. See Picture 4.2.3.

Picture 4.2.1 Small EPS Densifier

Picture 4.2.2 Small Densifier in Back of Small Truck



Picture 4.2.3 Small Densifier in a Van Trailer



4.2.1 Cost Analysis

A simple costing analysis is detailed in Table 4.2.1. The following assumptions have been made:
:

- municipality has a baler and can bale RPS
- capital budget cost of $45,000 cdn installed is to be amortization over 5 years at 6% interest
- utility rate is $.10 kw/hr
- monthly maintenance cost is $200
- scrap price is $110 tonne, picked up
- labor rate is $20 hr
- landfill cost is $80.00 tonne

Table 4.2.1 Operating Cost and Simple Payback for Small Densifier

OPERATING COST AND SIMPLE PAYBACK SMALL DENSIFIER 90 KG/HR						
Annual Volumes Processed (tonnes)	30	50	70	**75**	90
Hrs Required to Process	331	551	772	**827**	992
# of 6 hr days required	55	92	129	**138**	165
Monthly Operating Costs					
Energy use(13.4 kw/hr)	$ 37	$ 62	$ 86	**$ 92**	$ 111
Maintenance	$ 200	$ 200	$ 200	**$ 200**	$ 200
Labor	$ 551	$ 919	$ 1,286	**$ 1,378**	$ 1,653
Capital Costs (5 years,6%)	$ 870	$ 870	$ 870	**$ 870**	$ 870
Total Monthly Costs	$ 1,658	$ 2,050	$ 2,442	**$ 2,540**	$ 2,834
Monthly Scrap Revenue	$ 275	$ 458	$ 642	**$ 688**	$ 825
Net Monthly Cost	$ 1,383	$ 1,592	$ 1,801	**$ 1,853**	$ 2,009
Annual Cost to Recycle	$ 16,597	$ 19,102	$ 21,606	**$ 22,232**	$ 24,111
Annual Cost to Landfill	$ 2,400	$ 4,000	$ 5,600	**$ 6,000**	$ 7,200
Annual Net Cost to Recycle	$ 14,197	$ 15,102	$ 16,006	**$ 16,232**	$ 16,911
Net Cost/Tonne to Recycle	$ 473	$ 302	$ 229	**$ 216**	$ 188
Annual Yearly Scrap Revenue	$ 3,300	$ 5,500	$ 7,700	**$ 8,250**	$ 9,900
Simple Payback (years)	14	8	6	**5**	5

5 Year Payback

Maximum Volume for Small Machine before Operating

4.2.2 Conclusion

To obtain a simple payback of 5 years, a municipality is required to recycle 75 tonnes of PS annually and the cost per tonne to recycle is $216 tonne.

4.2.3 Case Study: Town Of Markham

The Town of Markham has trialed a small EPS densifier. The Town of Markham collects PS in 4 depots, see Pictures 4.2.4 and 4.2.5 and has a contractor consolidate bagged PS weekly from depots for loading into van trailer for loose shipment to local recycler. See Picture 4.2.6. The Town of Markham generated 26 skids of densified PS scrap over a 3 month trial period or 6 tonnes. See Picture 4.2.7.

Picture 4.2.4 Town of Markham Depot in Unionville

Picture 4.2.5 Markham Resident Dropping off EPS

Picture 4.2.6 Depot Storage of Bagged EPS Ready for Consolidation

Picture 4.2.7 EPS Ingot Produced from Densifier

4.2.4 Results of Trial

The cost comparison of current recycling method vs. densification is recorded in Table 4.2.2.

After a three month trial, it was determined there is a net benefit to densify EPS vs. shipping loose of $1160 monthly. The Town of Markham is currently looking for a suitable building for a permanent installation and is considering purchasing a larger densifier

Table 4.2.2 Cost Comparison of Densifying Vs. Current Method

MARKHAM SMALL DENSIFIER TRIAL MONTHLY COSTS VS. CURRENT METHOD			
Hrs Required to Process Volume	**30**	**Current Method Trucking Loose**	**Net Benefit Densifier**
Monthly Operating Costs			
Energy use			
crusher			
extruder (13.4 kw/hr)	$ 40		
maintenance	$ 200		
labor	$ 600		
Lease	$ 2,200		
Freight		$ 3,600	
Shipping Bags		$ 380	
Total Costs	$ 3,040	$ 3,980	
Scrap Revenue	$ 220	$ -	
Net Cost	$ (2,820)	$ (3,980)	**$ 1,160**

4.3 Large Depot or MRF Processing

Several companies manufacture and design larger systems for PS processing. This analysis will examine a medium sized densifier with infeed conveyor and a custom design to fit within MRF sortation equipment.

