Analysis of User Pay System Costs in Ontario

E&E Project 191

Association of Municipal Recycling Coordinators
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Table of Contents

1.0 Executive summary	1
2.0 Introduction	4
2.1 Background	4
2.2 Project methodology	4
2.3 Study municipalities	5
3.0 Results and Discussion	6
3.1 City of Brockville	6
3.1.1 Impact on Waste and Diversion Tonnage	6
3.1.2 Impact on Costs and Revenues	6
3.1.3 Discussion	10
3.2 Town of Marathon	11
3.2.1 Impact on Waste and Diversion Tonnage	11
3.2.2 Impact on Costs and Revenues	11
3.2.3 Discussion	13
3.3 County of Oxford: City of Woodstock	14
3.3.1 Impact on Waste and Diversion Tonnage	14
3.3.2 Impact on Costs and Revenues	14
3.3.3 Discussion	17
3.4 City of Orillia	19
3.4.1 Impact on Waste and Diversion Tonnage	19
3.4.2 Impact on Costs and Revenues	19
3.4.3 Discussion	23
3.5 City of Stratford	24
3.5.1 Impact on Waste and Diversion Tonnage	24
3.5.2 Impact on Costs and Revenues	24
3.5.3 Discussion	27
3.6 Town of the Blue Mountains	29
3.6.1 Impact on Waste and Diversion Tonnage	29
3.6.2 Impact on Costs and Revenues	29
3.6.3 Discussion	32
4.0 Conclusion and Recommendations	34
4.1 Study Limitations	35

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Table of Contents (continued)

Tables and Figures

Table 2.1 Overview of study municipalities 5

City of Brockville
Figure 3.1.1 Waste and diversion tonnage 6
Table 3.1.1 Overview of user pay on waste management system costs 7
Figure 3.1.2 Total system costs (gross and net) 7
Table 3.1.2 Detailed costs and timeline 7
Figure 3.1.3 Total system revenues 8
Table 3.1.3 Detailed system revenues and timelines 8
Figure 3.1.4 Per tonne costs 9
Table 3.1.4 Detailed per tonne costs 9

Town of Marathon
Table 3.2.1 Overview of user pay on waste management system costs 11
Figure 3.2.1 Total system costs (gross and net) 12
Table 3.2.2 Detailed costs and timeline 12
Figure 3.2.2 Total system revenues 13
Table 3.2.3 Detailed revenues and timeline 13

County of Oxford: Woodstock
Figure 3.3.1 Waste and diversion tonnage 14
Table 3.3.1 Overview of user pay on waste management system costs 14
Figure 3.3.2 Total system costs (gross and net) 15
Table 3.3.2 Detailed costs and timeline 16
Figure 3.3.3 Total system revenues 16
Table 3.3.3 Detailed system revenues and timelines 17
Figure 3.3.4 Per tonne costs 17
Table 3.3.4 Detailed per tonne costs 17

City of Orillia
Figure 3.4.1 Waste and diversion tonnage 19
Table 3.4.1 Overview of user pay on waste management system costs 19
Figure 3.4.2 Total system costs (gross and net) 20
Table 3.4.2 Detailed costs and timeline 21
Figure 3.4.3 Total system revenues 21
Table 3.4.3 Detailed system revenues and timelines 22
Figure 3.4.4 Per tonne costs 22
Table 3.4.4 Detailed per tonne costs 22

City of Stratford
Figure 3.5.1 Waste and diversion tonnage 24
Table 3.5.1 Overview of user pay on waste management system costs 24
Figure 3.5.2 Total system costs (gross and net) 25
Table 3.5.2 Detailed costs and timeline 25
Figure 3.5.3 Total system revenues 26
Table 3.5.3 Detailed system revenues and timelines 26
Figure 3.5.4 Per tonne costs 27
Table 3.5.4 Detailed per tonne costs 27

Table of Contents (continued)

Tables and Figures (continued)

Town of the Blue Mountains
Figure 3.6.1 Waste and diversion tonnage 29
Table 3.6.1 Overview of user pay on waste management system costs 29
Figure 3.6.2 Total system costs (gross and net) 30
Table 3.6.2 Detailed costs and timeline 31
Figure 3.6.3 Total system revenues 31
Table 3.6.3 Detailed system revenues and timelines 31
Figure 3.6.4 Per tonne costs 32
Table 3.6.4 Detailed per tonne costs 32

1.0 Executive summary

Implementation of user pay has a proven effect on increasing the amount of recyclable material recovered in municipal programs. However, in Ontario, the precise financial costs and benefits of implementing user pay have not been well documented, nor has the impact of user pay on overall waste management system costs been examined.

The present research includes a detailed review and analysis of six Ontario municipal user pay programs to determine costs, revenues and revenue offsets resulting from the implementation of user pay programs. All aspects of each study municipality's waste management programs before, during and after the implementation of user pay were examined to determine possible cause and effect relationships. The cost (or credit) for the extra recyclable material that was recovered in the launch and post-launch years was also analysed. The six municipalities that participated in the study were: the City of Brockville, the Town of Marathon, the County of Oxford (City of Woodstock), the City of Orillia, the City of Stratford and the Town of the Blue Mountains.

Following implementation of user pay waste collection in these six communities, recycling tonnage increases ranged from 22 to 86%. Waste tonnage decreases ranged from 6 to 61%.

Net recycling program costs have been calculated and reported in two ways:
1) Net: total recycling program costs minus any applicable revenues or funding, and
2) Net$'$ (net prime): total recycling program costs minus applicable revenues, but funding income (e.g., MOE grants or WDO funding) has not been deducted.
The use of this latter calculation allows for the normalisation of the data and removes the variability in program costs due to presence or absence of funding or grants. Launch of the user pay programs in Woodstock and Blue Mountains coincided with the start of blue box stewardship funding through Waste Diversion Ontario (WDO). Conversely, launch of the user pay programs in the other study municipalities occurred at a time when Ministry of Environment (MOE) blue box subsidies were ending or had ceased.

Gross recycling (blue box) program costs were found to increase in the post-launch year in all but one of the municipalities (Brockville). Net recycling program costs increased in all but one of communities (Woodstock).

The net unit cost of the new tonnes that were moved into the blue box as a result of user pay was found to decrease in three of the programs: Woodstock, Stratford and Blue Mountains. The net$'$ (net prime) cost per tonne decreased in two of the programs: Brockville and Blue Mountains.

Notwithstanding the impact on blue box program costs, net costs for the <u>total</u> waste management system following launch of user pay were found to increase in three of the municipalities (Brockville, Orillia and Blue Mountains). That the net cost increases were relatively low in these three programs in particular[1] illustrates the 'buffering' effect on total system costs afforded by the new (user pay) revenue stream. It also underscores the fact that blue box programs and costs should not be regarded in isolation but rather as an integral part of a total waste management system.

Summary findings for each of the study municipalities are provided in the following tables. **<u>In all cases, comparison is made with the pre-launch year.</u>**

[1] Brockville and Orillia launched just after MOE blue box funding ended, and Blue Mountains launched a curbside blue box program concurrently with user pay.

City of Brockville

City of Brockville	% Increase/Decrease Launch year (1996)	Post launch year (1997) % Increase/Decrease
Waste tonnage	-6%	-12%
Blue box tonnage	+29%	+22%
Net cost: total waste management system	+2%	+3%
Net/ cost: total waste management system	-10%	-13%
Net cost: blue box program	+44%	+12%
Net/ cost: blue box program	-3%	-5%
Net cost/tonne: blue box program	+44%	+18%
Net/ cost/tonne: blue box program	-25%	-18%

Town of Marathon

Town of Marathon	Launch year (1997) % Increase/Decrease	Post launch year (1998) % Increase/Decrease
Waste tonnage	N/A	N/A
Blue box tonnage	N/A	N/A
Net cost: total waste management system	-61%	-96%
Net/ cost: total waste management system	N/A	N/A
Net cost: blue box program	N/A	N/A
Net/ cost: blue box program	N/A	N/A
Net cost/tonne: blue box program	N/A	N/A
Net/ cost/tonne: blue box program	N/A	N/A

County of Oxford: City of Woodstock

County of Oxford: City of Woodstock	Launch year (2003) % Increase/Decrease	Post launch year (2004) % Increase/Decrease
Waste tonnage	-22%	-21%
Blue box tonnage	+14%	+17%
Net cost: total waste management system	+8%	-45%
Net/ cost: total waste management system	+14%	-37%
Net cost: blue box program	+27%	-3%
Net/ cost: blue box program	+31%	+24%
Net cost/tonne: blue box program	+12%	-17%
Net/ cost/tonne: blue box program	+16%	+7%

City of Orillia

City of Orillia	Launch year (1997) % Increase/Decrease	Post launch year (1998) % Increase/Decrease
Waste tonnage	-17%	-4%
Blue box tonnage	+23%	+37%
Net cost: total waste management system	+5%	+9%
Net' cost: total waste management system	N/A	N/A
Net cost: blue box program	+107%	+309%
Net' cost: blue box program	+94%	+283%
Net cost/tonne[2]: blue box program	+58%	+185%

City of Stratford

City of Stratford	Launch year (1997) % Increase/Decrease	Post launch year (1998) % Increase/Decrease
Waste tonnage	-25%	-14%
Blue box tonnage	+44%	+49%
Net cost: total waste management system	-50%	-37%
Net' cost: total waste management system	N/A	N/A
Net cost (same as Net' cost): blue box program	+3%	+5%
Net cost/tonne (same as Net' cost/tonne): blue box program	-28%	-30%

Town of the Blue Mountains

Town of the Blue Mountains	Launch year (2004) % Increase/Decrease	Post launch year (2005) % Increase/Decrease
Waste tonnage	-61%	-61%
Blue box tonnage	+77%	+86%
Net cost: total waste management system	+8%	+21%
Net' cost: total waste management system	+18%	+41%
Net cost: blue box program	+47%	+65%
Net' cost: blue box program	+65%	+103%
Net cost/tonne: blue box program	-17%	-33%
Net' cost/tonne: blue box program	-7%	-9%

[2] Because the difference between net and net prime for Orillia's blue box program costs was relatively small (difference of only $3,621), the difference between net and net prime for cost per tonne was not significant. This is reflected by the fact that percentage increases for net and net prime cost per tonne are the same.