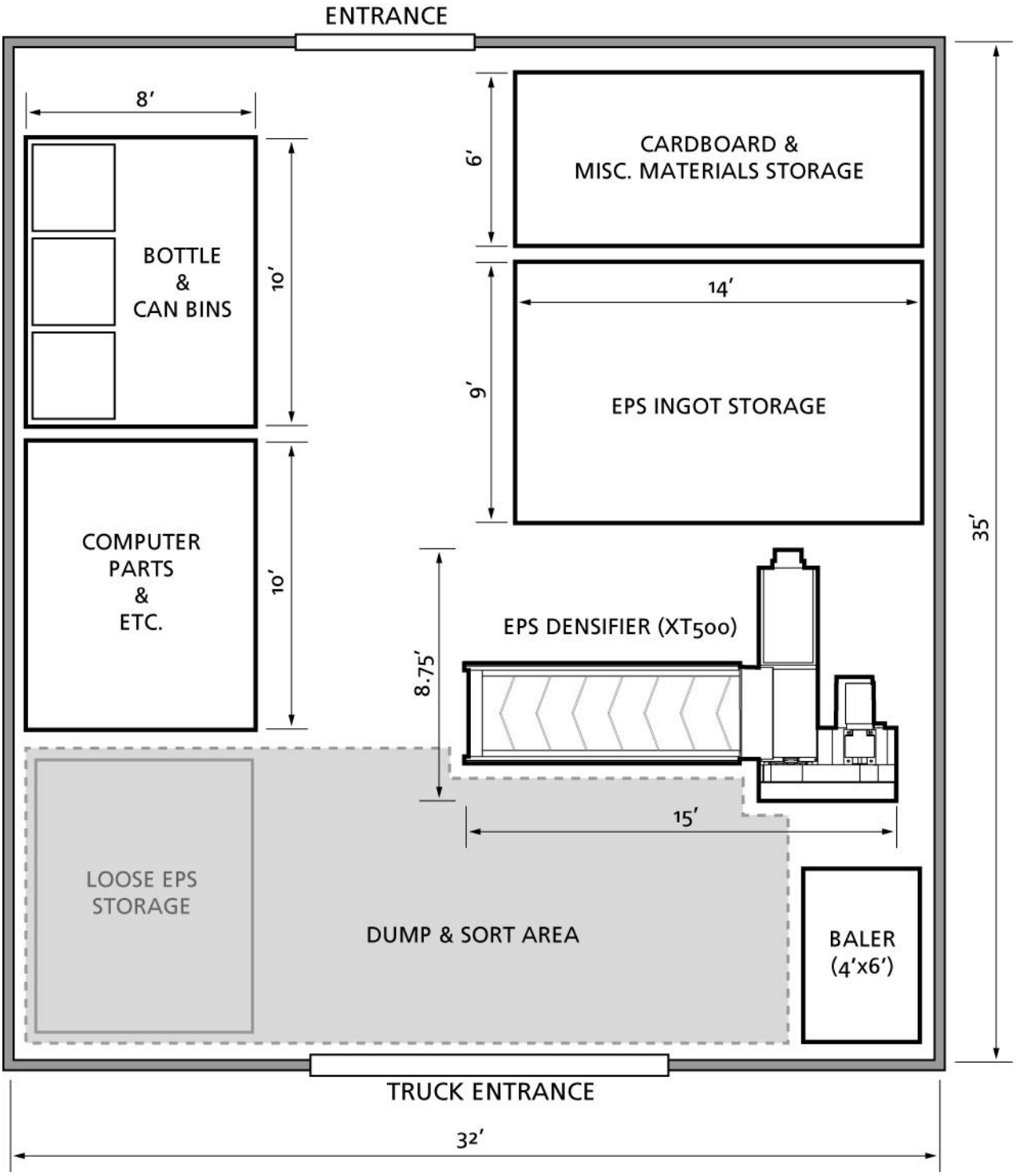
4.3.1 Medium Densifier

A medium densifier with in feed conveyor and capacity of 275 kg/hr will be used in this analysis. See Picture 4.3.1. A second analysis will be used with machine and a Coverall type building for a municipality with limited space. See Pictures, 4.3.2, 4.3.3 and costing in Appendix A-2.

Picture 4.3.1 Medium Densifier

Picture 4.3.2 Equipment in Coverall Type Building

Picture 4.3.3 Drawing of Coverall Type Building Layout with Other Recyclables



4.3.2 Cost Analysis

A simple costing analysis is detailed in Tables 4.3.1. and 4.3.2. The following assumptions have been made:

- municipality has a baler and can bale RPS
- capital budget cost of $$88,000 cdn installed ($123,000 with building) is to be amortization over 5 years at 6% interest
- utility rate is $.10 kw/hr
- monthly maintenance cost is $300
- scrap price is $110 tonne, picked up
- labor rate is $20 hr
- landfill cost is $80.00 tonne

Table 4.3.1 Medium Densifier Data

OPERATING COST AND SIMPLE PAYBACK MEDIUM DENSIFIER 225 KG/HR									
Annual Volumes Processed (tonnes)	100	**150**	200	250	300	**315**	350	400	450
Hrs Required to Process	441	**661**	882	1102	1323	**1,389**	1,543	1,764	1,984
# of 6 hr days required	73	**110**	147	184	220	**231**	257	294	331
Monthly Operating Costs									
Energy use (58.3 kw/hr)	$ 214	**$ 321**	$ 428	$ 536	$ 643	**$ 675**	$ 750	$ 857	$ 964
Maintenance	$ 300	**$ 300**	$ 300	$ 300	$ 300	**$ 300**	$ 300	$ 300	$ 300
Labor	$ 735	**$ 1,102**	$ 1,470	$ 1,837	$ 2,205	**$ 2,315**	$ 2,572	$ 2,939	$ 3,307
Capital Costs (5 years,6%)	$ 1,701	**$ 1,701**	$ 1,701	$ 1,701	$ 1,701	**$ 1,701**	$ 1,701	$ 1,701	$ 1,701
Total Monthly Costs	$ 2,950	**$ 3,425**	$ 3,899	$ 4,374	$ 4,848	**$ 4,991**	$ 5,323	$ 5,797	$ 6,272
Monthly Scrap Revenue	$ 917	**$ 1,375**	$ 1,833	$ 2,292	$ 2,750	**$ 2,888**	$ 3,208	$ 3,667	$ 4,125
Net Monthly Cost	$ 2,033	**$ 2,050**	$ 2,066	$ 2,082	$ 2,098	**$ 2,103**	$ 2,114	$ 2,131	$ 2,147
Annual Cost to Recycle	$ 24,401	**$ 24,595**	$ 24,790	$ 24,984	$ 25,179	**$ 25,237**	$ 25,373	$ 25,568	$ 25,762
Annual Cost to Landfill	$ 8,000	**$ 12,000**	$ 16,000	$ 20,000	$ 24,000	**$ 25,200**	$ 28,000	$ 32,000	$ 36,000
Annual Net Cost to Recycle	$ 16,401	**$ 12,595**	$ 8,790	$ 4,984	$ 1,179	**$ 37**	$ (2,627)	$ (6,432)	$ (10,238)
Net Cost/Tonne to Recycle	$ 164	**$ 84**	$ 44	$ 20	$ 4	**$ 0**	$ (8)	$ (16)	$ (23)
Annual Scrap Revenue	$ 11,000	**$ 16,500**	$ 22,000	$ 27,500	$ 33,000	**$ 34,650**	$ 38,500	$ 44,000	$ 49,500
Simple Payback (years)	8	**5**	4	3	3	**$ 3**	$ 2	$ 2	$ 2

5 Year Payback

No Cost to Recycle

Similar to Landfill Cost

Full Machine Capacity

Table 4.3.2 Medium Densifier Data with Building

OPERATING COST AND SIMPLE PAYBACK MEDIUM DENSIFIER 225 KG/HR WITH BUILDING									
Annual Volumes Processed (tonnes)	100	150	200	**210**	250	300	350	400	450
Hrs Required to Process	441	661	882	**926**	1102	1,323	1,543	1,764	1,984
# of 6 hr days required	73	110	147	**154**	184	220	257	294	331
Monthly Operating Costs									
Energy use (58.3 kw/hr)	$ 214	$ 321	$ 428	**$ 450**	$ 536	$ 643	$ 750	$ 857	$ 964
Maintenance	$ 300	$ 300	$ 300	**$ 300**	$ 300	$ 300	$ 300	$ 300	$ 300
Labor	$ 735	$ 1,102	$ 1,470	**$ 1,543**	$ 1,837	$ 2,205	$ 2,572	$ 2,939	$ 3,307
Capital Costs (5 years,6%)	$ 2,378	$ 2,378	$ 2,378	**$ 2,378**	$ 2,378	$ 2,378	$ 2,378	$ 2,378	$ 2,378
Total Monthly Costs	$ 3,627	$ 4,102	$ 4,576	**$ 4,671**	$ 5,051	$ 5,525	$ 6,000	$ 6,474	$ 6,949
Monthly Scrap Revenue	$ 917	$ 1,375	$ 1,833	**$ 1,925**	$ 2,292	$ 2,750	$ 3,208	$ 3,667	$ 4,125
Net Monthly Cost	$ 2,710	$ 2,727	$ 2,743	**$ 2,746**	$ 2,759	$ 2,775	$ 2,791	$ 2,808	$ 2,824
Annual Cost to Recycle	$ 32,525	$ 32,719	$ 32,914	**$ 32,953**	$ 33,108	$ 33,303	$ 33,497	$ 33,692	$ 33,886
Annual Cost to Landfill	$ 8,000	$ 12,000	$ 16,000	**$ 16,800**	$ 20,000	$ 24,000	$ 28,000	$ 32,000	$ 36,000
Annual Net Cost to Recycle	$ 24,525	$ 20,719	$ 16,914	**$ 16,153**	$ 13,108	$ 9,303	$ 5,497	$ 1,692	$ (2,114)
Net Cost/Tonne to Recycle	$ 245	$ 138	$ 85	**$ 77**	$ 52	$ 31	$ 16	$ 4	$ (5)
Annual Scrap Revenue	$ 11,000	$ 16,500	$ 22,000	**$ 23,100**	$ 27,500	$ 33,000	$ 38,500	$ 44,000	$ 49,500
Simple Payback (years)	11	7	6	**5**	4	$ 4	$ 3	$ 3	$ 2

5 Year Payback

No Cost to Recycle

Similar to Landfill Cost

Full Machine Capacity

4.3.3 Conclusion

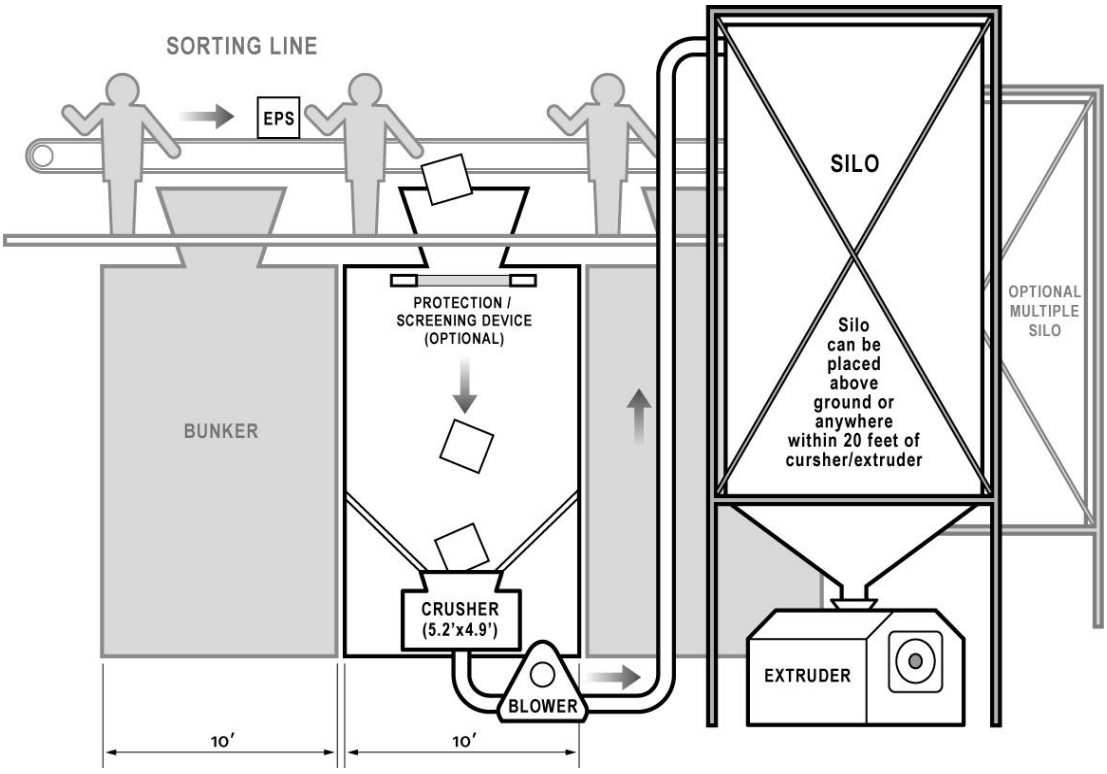
To obtain a simple payback of 5 years, a municipality is required to process 150 tonnes of PS annually and the cost per tonne to recycle is $84 tonne. It should be noted that $84 cost /tonne may be comparable to some municipal landfill costs. As PS processed volume increases, there is significant reduction in recycling costs and at 315 tonne, there is no cost to a municipality for recycling PS. After 315 tonnes, there is a net benefit to recycle and additional scrap revenue generated for a municipality.

The analysis including Coverall type building results in a 5 year simple payback at 210 tonnes and the cost per tonne to recycle is $77 tonne. There is no cost to recycle PS at approximately 400 tonne.

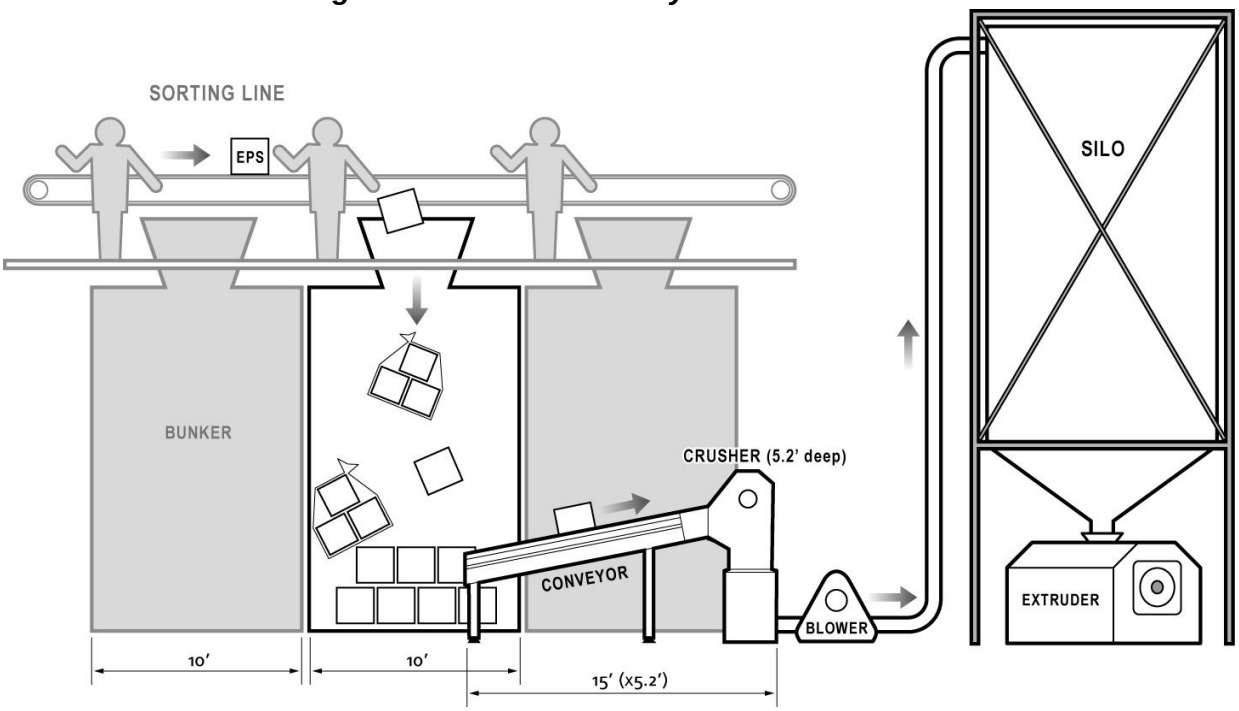
4.3.4 MRF Processing

This study will detail concept drawings for MRF Processing Systems. The first design is a system for EPS only. See Picture 4.3.4. In Pictures, 4.3.5 to 4.3.7b, the concept drawings seek to address PS systems to minimize EPS breakage and inclusion of RPS.