2.0 Introduction

The purpose of this study was to undertake a detailed analysis of the effect of user pay on municipal waste and recycling programs, and address the question: What is the impact of implementing a user pay program on total waste management system costs? It is important to emphasise that while individual waste management and diversion programs are highlighted in this review, no single diversion program should be regarded in isolation. The study and conclusions are based on total waste management system impacts. It is also important to emphasise that no comparison has been made between the municipalities that participated in this study.

For this analysis, all aspects of each study municipality's waste programs were examined before and after the implementation of user pay in order to determine possible cause and effect relationships, if any, and assess what price (or credit) there is for the extra recyclable material that was recovered.

Municipalities that are considering user pay can use the data from the research to project what benefit/cost may result to their own waste management system costs and estimate the net gain or loss that would result from implementing a user pay program.

2.1 Background

User pay waste programs got their start in 1991 in eastern Ontario. Since then, new programs have been added each year. Presently there are some 145 municipalities with some form of user pay or pay as you throw (PAYT) in Ontario. These include all areas of the province, ranging from large urban municipalities to small rural ones. There are programs for curbside waste collection as well as those based at landfills, and each program is as unique as the municipality it serves. There are approximately 1.8 million households in Ontario that now pay directly to dispose of at least some of their waste. This is nearly 45% of the households in the province.

The AMRC has completed two previous E&E-funded projects on user pay:

1. Analysis of User Pay Programs in Ontario which included a 2005 survey and update of the *User Pay Implementation Guide,* (E&E Project #126) and
2. A series of modules for the Knowledge Network designed for assisting both existing user pay municipalities as well as communities considering user pay implementation (E&E Project #190).

Both of these can be accessed on Stewardship Ontario's website at:
http://www.stewardshipontario.ca/eefund/projects.htm

2.2 Project methodology

An initial review of all of the existing user pay programs in the province was undertaken using the results from 2005's user pay survey. From a 'long list' of potential study municipalities, a short list of programs representative of user pay program type (full vs. partial), geographic location and demographics was developed by contacting each of the programs to ensure that they had sufficient usable data and records. Given that many Ontario user pay programs were implemented in the mid to late 1990's, and also that many existing programs are the result of municipal amalgamations in that time period, a number of potential study sites were eliminated because an accurate historical record was not available. The short list, comprising some 15 programs, was presented to the Municipal Industry Programs Committee (MIPC) advisory subcommittee for a final selection of the six study sites. Of the original six, the City of Barrie (large urban) was eliminated due to an inability to retrieve the appropriate records (program first implemented in 1997). The City of Orillia (small urban) was substituted.

A data recording template, based in format and detail on the WDO's Financial Datacall, was developed and reviewed by members of the project team and Stewardship Ontario staff. The template, a series of excel worksheets, was used in each location to ensure completeness of records. (Refer to electronic Appendix UP 191 datasheets.xls). The study manager visited each

location and worked with staff to fill in the spreadsheet, using financial and program records kept on site. The object was not to fill in each line item in the worksheets, but rather to ensure that the financial data for each waste management and diversion program were fully accounted. The study manager worked both onsite and via email and telephone follow up to confirm financial and program details.

Once compiled, the financial and tonnage information was reviewed and verified by each of the study municipalities

2.3 Study municipalities

Table 2.1 provides an overview of the user pay and waste management/diversion programs in each municipality. Further program details are provided in Section 3.

Table 2.1 Overview of study municipalities

Municipality (Type, 2005 hhlds))	User pay launched	Current UP Program	Diversion programs
Brockville, City (small urban, 8,415 hhlds)	1992	Partial; 1 'free' per setout; $2.00/tag	• Curbside recycling, weekly • Curbside leaf and yard • Scrap metal/white goods depot • Community-wide 'Trash to Treasure' days • BYC[3] program • Annual HHW[4] event, now biennial
Marathon, Town (small urban, north, 1,674 hhlds)	1997	Full; $1.00/tag	• Depot recycling launched at same time as user pay • Scrap metal/white goods depot • Annual HHW event
Woodstock, City (small urban, 14,292 hhlds) Oxford County (rural regional, 40,000 hhlds)	2003	Full; $1.00/tag	• Curbside recycling, bi-weekly • Curbside collection of brush, depot collection of leaf and yard • Scrap metal/white goods depot • BYC program • Annual HHW events (4)
Orillia, City (small urban; 12,500 hhlds)	1997	Partial; 40 'free' tags/year; $1.50/tag	• Curbside recycling, weekly • Curbside leaf and yard at launch, now year round SSO[5] collection as well • Curbside diaper collection at launch • Scrap metal/white goods, gypsum depot • BYC program • HHW depot, includes WEEE[6]
Stratford, City (small urban; 13,023 hhlds)	1997	Full; $1.75/tag	• Curbside recycling, bi-weekly • Depot leaf and yard at launch, now curbside leaf and yard • Scrap metal/white goods depot • BYC program • Annual HHW events (2)
The Blue Mountains, Town (rural collection, south; 6,062 hhlds)	2003	Partial; 1 'free' per setout; $1.00	• Curbside recycling, weekly • Scrap metal/white goods depot • Resident access to Owen Sound HHW collection events (7)

[3] Backyard composter
[4] Household hazardous waste
[5] Source separated organics
[6] Waste electronics and electrical equipment

3.0 Results and Discussion

Detailed program information and financial data for each of the study municipalities are provided in sections 3.1 through 3.6. The format is the same for each:

1) Impact on program tonnages: pre- during and post user pay program launch
2) Impact on system costs and revenues: pre-, during and post-launch, and
3) Summary and discussion of user pay impacts.

Program costs are reported as 1) Gross costs (total costs), 2) Net costs (total costs minus any revenues and funding applicable to that stream, and 3) Net$^{/}$ (net prime: total costs minus revenues applicable to that stream, but funding income - e.g., MOE grants or WDO funding - has not been deducted). The use of Net$^{/}$ normalizes the data and removes the variability encountered due to timing of the program launch.

Note: Section 3 contains substantial amounts of detail on before, during and after program launch costs/revenues for each of the study municipalities. For those interested in cutting more briskly to the chase, it is suggested that they focus on Tables 3.1.1 through 3.6.1 and the discussion in Sections 3.1.3 through 3.6.3.

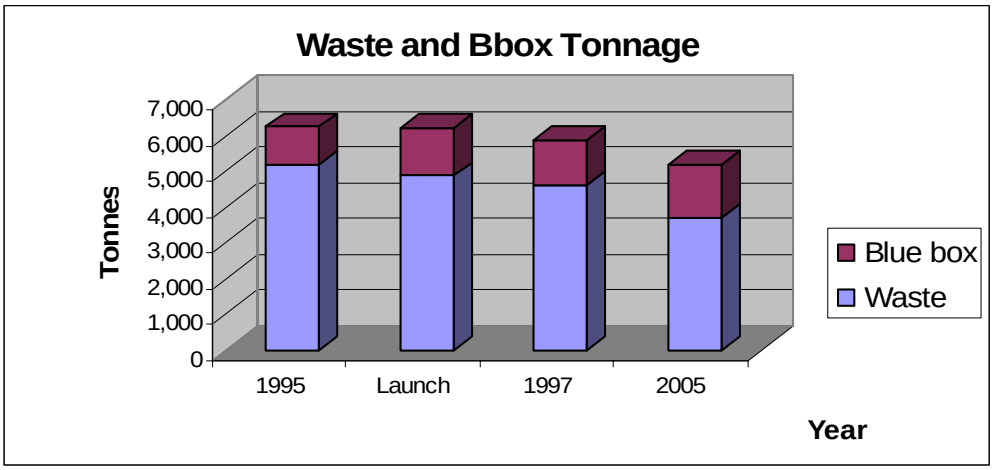
3.1 City of Brockville

The City of Brockville's user pay program actually began in 1992 as a partial program that allowed residents to set out four bags before a tag was required. That number was reduced over the years to one bag as of June, 1996. Cost per tag at that time was $1.25. Given the higher number of 'free' bags until that year, 1996 was treated as the program's launch date for the purposes of this study. 2006 tag price is $2.00

3.1.1 Impact on Waste and Diversion Tonnage

Waste tonnage decreased by 6% in the launch year compared with 1995, the pre-launch year, and a further 6% in 1997. Blue box tonnage increased by 29% in 1996, with a decrease of 6% in 1997, the post-launch year. It is worth noting that 2005 waste tonnage is some 29% lower than that of 1995, while blue box tonnage has increased by 42% over the ten years.

Figure 3.1.1 Waste and diversion tonnage



3.1.2 Impact on Costs and Revenues

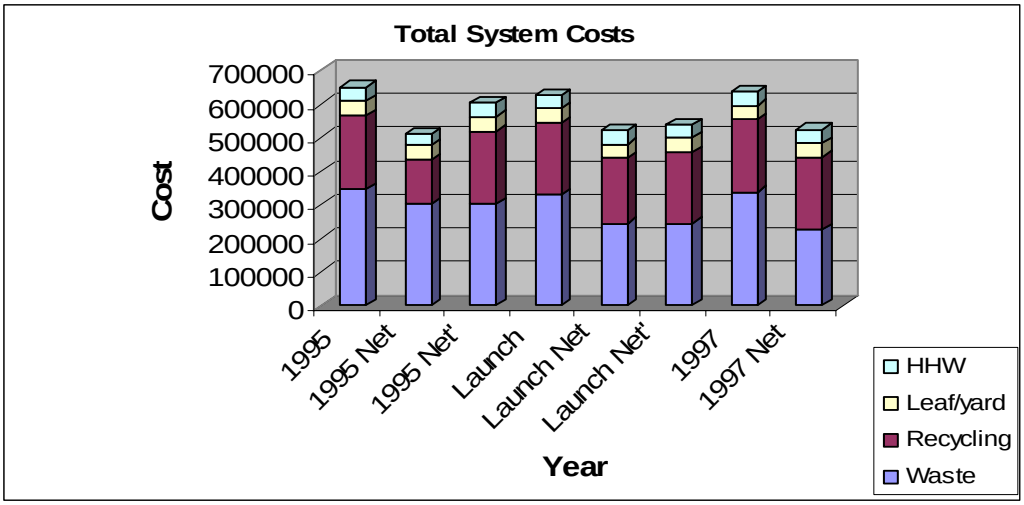
Table 3.1.1 summarises the overall impacts following user pay program launch, comparing the launch and post launch years with 1995, the pre-launch year. Detailed total and unit costs are provided in Tables and Figures 3.1.2 through 3.1.4.