Picture 4.3.4 Processing of EPS Only

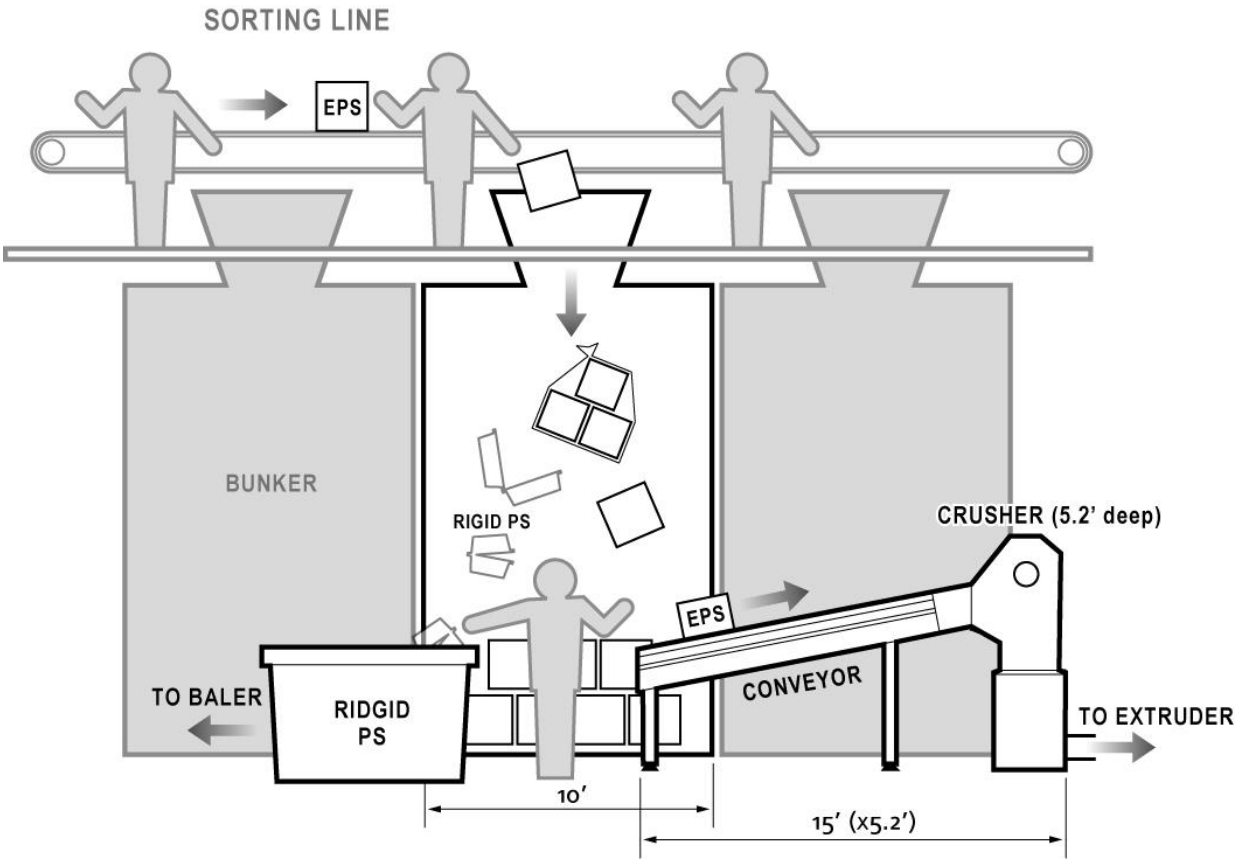


Picture 4.3.5 Processing of EPS with Secondary Sort

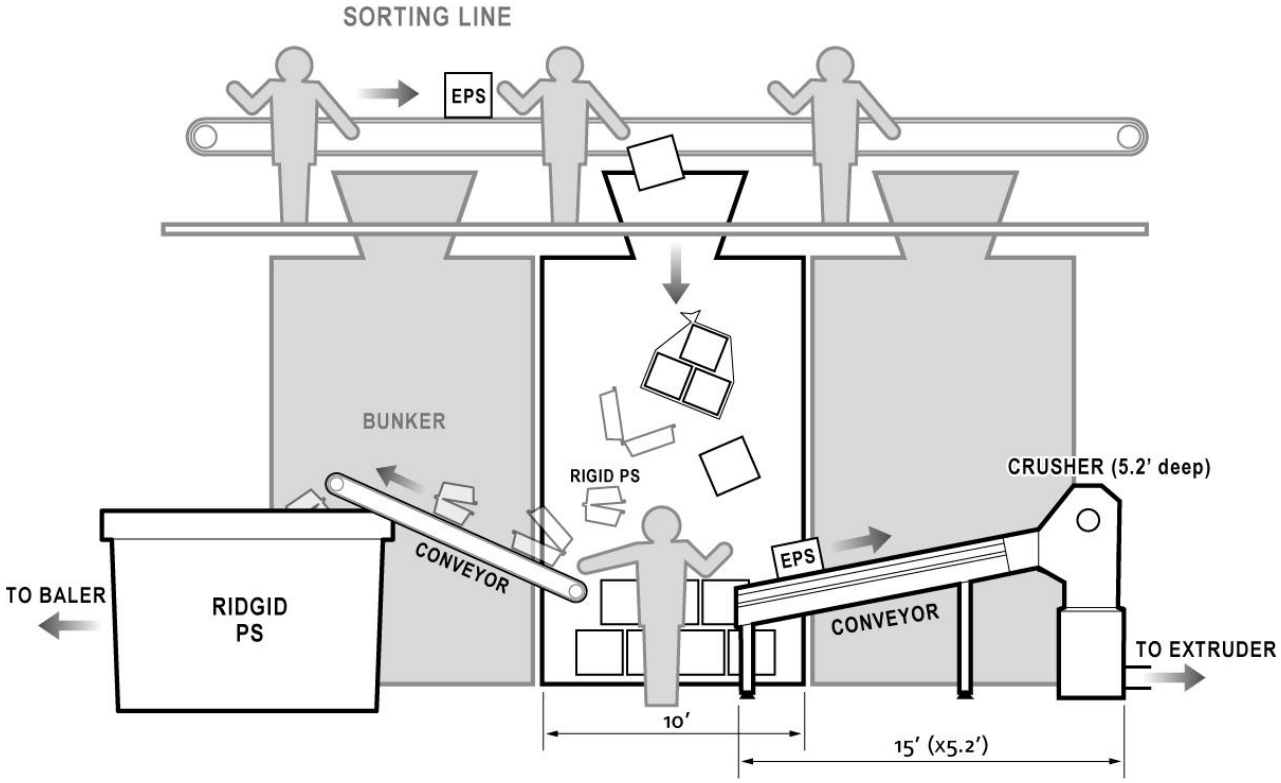


Picture 4.3.6 Poly Bagged EPS

Picture 4.3.7a Processing of EPS and RPS Option 1



Picture 4.3.7b Processing of EPS and RPS Option 2



4.3.5 Cost Analysis

A simple costing analysis is detailed in Table 4.3.3. The following assumptions have been made:

- municipality has a baler and can bale RPS
- capital budget cost of $195,000 cdn installed is to be amortization over 5 years at 6% interest
- utility rate is $.10 kw/hr
- monthly maintenance cost is $500
- scrap price is $110 tonne, picked up
- labor rate is $20 hr
- landfill cost is $80.00 tonne