Table 3.1.1 Overview of user pay on waste management system costs

System component	Tonnage	Gross cost	Net/Net′ cost	Per tonne cost (gross/net/net′)	Cost/revenue drivers
Waste Launch year Post-launch year	↓ ↓	↓ ↓	↓ ↓	↑ / ↓ ↑ / ↓	**Savings:** • Reduced tonnage: avoided disposal costs **Revenues**: • Bag tag revenues
Bbox Launch year Post-launch year	↑ ↑	↓ ↓	↑ / ↓ ↑	↓ / ↑ / ↓ ↓ / ↑	**Costs:** • Net cost increase (96, 97) reflects end of MOE funding in 95
Overall WM system Launch year Post launch year	↓ ↓	↓ ↓	↑ / ↓ /↓ ↑		**Savings:** • Overall decline in tonnage **Costs:** • Net system cost increase driven by net increase in recycling

Total system tonnes managed declined marginally (0.2%) in the launch year, and showed a more pronounced decline in the post-launch year (6%). This tonnage decline is reflected by a slight decline in gross system costs (Figure and Table 3.1.2), which was 2%, comparing the post-launch with the pre-launch year.

Figure 3.1.2 Total system costs (gross, net, *net′*)



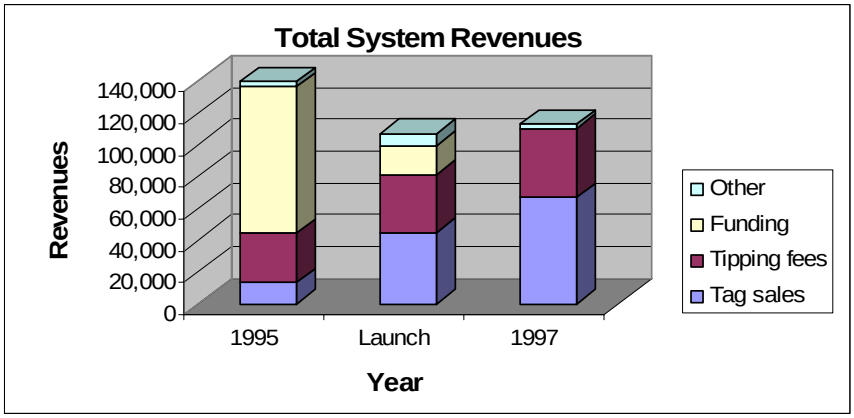
Conversely, net system costs increased by 3% over the same period, driven largely by a 62% increase in net blue box program costs. This sharp increase in the blue box program was largely driven by the loss of MOE funding as a major program cost offset in the launch year (refer to Figure and Table 3.1.3). The net system cost increase was buffered to a great extent by a 25% decrease in net waste costs, reflecting the revenue offset provided by tag sales. Net′ (net prime) system costs (MOE funding removed from calculation of net cost) declined by 13% comparing 1997 with 1995.

Table 3.1.2 Detailed costs and timelines

	1995 (gross/net/net[/])	Launch (gross/net/net[/])	1997 (gross/net)
Waste	$346,538 / $302,499	$329,918 / $246,736	$338,750 / $226,886
Blue box	$220,227 / $133,816 / $217,325	$214,860 / $192,730 / $210,827	$216,255 / $216,255
Leaf/yard	$43,433 / $43,433	$43,023 / $43,023	$41,479 / $41,479
HHW	$40,805 / $31,888 / $40,805	$39,275 / $39,275	$41,368 / $41,368
Total	$651,003 / $511,636 / $604,062	$627,075 / $521,764 / $539,861	$637,853 / $525,989
	• OMG, Bbd and HDPE added to Bbox pgm	• # of 'free' bags reduced to 1	• No MOE grants for Bbox, HHW
	• Waste and recyclables collected weekly by contractor' • Landfill owned and operated by municipality		

Figure and Table 3.1.3 detail system revenues over the launch period. Tag sale revenues grew steadily over the three years, increasing by almost 400%. This increase partially offset the loss of MOE blue box funding in 1996.

Figure 3.1.3 Total system revenues



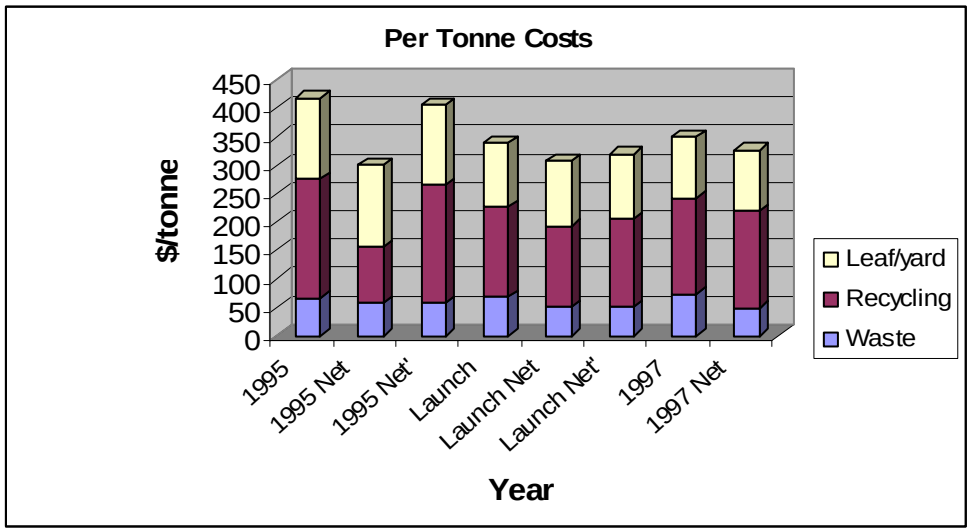
In the launch year, the ratio of tag sale revenues to total revenues increased to 42% (from 10% pre-launch), and increased a further 18% in the post-launch year. Despite these component increases, total system revenues declined in 1996 and 1997.

Table 3.1.3 Detailed system revenues and timelines

	1995	Launch	1997
Tag sales	$13,500	$44,963	$67,021
Tipping fees	$30,539	$36,267	$42,915
Funding	$92,426	$18,097	0
Other	$2,902	$7,727	$2,829
Total	$139,367	$107,054	$112,765
Timeline	• User pay program allows 2 'free' bags, cost per tag is $1.50 • Final year of MOE subsidy on blue box program	• 'Free' bags reduced to 1; cost per tag is $1.25	
Notes	• Other revenues include, scrap metal revenues, large item fees, bbox sales.		

Gross cost per tonne increased slightly for waste (as would be expected given relatively static costs and decreased tonnage), while net costs declined, offset by tag sale revenue.

Figure 3.1.4 Per tonne costs



While gross cost per tonne for recycling followed the expected decrease resulting from increased tonnage, net costs jumped substantially – again reflecting the impact of the loss of the MOE blue box subsidy in the launch year. Conversely, net' (net prime) cost per tonne for recycling declined by 25% in the launch year.

Table 3.1.4 Detailed per tonne costs

	1995 (gross/net/net')	Launch (gross/net/ net')	1997[7] (gross/net)
Waste	$67 /$58	$68 / $51	$74 / $49
Recycling	$210 / $99 / $207	$159 / $143 / $156	$169 / $169
Leaf/yard	$142 / $142	$113 / $113	$108 / $108

[7] There was no funding in 1997, thus net prime is the same as net

3.1.3 Discussion

Brockville's gross and net waste management system costs remained relatively stable over the user pay program launch period, with no substantive changes in program service level or provision.

The impacts of the launch of Brockville's partial user pay program on its total waste management system can be summarised as follow:

1. Overall tonnes managed decreased by 6% over the launch/post-launch period, while the blue box program saw an influx of 303 and 229 'new tonnes' in the launch and post-launch years, respectively. These new tonnes came at considerable expense, given that the launch year coincided with the end of the MOE blue box subsidy. However, removing MOE subsidy from the equation (i.e., using net$^{/}$), the new blue box tonnage was found to be substantially less expensive than pre-launch tonnage, showing a per tonne decrease of 25% in the launch year, and 18% in the post-launch year.
2. Total net system costs increased only marginally over the launch/post-launch period (3%), and actually declined by 3% if MOE funding is removed from the calculation.
3. Despite the fact that tag sale revenues tend to play a smaller role in the overall system in a partial program, in Brockville's case, this revenue stream served to help 'buffer' the system through the loss of the MOE blue box subsidy.
4. Summary of impacts on Brockville's blue box program:

	Post-launch year	% increase/decrease over pre-launch year	% increase/decrease over pre-launch year Funding removed (net$^{/}$)
Tonnage	1,278 T	+22%	
Gross cost	$216,255	-2%	
Net cost	$216,255	+62%	-5%
Unit cost	$169/T	+71%	-18%

3.2 Town of Marathon

The Town of Marathon's full user pay program was launched in 1997 in the same year that depot-based blue box recycling was introduced. Tag prices have remained at $1.00 since launch.

3.2.1 Impact on Waste and Diversion Tonnage

Unfortunately, and despite exhaustive searches, tonnage data for the Town of Marathon are unavailable for the years 1996 through 1998. For reference, tonnages for 2005 were:

- Waste: 1,501 tonnes
- Blue box materials: 192 tonnes (115 kg/hhld)
- Other materials diverted: 198 tonnes

3.2.2 Impact on Costs and Revenues

Table 3.2.1 provides a snapshot of the system impacts of Marathon's user pay program in comparison with 1996, the pre-launch year. Details follow in tables 3.2.1 through 3.2.3 and figures 3.2.1 and 3.2.2. Gross costs are reported as total costs. Net costs are reported as total costs minus revenues applicable to that stream. For Marathon as for all study municipalities, program funding (MOE, and WDO) has been treated as a revenue and applied to the appropriate stream.

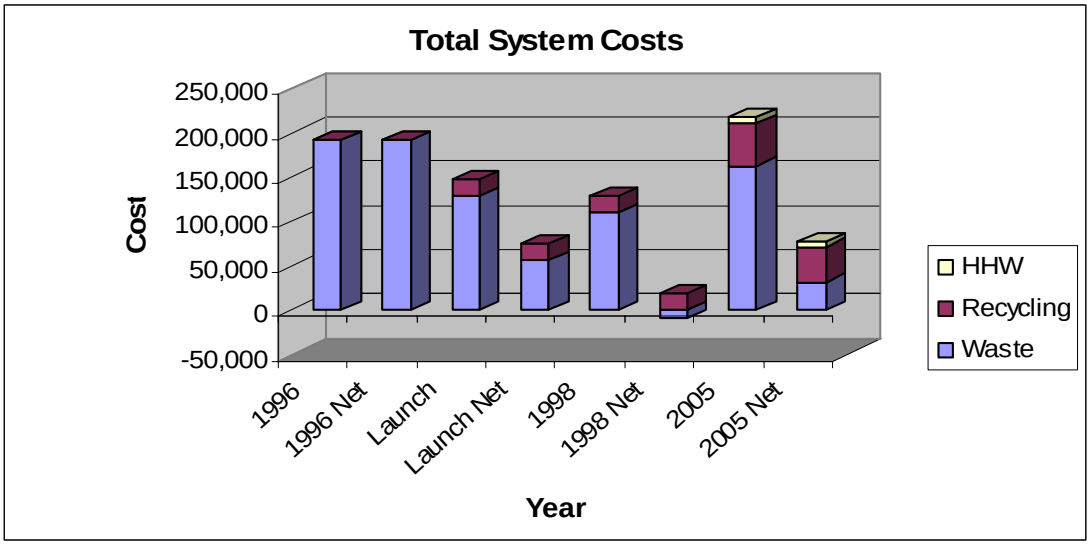
Table 3.2.1 Overview of user pay on waste management system costs

System component	Tonnage	Gross cost	Net cost	Per tonne cost	Cost/revenue drivers
Waste Launch year Post-launch year	N/A N/A	↓ ↓	↓ ↓	N/A N/A	**Revenues:** • Introduction of tipping fees, bag tags, commercial pickup fees **Savings**: • Avoided disposal costs assumed.
Bbox Launch year Post-launch year	N/A N/A	No comparison ↓	No comparison ↓	N/A	**Costs:** • Introduction of recycling program
Overall WM system Launch year Post launch year	NA N/A	↓ ↓	↓ ↓	NA N/A	

Waste management system costs are detailed in Figure 3.2.1 and Table 3.2.2 (next page). Gross and net waste collection/disposal costs declined substantially in launch and post-launch years. 2005 net waste costs are still well below 1996 levels.

The decline in gross costs suggests that substantial savings were realised by avoided waste collection and disposal costs as a result of a decrease in waste tonnage following introduction of user and tipping fees. The dramatic decline in net waste costs comparing 2005 with the pre-launch year (84%) reflects the introduction of new revenue streams – a shift in waste management funding away from the tax base and onto the users of the system.

Figure 3.2.1 Total system costs (gross and net)



Given that the recycling program was introduced in conjunction with user pay, no comparison can be made with previous year costs. It is reasonable to assume however that removing recycling tonnage from the waste stream contributed to a decrease in waste collection/disposal costs.

Table 3.2.2 Detailed costs and timeline

	1996 Gross / Net	Launch Gross/Net	1998 Gross/Net	2005 Gross/Net/Net[/]
Waste	$190,784 / $190,784	$127,895 / $55,726	$108,863 / $(10,132)	$162,185 / $30,827
Blue box		$19,060 / $19,060	$18,540 / $18,540	$48,000 / $40,062 / $40,062
HHW				$6,313 / $6,313
Total	$190,784 / $190,784	$146,955 / $74,786	$127,403 / $8,408	$216,497 / $77,202
Timeline	• Waste collection and disposal costs only, no recycling program	• User pay program launched March 1997 • Depot recycling launched May, 1997		• HHW event collection (shared with Manitouwadge)
Notes	• Contractor picks up from recycling depots (2) and retains material revenues; same contractor since launch of program • Landfill is owned by municipality, operated by contractor • Residential waste is collected weekly by municipal crews			

From ‘0’ in 1996 (pre-launch year), revenues have increased steadily through 2005 to the extent that tag fees alone offset 36% of total system costs in 1998 (post launch year), and 30% in 2005.

Figure 3.2.2 Total system revenues

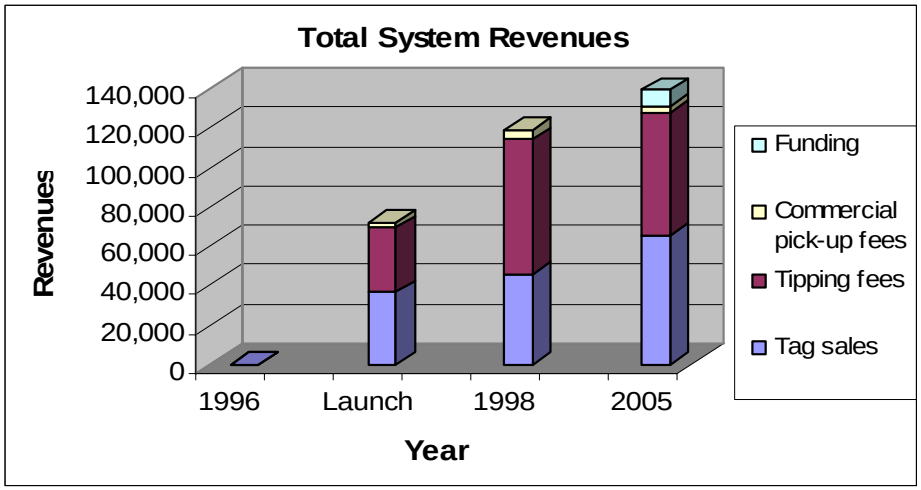


Table 3.2.3 Detailed revenues and timeline

	1996	Launch	1998	2005
Tag sales	0	$36,560	$46,125	$65,294
Tipping fees	0	$32,726	$68,110	$62,933
Commercial pick-up fees	0	$2,884	$4,760	$3,130
Funding	0	0	0	$7,938
Total	0	$72,169	$118,995	$139,296
Timeline		• Bag tags, tipping fees and fees for commercial waste picked up by municipality introduced. • Tipping fee=$4-$20.00		• WDO funding (applied against Bbox costs) • Tipping fee = $5 - $25.00

3.2.3 Discussion

Marathon's situation is somewhat unique in that the user pay program was introduced at the same time as blue box recycling. What better motivator to participate in a recycling program than the requirement to pay for each bag of waste generated? On the other hand, it is not possible to analyse before and after impacts of user pay on recycling.

Notwithstanding the above, the overall impacts of the implementation of user pay on Marathon's waste management system costs can be summarised as follow:

1. The introduction of user-based revenue streams at program launch (tags fees, tipping fees) significantly offset the costs of the new recycling program;
2. (Assumed) reduction in waste requiring collection and disposal (source reduction and diversion program) contributed to a decline in gross waste management system costs in the launch and post launch years.
3. The substantial decline in net waste management system costs since the introduction of user pay is due to a significant extent to revenues from tag sales.
4. Summary of impacts on Marathon's blue box program:

	Post-launch year	% increase/decrease over pre-launch year
Gross cost	$18,540	+100%
Net cost	$18,540	+100%

3.3 County of Oxford: City of Woodstock

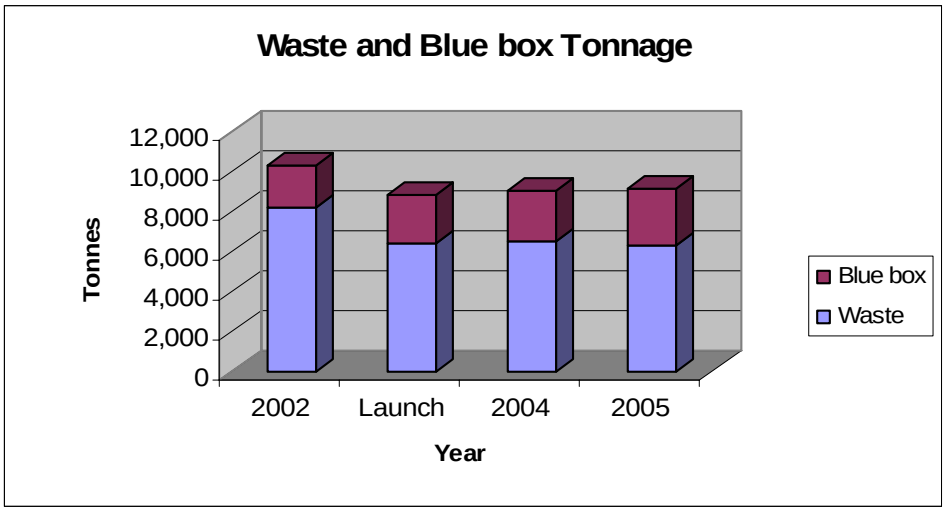
The County of Oxford assumed responsibility for waste management from all of its lower tier municipalities in 2002 and implemented a county-wide full user pay program in February, 2003. Because of the way the county tracks its waste management data, it has been possible to focus in this study on one of its local municipalities, the City of Woodstock. 2006 tag price is $1.00.