Table 4.3.3 MRF Processing System Data

OPERATING COST AND SIMPLE PAYBACK MRF SYSTEM 320 KG/HR					
Annual Volumes Processed (tonnes)	**460**	520	**530**	580	640
Hrs Required to Process	**1,449**	1,638	**1,669**	1,827	2,016
# of 6 hr days required	**241**	273	**278**	304	336
Monthly Operating Costs					
Energy use (83kw/hr)	**$ 1,002**	$ 1,133	**$ 1,155**	$ 1,263	$ 1,394
Maintenance	**$ 700**	$ 700	**$ 700**	$ 700	$ 700
Labor	**$ 2,415**	$ 2,730	**$ 2,782**	$ 3,044	$ 3,359
Capital Costs (5 years,6%)	**$ 3,770**	$ 3,770	**$ 3,770**	$ 3,770	$ 3,770
Total Monthly Costs	**$ 7,887**	$ 8,332	**$ 8,407**	$ 8,778	$ 9,224
Monthly Scrap Revenue	**$ 4,217**	$ 4,767	**$ 4,858**	$ 5,317	$ 5,867
Net Monthly Cost	**$ 3,670**	$ 3,566	**$ 3,548**	$ 3,461	$ 3,357
Annual Cost to Recycle	**$ 44,039**	$ 42,787	**$ 42,578**	$ 41,535	$ 40,282
Annual Cost to Landfill	**$ 36,800**	$ 41,600	**$ 42,400**	$ 46,400	$ 51,200
Annual Net Cost to Recycle	**$ 7,239**	$ 1,187	**$ 178**	$ (4,865)	$ (10,918)
Net Cost/Tonne to Recycle	**$ 16**	$ 2	**$ 0**	$ (8)	$ (17)
Annual Scrap Revenue	**$ 50,600**	$ 57,200	**$ 58,300**	$ 63,800	$ 70,400
Simple Payback (years)	**4**	3	**3**	3	3

4 Year Payback

No Cost to Recycle

Full Machine Capacity

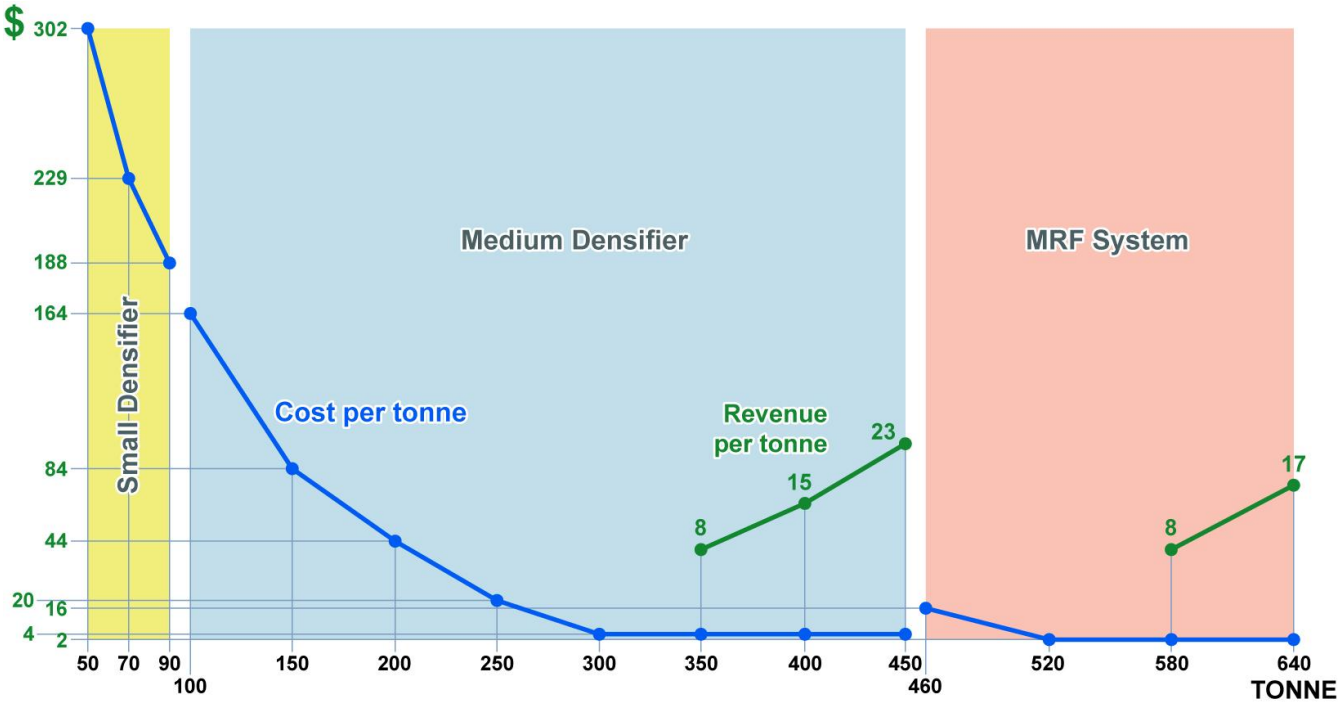
4.3.6 Conclusion

To obtain a simple payback of less than 5 years a municipality is required to process 460 tonnes of PS annually and the cost per tonne to recycle is $16 tonne. At 530 tonne, there is no cost to recycle PS. After 530 tonnes, there is a net benefit to recycle and revenue generated for a municipality.

4.4 Cost Summary

A cost curve in Graph 4.4.1 will show the 3 types of permanent densifying systems and the effect of increases in PS volume relative to cost per tonne.

Graph 4.4.1 Processing Cost / Revenue Curve by Material Volume



5.0 Cost Analysis Results and Municipal Numbers

The results in Table 5.1 will show key volume indicators and the effect on individual municipal diversion rates for the 19 Ontario municipalities studied. The key volume indicators are:

- 75 tonne processed in small densifier and 5 year payback
- 150 tonne processed in medium densifier and 5 year payback
- 315 tonne processed in medium densifier and no net cost to recycle PS
- 530 tonne processed in MRF system and no net cost to recycle PS

For example; if Ottawa processes150 tonnes of PS in a medium densifier and current baler, they can divert 10 % of projected PS generation. If they process 315 tonnes in same PS system, the municipality can divert 21% of projected generation and incur no additional costs to recycle PS.