3.3.1 Impact on Waste and Diversion Tonnage

Waste tonnage declined by 22% in 2003, the user pay program launch year, when compared with 2002, the pre-launch year. Waste increased by 2% in 2004 over 2003, but in 2005 was still some 23% lower than pre-launch year tonnage. 2005 per household waste was 445 kg/hhld., a decline of 27%, compared with the pre-launch year.

Recycling tonnage increased by 14% in 2003, with a further increase of 3% in 2004. 2005 recycling tonnage shows an increase of 30% over 2002, the pre-launch year. 2005 per household capture of blue box materials was 194 kg/hhld., an increase of 23% compared with 2002.

Figure 3.3.1 Waste and diversion tonnage



3.3.2 Impact on Costs and Revenues

Table 3.3.1 summarises the tonnage and cost impacts of the launch and post-launch years, compared with 2002, pre-launch year. System details follow in Figures 3.3.2 and Table 3.3.2.

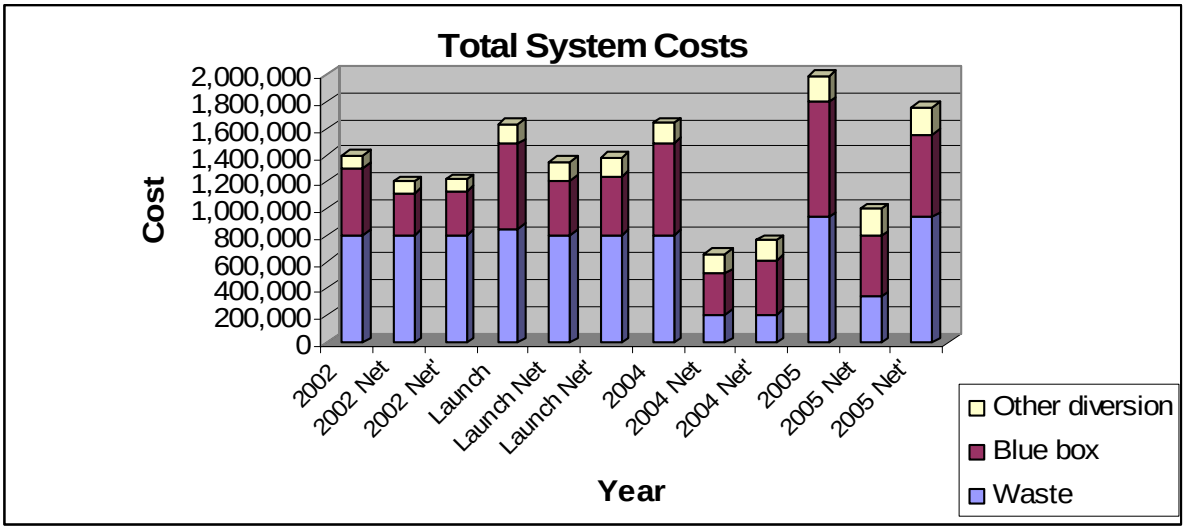
Table 3.3.1 Overview of user pay on waste management system costs

System component	Tonnage	Gross cost	Net/Net$^{/}$ cost	Per tonne cost (gross/net/net$^{/}$)	Cost/revenue drivers
Waste					**Revenues:**
Launch year	↓	↑	↑	↑ / ↑	• Introduction of bag tags
Post-launch year	↓	↑	↓	↑ / ↓	**Savings:**
					• Decline in tonnes managed and tipping fees paid
					Costs:
					• Increase in collection costs
Bbox					**Costs:**
Launch year	↑	↑	↑ / ↑	↑ / ↑ / ↑	• Increase in collection/ processing
Post-launch year	↑	↑	↓ / ↑	↑ / ↓ / ↑	**Revenues:**
					• WDO funding in 04 offset

System component	Tonnage	Gross cost	Net/Net′ cost	Per tonne cost (gross/net/net′)	Cost/revenue drivers
					costs
Other diversion Launch year Post launch year	N/A	↑ ↑			
Overall WM system Launch year Post launch year	↓ ↓	↑ ↑	↑ ↓		**Costs** • Increased system costs as more materials diverted to blue box, other diversion programs **Revenues** • Tag fees and WDO funding offset gross costs

Gross waste management system costs have increased year over year (to 2005) since the pre-launch year 2002. Despite a slight increase in net system costs in the user pay program launch year,[8] net system costs have declined since pre-launch.

Figure 3.3.2 Total system costs (gross, net, net′)



The greatest decline in net costs is seen in waste, with a reduction of 57%. The most significant increase in net costs is seen in recycling, with an increase of 45%.[9] Removal of funding from the calculation, however, (net′) indicates that recycling costs have risen steadily over launch (31%) and post-launch (24%).

[8] Note that launch year bag tag revenues were significantly lower than subsequent years, in part because of the provision at launch of complementary tags – refer to Figure and Table 3.3.3.
[9] Although L/Y costs increased by 193%, the system impact was lower.

Table 3.3.2 Detailed costs and timeline

	2002 Gross / Net / Net[/]	Launch Gross / Net / Net[/]	2004 Gross / Net / Net[/]	2005 Gross / Net / Net[/]
Waste	$800,007 / $800,007	$849,477 / $807,379	$800,241 / $210,441	$936,228 / $341,359
Blue box	$509,223/$316,363/$329,223	$638,207/$402,124/$432,029	$696,467/$306,129/$407,876	$862,914/$457,871/$621,793
Leaf/Yard	$52,190 / $52,190	$87,196 / $87,196	$102,765 / $102,765	$153,193 / $153,193
HH/HSW	$35,456 / $35,456	$49,939 / $49,939	$40,286 / $40,286	$38,086 / $38,086
BYC		$10,013 / $10,013	$4,291 / $4,291	$9,015 / $9,015
Total	$1,396,876/$1,204,016/$1,216,876	$1,634,832/$1,304,911/$1,386,556	$1,644,050/$663,912/$765,659	$1,999,436/$999,524/$1,758,315
Timeline	• County assumed responsibility for all waste management in January, 2002; programs remained 'status quo' • Recyclables collected bi-weekly	• Bag tag program launched (county-wide) February, 2003; residents received 20 complementary tags. • New County contract for waste and recycling, but Woodstock retained municipal collection and its own processing facility. • Tubs/lids & bottles added to bbox program • Recyclables collected bi-weekly	• Recyclables collected bi-weekly • Tipping fee: $30/tonne • WDO funding for Bbox	• Recyclables collected bi-weekly • Tipping fee: $40/tonne • WDO funding for Bbox
Notes	• Residential waste picked up weekly by municipal forces • Recyclables processed by city staff at City of Woodstock facility • Landfill is owned and operated by County of Oxford			

Tag sales comprised the greatest single revenue source in the post launch and subsequent year, and were the major factor in the overall decline in net system costs since the pre-launch year. Details are provided in Figure and Table 3.3.3.

Figure 3.3.3 Total system revenues

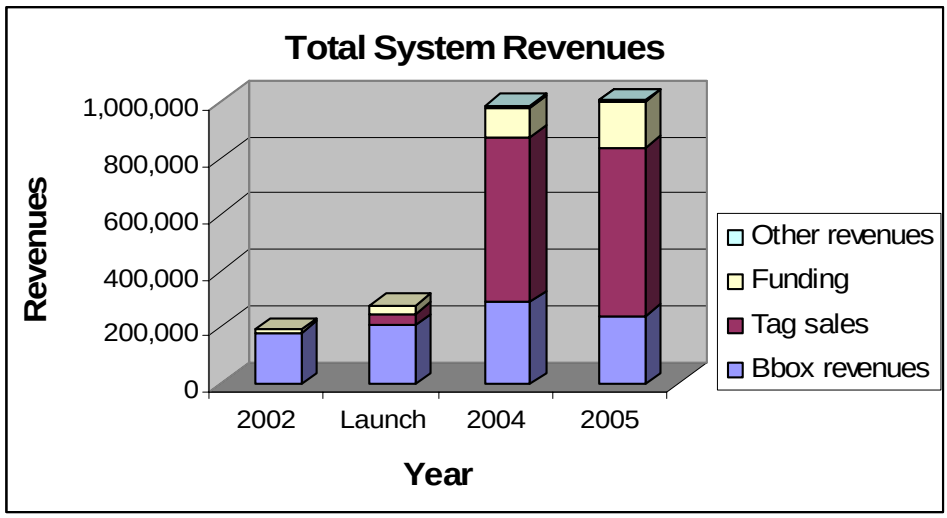


Table 3.3.3 Detailed system revenues and timelines

	2002	Launch	2004	2005
Tag sales	0	$42,098	$582,178	$591,899
Bbox revenues	$180,000	$206,178	$288,591	$241,121
Funding	$12,860	$29,905	$101,747	$163,922
Other			$7,622	$2,970
Total	$192,860	$278,181	$960,137	$999,912
Timeline	• Tipping fee: $30/tonne			• Tipping fee: $40/tonne
Notes		• Residents received 20 complementary tags	• Other revenues=downtown collection costs recovered	

Comparing 2005 with 2002, the pre-launch year, Woodstock's gross cost per tonne for waste has increased by 49%. Net cost/tonne for waste has declined by 46%. As noted above, bag tag sales have been the significant revenue offset. Gross cost/tonne for the blue box has increased by 30% in the same time period while net costs have increased by 12%. Net' (net prime) costs for blue box (WDO funding removed as cost offset) increased by 46% over the corresponding time period.