Table 5.1 Key Volume Indicators Relative to Municipal Projections

CURRENT MUNICIPAL DATA RELATIVE TO POTENTIAL PS VOLUMES								
		100%	Actual	Actual	5 Year Payback		No Cost to Recycle	
	Households	(tonnes)	(tonnes)	%	75 MT	150 MT	315 MT	530 MT
EAST (2007)		3550	105	3%				
KINGSTON	49337	210	58	28%	36%	71%		
QUINTE	67494	287	10	3%	26%	52%		
OTTAWA	360578	1535	0	0%	5%	10%	21%	35%
CITY OF PTB.	32603	139	19	14%	54%	108%		
CTY OF PTB.	34279	146	0	0%	51%	103%		
CENTRAL (2007)		12660	114	1%				
NIAGARA	183330	780	81	10%	10%	19%	40%	40%
PEEL	377000	1605	13	1%	5%	9%	20%	20%
HAMILTON	204391	870	16	2%	9%	17%	36%	36%
MARKHAM			22					
YORK	294022	1252	0	0%	6%	12%	25%	25%
TORONTO	1066318	4539	0	0%	2%	3%	7%	7%
DURHAM	201720	859	0	0%	9%	17%	37%	37%
NORTHBLD	38848	165	0	0%	45%	91%		
CKL	37986	162	21	13%	46%	93%		
WEST (2007)		3977	6					
WATERLOO	186350	793	11	1%	9%	19%	40%	40%
LONDON	158900	676	0	0%	11%	22%	47%	47%
ESSEX	150519	641	0	0%	12%	23%	49%	49%
NORTH (2007)		1256	33	3%				
NORTH BAY	22965	98	0	0%	77%	153%		
SAULT	33378	142	4	3%	53%	106%		
TOTAL ONTARIO		21443	258	1%				
TOTAL STUDY		14898	255	2%				

6.0 Cost Analysis without Capital Costs to Municipality

Tables 6.1 to 6.4 will show previous data tables assuming there is no capital cost for PS processing equipment. These tables will show the associated reduction in operating costs and significant additional revenue opportunity for a municipality.

Table 6.1 Mobile System with no Capital Cost

Hrs Required to Process Volume	8
Operating Costs	
Truck and Driver	$ 640
Maintenance	$ 50
Capital Costs (5 years,6%)	
Total Costs	$ 690
Scrap Revenue	$ 50
Daily Cost	**$ 640**

Table 6.2 Small Densifier with no Capital Cost

OPERATING COST AND SIMPLE PAYBACK SMALL DENSIFIER 90 KG/HR					
Annual Volumes Processed (tonnes)	30	50	70	75	90
Hrs Required to Process	331	551	772	827	992
# of 6 hr days required	55	92	129	138	165
Monthly Operating Costs					
Energy use (13.4 kw/hr)	$ 37	$ 62	$ 86	$ 92	$ 111
Maintenance	$ 200	$ 200	$ 200	$ 200	$ 200
Labor	$ 551	$ 919	$ 1,286	$ 1,378	$ 1,653
Capital Costs (5 years,6%)	$ -	$ -	$ -	$ -	$ -
Total Monthly Costs	$ 788	$ 1,180	$ 1,572	$ 1,670	$ 1,964
Monthly Scrap Revenue	$ 275	$ 458	$ 642	$ 688	$ 825
Net Monthly Cost	$ 513	$ 722	$ 931	$ 983	$ 1,139
Annual Cost to Recycle	$ 6,157	$ 8,662	$ 11,166	$ 11,792	$ 13,671
Annual Cost to Landfill	$ 2,400	$ 4,000	$ 5,600	$ 6,000	$ 7,200
Annual Net Cost to Recycle	$ 3,757	$ 4,662	$ 5,566	$ 5,792	$ 6,471
Net Cost/Tonne to Recycle	$ 125	$ 93	$ 80	$ 77	$ 72
Annual Scrap Revenue	$ 3,300	$ 5,500	$ 7,700	$ 8,250	$ 9,900
Simple Payback (years)					

Table 6.3 Medium Densifier Data with no Capital Cost

OPERATING COST AND SIMPLE PAYBACK MEDIUM DENSIFIER 225 KG/HR									
Annual Volumes Processed (to	100	**150**	200	210	250	**300**	350	400	450
Hrs Required to Process	441	**661**	882	926	1102	**1,323**	1,543	1,764	1,984
# of 6 hr days required	73	**110**	147	154	184	**220**	257	294	331
Monthly Operating Costs									
Energy use (58.3 kw)/hr)	$ 214	**$ 321**	$ 428	$ 450	$ 536	**$ 643**	$ 750	$ 857	$ 964
Maintenance	$ 300	**$ 300**	$ 300	$ 300	$ 300	**$ 300**	$ 300	$ 300	$ 300
Labor	$ 735	**$ 1,102**	$ 1,470	$ 1,543	$ 1,837	**$ 2,205**	$ 2,572	$ 2,939	$ 3,307
Capital Costs (5 years,6%)	$ -	**$ -**	$ -	$ -	$ -	**$ -**	$ -	$ -	$ -
Total Monthly Costs	$ 1,249	**$ 1,724**	$ 2,198	$ 2,293	$ 2,673	**$ 3,147**	$ 3,622	$ 4,096	$ 4,571
Monthly Scrap Revenue	$ 917	**$ 1,375**	$ 1,833	$ 1,925	$ 2,292	**$ 2,750**	$ 3,208	$ 3,667	$ 4,125
Net Monthly Cost	$ 332	**$ 349**	$ 365	$ 368	$ 381	**$ 397**	$ 413	$ 430	$ 446
Annual Cost to Recycle	$ 3,989	**$ 4,183**	$ 4,378	$ 4,417	$ 4,572	**$ 4,767**	$ 4,961	$ 5,156	$ 5,350
AnnualYearly Cost to Landfill	$ 8,000	**$ 12,000**	$ 16,000	$ 16,800	$ 20,000	**$ 24,000**	$ 28,000	$ 32,000	$ 36,000
Annual Net Cost to Recycle	$ (4,011)	**$ (7,817)**	$ (11,622)	$ (12,383)	$ (15,428)	**$ (19,233)**	$ (23,039)	$ (26,844)	$ (30,650)
Net Cost/Tonne to Recycle	$ (40)	**$ (52)**	$ (58)	$ (59)	$ (62)	**$ (64)**	$ (66)	$ (67)	$ (68)
Annual Scrap Revenue	$ 11,000	**$ 16,500**	$ 22,000	$ 23,100	$ 27,500	**$ 33,000**	$ 38,500	$ 44,000	$ 49,500
Simple Payback (years)									

Full Machine Capacity

Table 6.4 MRF Processing System with no Capital Cost

OPERATING COST AND SIMPLE PAYBACK MRF SYSTEM 320 KG/HR					
Annual Volumes Processed (tonnes)	**460**	520	**530**	580	640
Hrs Required to Process	**1,449**	1,638	**1,669**	1,827	2,016
# of 6 hr days required	**241**	273	**278**	304	336
Monthly Operating Costs					
Energy use (83 kw/hr)	**$ 1,002**	$ 1,133	**$ 1,155**	$ 1,263	$ 1,394
Maintenance	**$ 700**	$ 700	**$ 700**	$ 700	$ 700
Labor	**$ 2,415**	$ 2,730	**$ 2,782**	$ 3,044	$ 3,359
Capital Costs (5 years,6%)	**$ -**	$ -	**$ -**	$ -	$ -
Total Monthly Costs	**$ 4,117**	$ 4,562	**$ 4,637**	$ 5,008	$ 5,454
Monthly Scrap Revenue	**$ 4,217**	$ 4,767	**$ 4,858**	$ 5,317	$ 5,867
Net Monthly Cost	**$ (100)**	$ (204)	**$ (222)**	$ (309)	$ (413)
Annual Cost to Recycle	**$ (1,201)**	$ (2,453)	**$ (2,662)**	$ (3,705)	$ (4,958)
Annual Cost to Landfill	**$ 36,800**	$ 41,600	**$ 42,400**	$ 46,400	$ 51,200
Annual Net Cost to Recycle	**$ (38,001)**	$ (44,053)	**$ (45,062)**	$ (50,105)	$ (56,158)
Cost/Tonne to Recycle	**$ (83)**	$ (85)	**$ (85)**	$ (86)	$ (88)
Annual Scrap Revenue	**$ 50,600**	$ 57,200	**$ 58,300**	$ 63,800	$ 70,400
Simple Payback (years)					

Full Machine Capacity

7.0 Study Summary

The current post consumer polystyrene packaging recycling rate is very low at 1% relative to other blue box plastics at approximately 22%.

A Mobile Recycling System can process approximately 450 kg (1000 pounds) of PS daily and the cost to operate machine is $794 daily.

The key volume indicator for 5 year payback of a small densifier is 75 tonnes and cost to recycle is $216 tonne.

The Town of Markham trialed a small densifier and was able to reduce monthly costs.

The key volume indicator for 5 year payback of a medium densifier is 150 tonnes and the cost to recycle is $84 tonne.

A municipality may be able to obtain comparable PS recycling costs relative to landfill costs after processing 150 tonnes of PS annually.

A municipality is required to process 315 tonnes of PS annually to be cost neutral.

A municipality can generate additional scrap revenue by processing more than 315 tonnes of PS annually.

Cost per tonne to recycle PS reduces as volume processed increases.

Larger municipalities have potential to divert 20% – 49 % of estimated PS generation without adding additional costs.

If there is no capital cost for PS processing equipment to a municipality, the cost per tonne to recycle PS is reduced and as volumes processed increases, significant additional scrap revenue can be generated.

Appendix

A-1 Stewardship Ontario PS Projections

Addendum #1

Request for Proposals
Blue Box Plastics Recycling Enhancement Initiative

Stewardship Ontario
and
Waste Diversion Ontario's Continuous Improvement Fund

February 9, 2009

This first addendum provides two items of clarification to the information provided in the Request for Proposals (RFP) for the Blue Box Plastics Recycling Enhancement Initiative relating to estimates of generation of plastics.

As noted in Section 1.4 of the RFP, the deadline for submission of written questions of clarification was Friday, February 6 and the deadline for Stewardship Ontario's issuance of addenda is February 20, 2009. The closing date for the RFP is March 5, 2009.

Item #1 Table 1 – 2007 Blue Box Plastics Generation in Ontario by Region and
Table 2 – 2007 Blue Box Plastics Recycling in Ontario by Region

Correction – It was noted that the numbers in the "East", "West" and "Central" columns of Tables 1 and 2 in the original RFP were transposed, i.e. for both generation and recovery data. The corrected tables are presented below as Table 1 (rev) and Table 2 (rev) respectively.

The figures in the tables also have been updated to reflect the most current data available.

Table 1 (rev) – 2007 Blue Box Plastics Generation in Ontario by Region[(1)]

	Central (tonnes)	**East** (tonnes)	**West** (tonnes)	**North** (tonnes)	**Total** (tonnes)
PET Beverage Bottles	22,980	6,767	7,406	2,663	39,816
PET Other Bottles & Jars	4,629	1,387	1,500	552	8,068
PET Other Packaging	3,361	1,020	1,116	411	5,907
HDPE Beverage Bottles	2,662	757	845	277	4,542
HDPE Other Bottles & Jugs	12,386	3,650	4,047	1,401	21,483
PVC Bottles & Jars	711	213	227	86	1,237
Other Bottles, Jars & Jugs Total	3,052	927	1,000	377	5,357
Polystyrene Packaging	12,660	3,550	3,977	1,256	21,443
Wide Mouth Tubs & Lids	7,032	2,103	2,308	822	12,266
Large HDPE & PP Pails & Lids	2,606	752	823	283	4,464
Polyethylene PE Plastic Bags & Film – Packaging	35,698	9,961	10,890	3,585	60,134
Laminated/Other Plastic Bags & Film	15,199	4,665	4,978	1,914	26,755
Other Rigid Plastic Packaging	11,704	3,561	3,815	1,446	20,526
All Plastics	**134,681**	**39,314**	**42,931**	**15,072**	**231,998**

Table 2 (rev) – 2007 Blue Box Plastics Recycling in Ontario by Region[(1)]

	Central (tonnes)	East (tonnes)	West (tonnes)	North (tonnes)	Total (tonnes)
PET	12,177	3,389	4,040	1,111	20,717
HDPE	7,094	1,768	2,016	573	11,451
FILM	2,993	567	255	230	4,045
TUBS	1,139	436	368	45	1,989
PS	114	105	6	33	257
MIXED	3,528	1,033	968	914	6,443
Commingled	5,051	1,679	1,098	472	8,300
TOTAL	**32,095**	**8,976**	**8,751**	**3,379**	**53,201**

Table 1 and 2 Notes:

1. East includes municipalities east of the Counties of Hastings and Renfrew; Central includes municipalities around the Golden Horseshoe, including all municipalities within the Greater Toronto Area and bounded on the north by the Counties of Parry Sound and Nipissing; West includes municipalities of Wellington and those to the west; and North includes Parry Sound, Nipissing and all municipalities further north.

Item #2 – Additional detail regarding Blue Box plastics generation estimates

In order to support potential respondents to the RFP in their efforts to identify the quantity and composition of Blue Box plastics that may be available in major curbside recycling programs in Ontario, Stewardship Ontario has prepared generation estimates for Blue Box plastics materials for 2007 from areas served by the 20 largest programs in the province. The estimates are presented in Table 3 below. These estimates are based on an extensive series of waste composition studies completed throughout the province in 2005, 2006 and 2007 through Stewardship Ontario's Effectiveness and Efficiency Fund. **While these estimates represent the most up-to-date data and analysis of Blue Box plastics material available in some of the largest municipalities in the province, interested parties should be aware that these are estimates only and that Blue Box plastic composition changes over time.**

Table 3 – Estimated Generation of Blue Box Plastics in 2007 by Major Program and Material Type