Figure 3.3.4 Per tonne costs

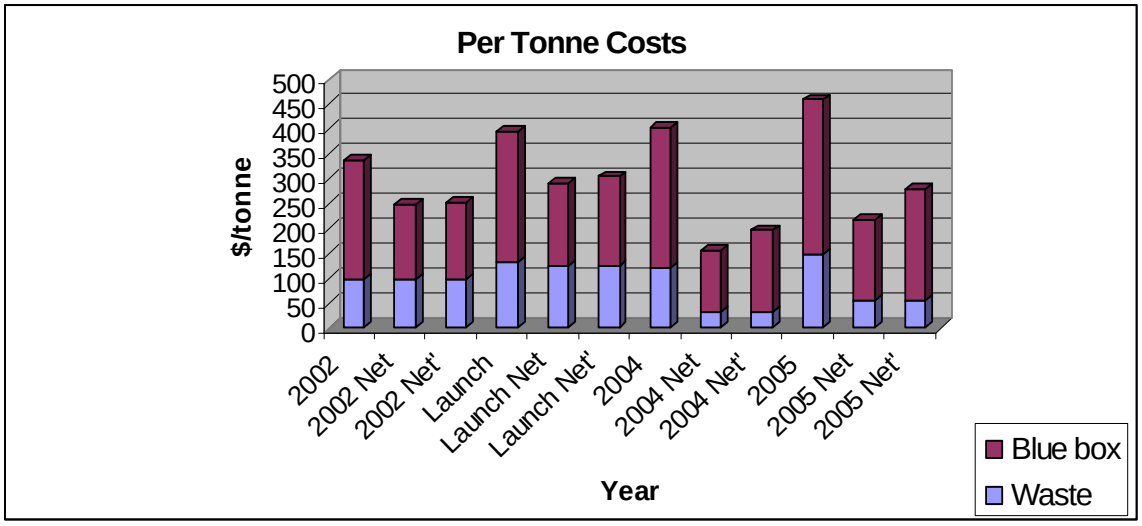


Table 3.3.4 Detailed per tonne costs

	2002 (Gross / Net / Net')	Launch (Gross / Net / Net')	2004 (Gross / Net / Net')	2005 (Gross / Net / Net')
Waste	$99 / $99	$133 / $126	$122 / $32	$147 / $54
Blue box	$239 / $148 / $154	$263 / $166 / $178	$280 / $123 / $164	$311 / $165 / $224

3.3.3 Discussion

Woodstock's user pay launch year included changes in its recycling program with the addition of new (bulky) materials to the blue box (tubs/lids, bottles). Blue box tonnage has increased by 30% as of 2005 compared with the pre-launch year, attributable to a great extent to user pay, and to a lesser extent to the 6% increase in households served by the program.

There have been no substantial changes to other waste management or diversion programs since the pre-launch year – i.e., garbage collection frequency has remained consistent, and the spring clean-up program is ongoing.

The following points summarise the system impacts of user pay, comparing 2005 with 2002, the pre-launch year:

1. Overall tonnes (waste, recyclables) managed in Woodstock have decreased by 12%.
2. Net waste management system costs have decreased by 17%. Revenues from tag sales have been the single greatest factor in the system cost decline, although WDO funding in 2004 and 2005 was also a large factor. Removing WDO funding from the equation, (net$'$), indicates a waste management system cost increase of 44%.
3. Net blue box program costs have increased by 45%, with a tonnage increase of 30%. Increased blue box capture has come at a net cost per tonne increase of 12%. Increased blue box capture using net$'$ (net prime) costs show a cost per tonne increase of 46%.
4. However, the user pay program revenues have made it possible for the waste management system to "absorb" cost increases on all fronts and come out 17% ahead (in lower total net cost) than the pre-launch year.
5. Summary of impacts on Woodstock's blue box program:

	Post-launch year	**% increase/decrease over pre-launch year**	**% increase/decrease over pre-launch year Funding removed (net$'$)**
Tonnage	2,490T	+17%	
Gross cost	$696,467	+37%	
Net cost	$306,129	-3%	+24%
Unit cost	$123/T	-17%	+7%

3.4 City of Orillia

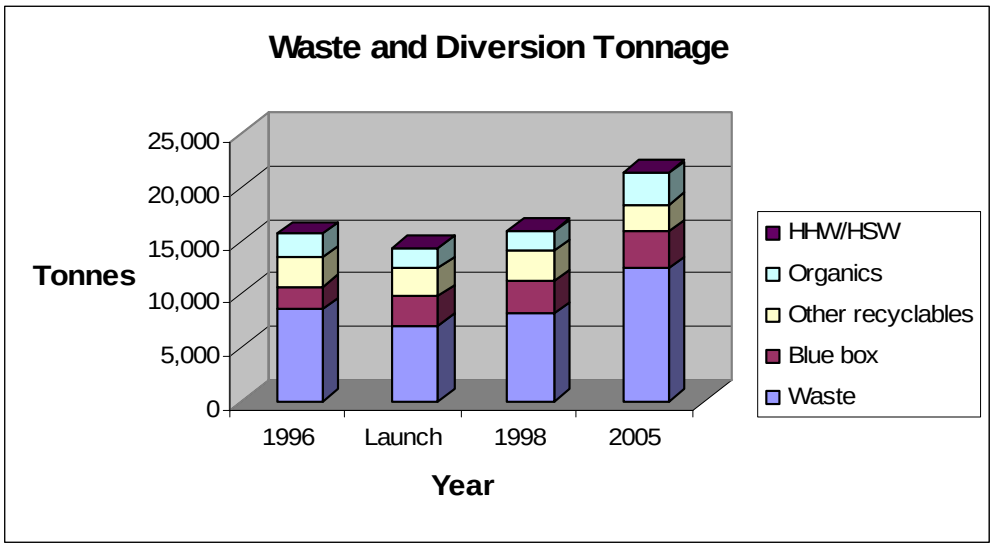
The City of Orillia's partial user pay program was implemented in July 1997. Residents were issued 35 'free' tags for the first partial year (July-Dec.) and 52 in subsequent full years. In 2000, the annual number of tags issued was lowered to 40. Tag prices have remained at $1.50 since program launch.

3.4.1 Impact on Waste and Diversion Tonnage

Waste tonnage declined by 17% in 1997, the user pay program launch year, when compared with 1996, the pre-launch year. Waste increased by 16% in 1998 over 1997, but was still some 4% lower than the pre-launch year tonnage. 2005 waste tonnage shows a substantial increase due in large part to an additional 3,800 tonnes of catch basin material and street sweepings. If this tonnage is removed, waste has only increased 0.9% since 1996.

Blue box tonnage increased by 23% in the launch year, and a further 12% in the post launch year. 2005 blue box tonnage has increased by 57% since 1996. Tonnage trends are summarised in Figure 3.4.1. Per household capture of blue box materials has risen from 175 kg/hhld. in 1996 to 275 kg/hhld. in 2005.

Figure 3.4.1 Waste and diversion tonnage



3.4.2 Impact on Costs and Revenues

The overall impact of Orillia's user pay program is summarised in Table 3.4.1. Comparisons are made with 1996, the pre-launch year.

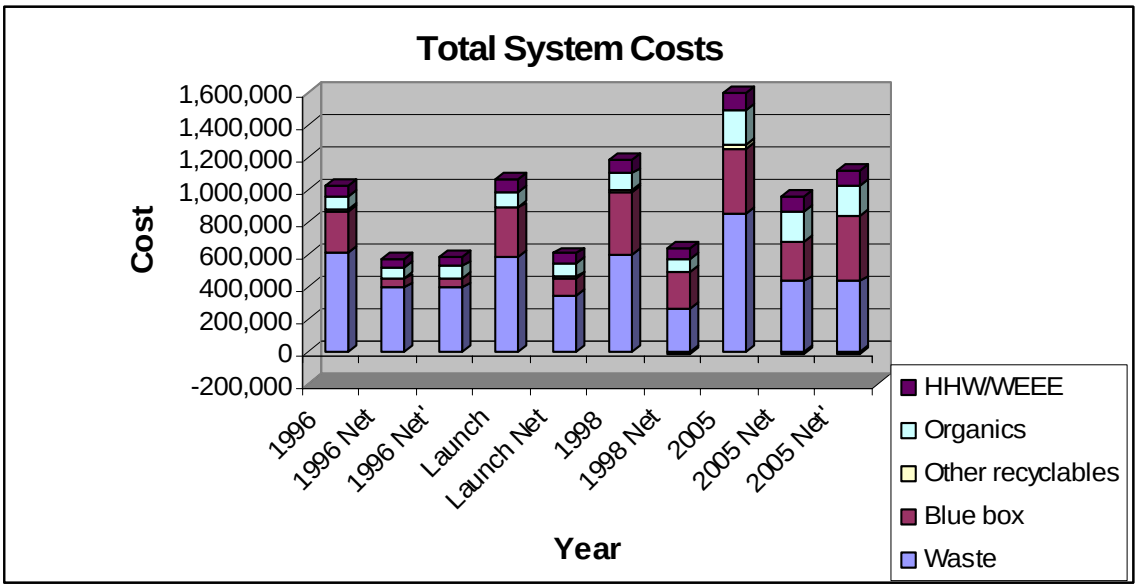
Table 3.4.1 Overview of user pay on waste management system costs

System component	Tonnage	Gross cost	Net cost	Per tonne cost (Gross/Net)[10]	Cost/revenue drivers
Waste Launch year Post-launch year	↓ ↓	↓ ↓	↓ ↓	↑ / ↑ ↑ / ↓	**Savings** • Reduced tonnage: avoided collection/disposal costs (but higher unit costs) **Revenues** • Introduction of bag tags
Bbox Launch year Post-launch year	↑ ↑	↑ ↑	↑ ↑	↓ / ↑ ↑ / ↑	**Costs** Tonnage up, and material revenues down
Organics Launch year Post-launch year	↓ ↓	↑ ↑	↑ ↑	↑ / ↑ ↑ / ↑	**Costs** • Year over year increases in collection and composting costs
Other recyclables Launch year Post-launch year	↓ ↑	↓ ↓	↑ ↓		**Costs** • Year over year increases in collection and processing costs
HH/HSW Launch year Post-launch year	↓ ↓	↑ ↑	↑ ↑		**Cost** • Never a bargain! But Orillia one of the few municipalities to cite revenues on materials diverted.
Overall WM system Launch year Post launch year	↓ ↑	↑ ↑	↑ ↑		**Costs** • Marginal cost increase driven by higher cost of diversion programs. **Revenues** • Offset overall system cost increase

Total system tonnes managed in the pre- and post-launch years were almost the same (within 250 tonnes), but with very different net costs, as detailed in Figure and Table 3.4.2.