MUNICIPALITY	PET Bottles (tonnes)	PET Other Packaging (tonnes)	HDPE Bottles (tonnes)	PVC Bottles & Jars (tonnes)	Other Bottles, Jars & Jugs (tonnes)	PS (tonnes)	Wide Mouth Tubs & Lids (tonnes)	Large HDPE & PP Pails & Lids (tonnes)	Polyethylene Plastic Bags & Film – Packaging (tonnes)	Laminated Plastic Bags & Film (tonnes)	Other Rigid Plastic Packaging (tonnes)
TORONTO, CITY OF	9,442	1,110	5,086	250	1,030	4,461	2,362	919	13,117	5,169	4,000
NIAGARA, REGIONAL MUNI. OF	1,898	243	989	51	222	740	485	167	2,114	1,127	853
YORK, REGIONAL MUNI. OF	2,778	337	1,548	69	300	1,325	709	264	3,624	1,468	1,138
PEEL, REGIONAL MUNI. OF	3,578	434	1,993	89	387	1,707	914	340	4,673	1,892	1,467
HAMILTON, CITY OF	1,934	234	1,076	48	209	922	493	184	2,532	1,024	794
DURHAM, REGIONAL MUNI. OF	1,973	242	1,114	47	212	945	508	185	2,509	1,028	798
HALTON, REGIONAL MUNI. OF	1,562	191	876	38	168	747	401	147	2,010	819	636
SIMCOE, COUNTY OF	1,210	156	642	33	144	485	317	109	1,379	740	558
BARRIE, CITY OF	459	56	257	11	49	219	118	43	592	241	187
MUSKOKA, DISTRICT MUNI. OF	312	40	165	9	37	126	82	28	354	191	143
NORTHUMBERLAND, COUNTY OF	400	52	215	11	48	164	107	37	464	250	188
CENTRAL TOTAL	**25,546**	**3,096**	**13,961**	**655**	**2,808**	**11,841**	**6,496**	**2,422**	**33,367**	**13,951**	**10,762**
% OF CENTRAL REGION	*93%*	*92%*	*93%*	*92%*	*92%*	*94%*	*92%*	*93%*	*93%*	*92%*	*92%*
OTTAWA, CITY OF	3,378	407	1,870	85	366	1,609	859	322	4,463	1,798	1,393
QUINTE WASTE SOLUTIONS	689	90	368	19	82	279	183	62	793	426	321
PETERBOROUGH, CITY OF	337	42	172	9	39	127	84	29	366	194	147
KINGSTON, CITY OF	466	56	259	12	50	222	119	44	609	247	191
EAST TOTAL	**4,869**	**596**	**2,670**	**124**	**537**	**2,237**	**1,245**	**458**	**6,231**	**2,664**	**2,053**
% OF EASTERN REGION	*60%*	*58%*	*61%*	*58%*	*58%*	*63%*	*59%*	*61%*	*63%*	*57%*	*58%*
GREATER SUDBURY, CITY OF	679	86	351	18	79	262	172	59	749	399	302
NORTH TOTAL	**679**	**86**	**351**	**18**	**79**	**262**	**172**	**59**	**749**	**399**	**302**
% OF NORTHERN REGION	*21%*	*21%*	*21%*	*21%*	*21%*	*21%*	*21%*	*21%*	*21%*	*21%*	*21%*
WATERLOO, REGIONAL MUNI. OF	1,871	232	1,068	44	200	899	485	174	2,325	963	748
LONDON, CITY OF	1,486	179	822	37	161	707	378	142	1,966	791	613
ESSEX-WINDSOR SOLID WASTE	1,463	179	823	35	157	700	376	138	1,871	765	593
BLUEWATER RECYCLING ASSOC.	736	96	396	20	89	301	197	67	854	459	346
WEST TOTAL	**5,555**	**687**	**3,109**	**137**	**607**	**2,607**	**1,436**	**521**	**7,015**	**2,978**	**2,300**
% OF WESTERN REGION	*62%*	*62%*	*64%*	*60%*	*61%*	*66%*	*62%*	*63%*	*64%*	*60%*	*60%*
TOP 20 TOTAL	**36,649**	**4,464**	**20,091**	**934**	**4,031**	**16,947**	**9,348**	**3,460**	**47,363**	**19,992**	**15,417**
ONTARIO TOTAL	**47,884**	**5,907**	**26,025**	**1,237**	**5,357**	**21,443**	**12,266**	**4,464**	**60,134**	**26,755**	**20,526**
PERCENTAGE OF TOTAL	**77%**	**76%**	**77%**	**76%**	**75%**	**79%**	**76%**	**78%**	**79%**	**75%**	**75%**

Methodological Notes to Table 3:

1. Estimates are based on composition audits in single- and multi-family households conducted in 19 Ontario municipalities, and covering large urban, small urban and rural areas and single-family, multi-family households and seasonal homes.
2. The figures are developed using the composition and generation data for each household type from the audits together with the demographic information from each municipality.

Stewardship Ontario also has converted the Blue Box plastics generation estimates in Table 3 into average per-household generation rates, presented in Table 4.

Table 4 - Estimated Per-Household Plastics Generation in Ontario

Material	**Estimated Province-Wide Generation[(1)]** (kg/hhld/year)
PET Bottles	9.505
PET Other Packaging	1.173
HDPE Bottles	5.166
PVC Bottles & Jars	0.246
Other Bottles, Jars & Jugs	1.063
Polystyrene Packaging	4.256
Wide Mouth Tubs & Lids	2.435
Large HDPE & PP Pails & Lids	0.886
Polyethylene PE Plastic Bags & Film - Packaging	11.936
Laminated Plastic Bags & Film	5.311
Other Rigid Plastic Packaging	4.074
Total	**46.050**

Methodological Notes to Table 4:

1. Estimates are based on a weighted average of the generation data according to housing type in Ontario.

As noted in Section 2.4 of the RFP, interested parties are advised to consult Waste Diversion Ontario's Blue Box Datacall results posted on the WDO website (www.wdo.ca) for historic and municipality–specific annual data for Blue Box material RECOVERY information – i.e. information on Blue Box plastics that are collected and marketed by each program in the province.

A-2 Coverall Building Quotations

A-2-1 Quotation (1)

Estimate: 32 x 35, 22 foot height Legend based on Industrial Medium Hazard

32'w x 35'long- Cover-All™ Building – Engineered to local loads 10 Year Pro-Rated Warranty on Exclusive DURAWEAVE II™ FR 12.5 oz. Cover –

Colour option (Blue, Green, White, Grey, Brown or Sandstone)

Fabric Ends & HSS-

2- 32WT1 weather tight fabric end (FR) terminating at truss base

2- HSS package – type 10 with drop to base of truss (12 x 12 door opening) doors not included

Engineering

Freight to site included (500 mile radius to Lucknow, ON)

Full Installation Package (foundation not included)
Termination materials (main building and ends, door openings)

Installation of Main building / Installation of two ends

Rental Equipment

1- out-swing personal door with locking set (supply and install)

1- 10x10 sectional overhead doors (chain fall opener) (supply and install)

Wholesale Canadian Dollars Sub-total, plus GST **$27,641.00**

A-2-2 Quotation (2)

Estimate: 32 x 35, 30 foot height Legend based on Industrial Medium Hazard

32'w x 35'long- Cover-All™ Building –Engineered to local loads 10 Year Pro-Rated Warranty on Exclusive DURAWEAVE II™ FR 12.5 oz. Cover –

Colour option (Blue, Green, White, Grey, Brown or Sandstone)

Fabric Ends & HSS-

2- 32WT1 weather tight fabric end (FR) terminating at truss base

2- HSS package – type 10 with drop to base of truss (12 x 12 door opening) doors not included

Engineering

Freight to site included (500 mile radius to Lucknow ON)

Full Installation Package (foundation not included)
Termination materials (main building and ends, door openings)

Installation of Main building

Installation of two ends

Rental Equipment

1- out-swing personal door with locking set (supply and install)

1- 10x10 sectional overhead doors (chain fall opener) (supply and install)

Wholesale Canadian Dollars Sub-total, plus GST **$37,615.00**

A-3 About RecycleTech

RecycleTech is North America's largest supplier of Expanded Polystyrene Scrap (EPS) densifying and PS recycling equipment. RecycleTech has designed and installed over 150 machines in North America and is one of the largest brokers of polystyrene scrap, recycling over 4,000 tons annually. RecycleTech has installed 6 machines in Canada and has CSA approval.

RecycleTech has long term contracts for supply of densified EPS and baled RPS scrap with manufacturers around the world and requires monthly volumes of 5,000 to 10,000 tons per month over the next 5 years.

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