Figure 3.4.2 Total system costs (gross, net, net′)

[10] There was no funding in launch and post-launch years, therefore net=net prime.



Orillia's gross waste management costs have increased year over year (during the user pay program launch phase) and in 2005. Net waste collection/disposal costs increased by 9% comparing 1996, the pre-launch year with 1998, post launch, and have increased by 10% overall (comparing 2005 with 1996).

On the other hand, the blue box program shows the most significant increase in net costs, with an increase of 309%, comparing 1998 with 1996 (35% increase in tonnage). Comparison of 1998 net with 1996 net[/] this increase was 283%. Comparing blue box net costs in 2005 with 1996, the percentage increase is 353 (601% increase comparing net[/]) with a 56% increase in tonnage. Other diversion program cost increases are seen in HH/HSW and organics. Note that the timelines in Tables 3.4.2 and 3.4.3 provide detail on some of the cost/revenue drivers.

Table 3.4.2 Detailed costs and timeline

	1996 Gross/Net/ Net[/]	Launch Gross/Net	1998 Gross/Net	2005 Gross/Net/ Net[/]
Waste	$613,539 / $393,380	$587,827 / $344,802	$600,331 / $269,780	$851,305 / $433,292
Blue box	$249,244/$53,927/$57,548	$298,901 / $111,363	$387,769 / $220,732	$403,842/$244,426/$403,842
Other recyclables	$12,904 / $2,252	$11,436 / $4,380	$12,142 / $(8,916)	$28, 528 /$(9,302)
Organics	$81,449 / $72,657	$93,476 / $85,420	$99,948 / $78,890	$213,992 / $190,947
HHW/WEEE	$72,525 / $56,343	$76,102 / $60,479	$84,867 / $67,515	$102,112 / $94,412
Total	$1,029,661/$578,558/$582,179	$1,067,742 / $605,723	$1,185,057 / $628,000	$1,599,779/$953,775/$1,113,191
Timeline		Bag tag program launched July, 1997	City sold off two recycling trucks to contractor. Prior to this, contractor leased the trucks from the city; therefore, for 1998 collection contract, the contract price included cost of truck maintenance	New waste & recycling contract Polycoat and aseptic containers added Organics now include SSO collected year round WEEE added to HHW collection
Notes	• Residential waste and recyclables picked up weekly by contractor • Landfill is owned and operated by municipality			

Orillia's consistent major revenue source has been tipping fees throughout the period being analysed, although blue box material sales in the user pay program launch period and WDO funding in 2005 have significantly offset blue box program costs.

The relatively low proportion of tag sales in relation to total system revenues reflects the fact that Orillia's is a partial user pay program.

Figure 3.4 3 Total system revenues

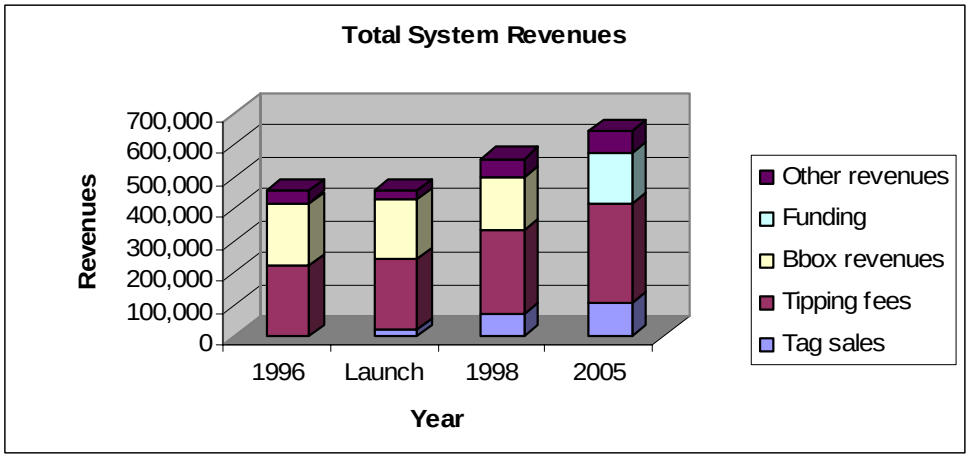


Table 3.4.3 Detailed system revenues and timelines

	1996	Launch	1998	2005
Tag sales	0	$23,033	$69,533	$105,405
Tipping fees	$220,159	$219,992	$261,018	$312,608
Bbox revenues	$195,317	$187,537	$167,037	0
Funding	$3,621	0	0	$159,416
Other revenues	$35,627	$29,736	$59,468	$68,575
Total	$454,724	$460,298	$557,056	$646,004
Timeline	• Tipping fee=$95/tonne • Bbox revenues split with contractor • Other revenues include scrap metal/compost/HHW sales and HHW chargeback to local municipalities			• Tipping fee=$100/T • All bbox revenues to contractor

Comparing 1998 with 1996, the pre-launch year, Orillia's gross cost per tonne for waste is virtually unchanged (1% increase) while the net cost/tonne for waste has declined by 28%. While tag sales provided some offset, the majority revenue offset was from tipping fees.

Gross cost/tonne for blue box increased by 14% in the same time period while net costs have increased by 185%.

Figure 3.4.4 Per tonne costs

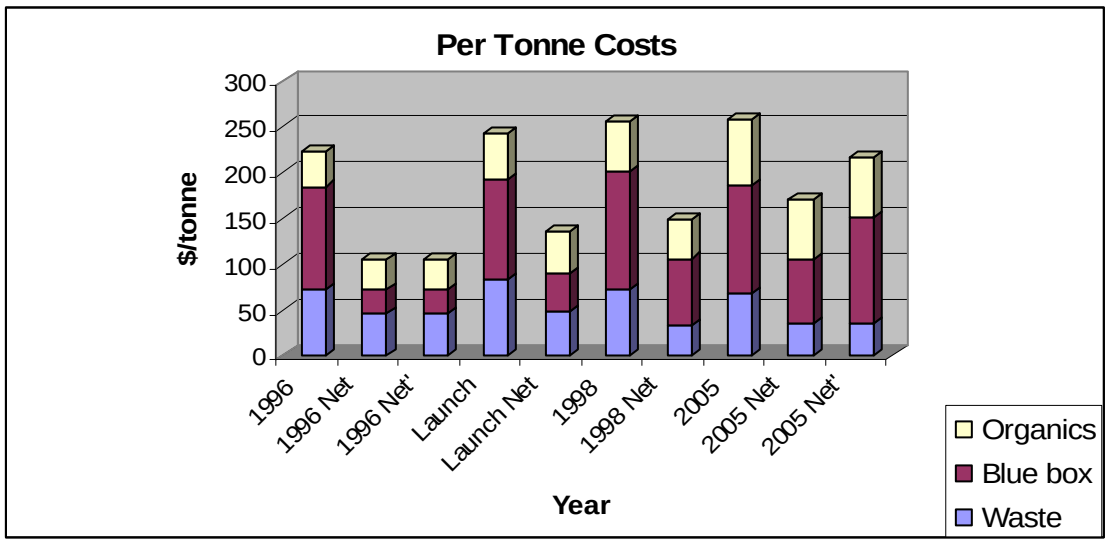


Table 3.4.4 Detailed per tonne costs

	1996 Gross / Net / Net[/]	Launch Gross / Net	1998 Gross / Net	2005 Gross / Net / Net[/]
Waste	$72 / $46	$83 / $49	$73 / $33	$69 / $35
Blue box	$113 / $26 / $26	$110 / $41	$129 / $74	$117 / $71 / $117
Organics	$38 / $34	$50 / $45	$54 / $42	$72 / $85

3.4.3 Discussion

Looking at Orillia's initial program launch years (now ten years ago), it can be seen that although total tonnes of waste and diverted materials remained relatively consistent over the launch period, there was a significant shift in materials away from the waste stream and into the blue box.

Comparing 2005 costs with the launch years, it is apparent that total net system cost increases have been driven by diversion programs (blue box, SSO, HH/HSW), while net waste costs have shown a relatively small increase (10% in 10 years). Note that there has been a 14% increase in the number of households served over the same time period. This cost stability for waste can be attributed to rising tipping fee and bag tag revenues.

The following points summarise the system impacts during the user pay launch years, comparing 1998 with 1996:

1. Overall tonnes (waste, recyclables, other diversion) managed in Orillia increased by 2%;
2. Net total waste management system costs increased by 9%;
3. Blue box tonnage increased by 36%, with a net cost increase of 309%, and a net cost per tonne increase of 185%.
4. The implementation of the partial user pay program for waste provided substantial motivation for residents to recycle, but resulted in relatively low revenues for the City – i.e., one third of households were able to 'make do' with the 52 'free' tags per year;
5. However, tipping fee and tag revenues greatly offset this apparent costly shift of materials out of the garbage bag and into the blue box. Had there been blue box stewardship funding in place at the time, it is likely that net total system costs would have remained unchanged, or even decreased.
6. Summary of impacts on Orillia's blue box program:

	Post-launch year	% increase/decrease over pre-launch year
Tonnage	3,001T	+37%
Gross cost	$387,769	+56%
Net cost	$220,732	+309%
Unit cost	$42/T	+24%

3.5 City of Stratford

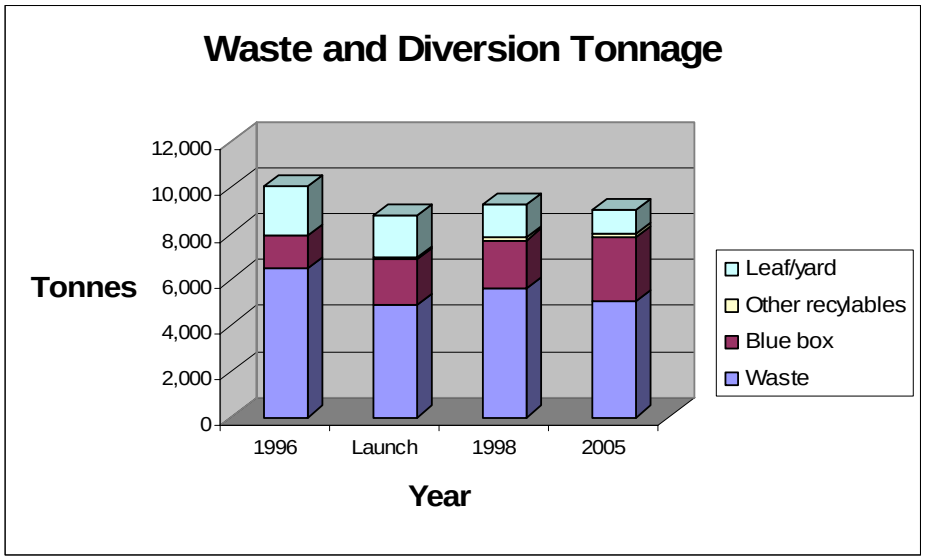
The City of Stratford's full user pay program was launched in January, 1997. At launch, tags were $1.20, and in 2006 is $1.75.

3.5.1 Impact on Waste and Diversion Tonnage

Waste tonnage declined by 25% in 1997, the user pay program launch year, when compared with 1996, the pre-launch year. 1998 waste tonnage showed an increase of 15% over the launch year, but was still 14% lower than the pre-launch year. Of note is the fact the 2005 waste tonnage is still some 22% lower than that of the pre-launch year.

Blue box tonnage increased by 44% in the launch year, compared with 1996, with an increase in 1998 of 49% over the pre-launch year. 2005 blue box tonnage is 98% greater than that of the pre-launch year. Blue box capture has increased from 118 kg/hhld in 1996 to 212 kg/hhld in 2005.

Figure 3.5.1 Waste and diversion tonnage



3.5.2 Impact on Costs and Revenues

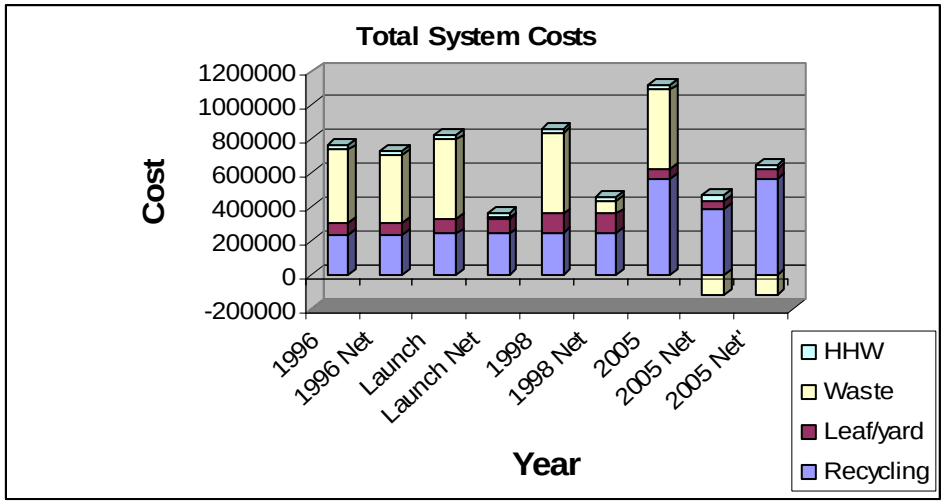
Table 3.5.1 provides a snapshot of the overall impact of implementation of user pay on Stratford's programs:

Table 3.5.1 Overview of user pay on waste management system costs

System component	Tonnage	Gross cost	Net cost	Per tonne cost (gross/net)[11]	Cost/revenue drivers
Waste Launch year Post-launch year	↓ ↓	↑ ↑	↓ ↓	↑ / ↓ ↑ / ↓	**Savings:** • Reduced tonnage: avoided collection/disposal costs with higher gross unit costs **Revenues:** • Net total and unit costs decline with revenue (tag sales)
Bbox Launch year Post-launch year	↑ ↑	↑ ↑	↑ ↑	↓ / ↓ ↓ / ↓	**Costs:** • Cost increase relatively low, with gross and net cost/tonne decrease as tonnage increases
Other diversion Launch year Post launch year	↓ ↓	↑ ↑	↑ ↑	↑ / ↑ ↑ / ↑	**Costs:** • Leaf/yard program enhancement
Overall WM system Launch year Post launch year	↓ ↓	↑ ↑	↓ ↓		**Savings:** • Overall decline in tonnage **Revenues:** • Tag sales contribute significantly to net cost decrease.

Figure and Table 3.5.2 detail total system and component cost trends. Gross system costs through the program launch period and indeed into 2005 show a steady increase, in marked contrast to net system costs which declined substantially in the launch year (50%), Post launch year net system costs were some 37% lower than pre-launch year costs.

Figure 3.5.2 Total system costs



[11] Funding was not a factor in launch or post launch years

Blue box costs remained relatively stable through this period with moderate increases in other diversion program costs. The major factor in net system cost decline has been revenues from tag sales. Of note is the fact that 2005 net system costs are 53% lower than those in 1996, the pre-launch year.

Table 3.5.2 Detailed costs and timeline

	1996 (gross/net)	Launch (gross/net)	1998 (gross/net)	2005 (gross/net/net^{I})
Waste	$434,043 / $402,294	$471,951 / $9,954	$467,854 / 77,900	$473,207 / $(122,209)
Blue box	$230,380 / $230,380	$238,266 / $238,266	$242,631 / $242,631	$566,035/$383,080/$566,035
Leaf & yard	$73,928 / $73,928	$87,109 / $87,109	$115,076 / $115,076	$54,616 / $54,616
HHW	$25,409 / $25,409	$28,913 / $28,913	$26,072 / $26,072	$29,601 / $29,601
Total	$763,760 /$732,211	$826,239 / $363,242	$860,632 / $461,678	$1,123,459/$345,089/$528,043
Timeline	• New contracts waste, recycling (1996, 2001)	• Bag tag program launched Jan. 1, 1997 ($1.20/tag)		• Aerosol cans now included in Bbox • Bag tag = $1.75
Notes	• Recyclables collected bi-weekly, waste weekly • Landfill is owned and operated by municipality			

Net^{I} (net prime) blue box costs (WDO funding removed, 2005) are the same as gross costs since funding is the only revenue offset in Stratford.

Figure and Table 3.5.3 detail system revenues. Note that although tipping fee revenues are included in these data for reference purposes, they have not been used in calculation of net residential waste costs.

Although tipping fees have been the major revenue offset for Stratford's total system costs, the introduction of tag sales to offset residential waste costs has been a significant factor in maintaining relatively stable net system costs, to the extent that 2005 waste collection/disposal more than paid for itself through tag sales.

Figure 3.5.3 Total system revenues

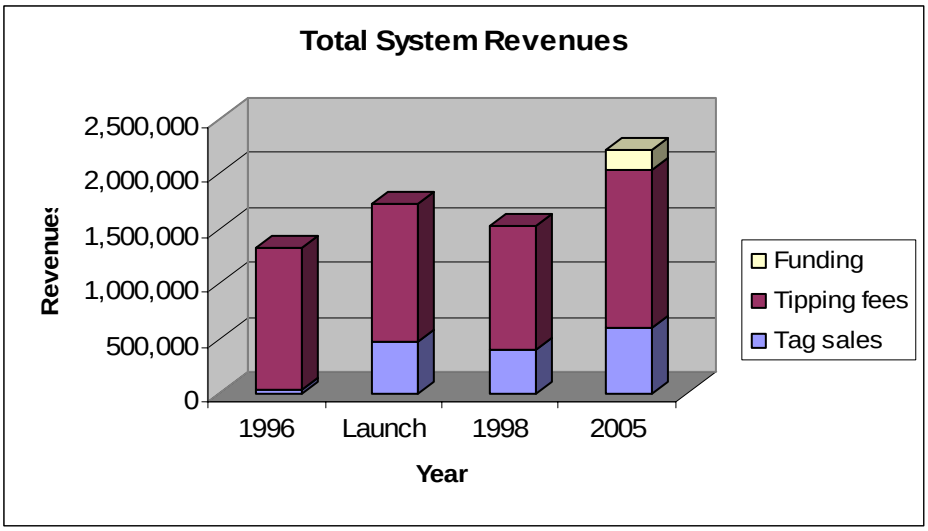


Table 3.5.3 Detailed system revenues and timelines

	1996	Launch	1998	2005
Tag sales	$31,548	$461,997	$398,954	$595,416
Tipping fees	$1,298,862	$1,267,512	$1,124,576	$1,428,271
Funding				$182,955
Total revenues	$1,330,411	$1,729,509	$1,523,530	$2,206,641
Timeline		• Tipping fee=$52.50/T • Tag=$1.20 • Bbox revenues to contractor		• Tipping fee=$58/T • Tag=$1.75 • Bbox revenues to contractor

Given that Stratford's blue box program costs remained relatively consistent through the user pay program launch period, the tonnage increase in the launch and post-launch years led to the expected reduction in unit (per tonne costs – Figure and Table 3.5.4). The substantial increase in unit cost in 2005 for blue box materials is more reflective of the new contract pricing (2001).

Gross unit costs for waste have been relatively stable since user pay program implementation, but net unit costs have seen a dramatic decline, due in significant measure to tag sale revenues.

Figure 3.5.4 Per tonne costs

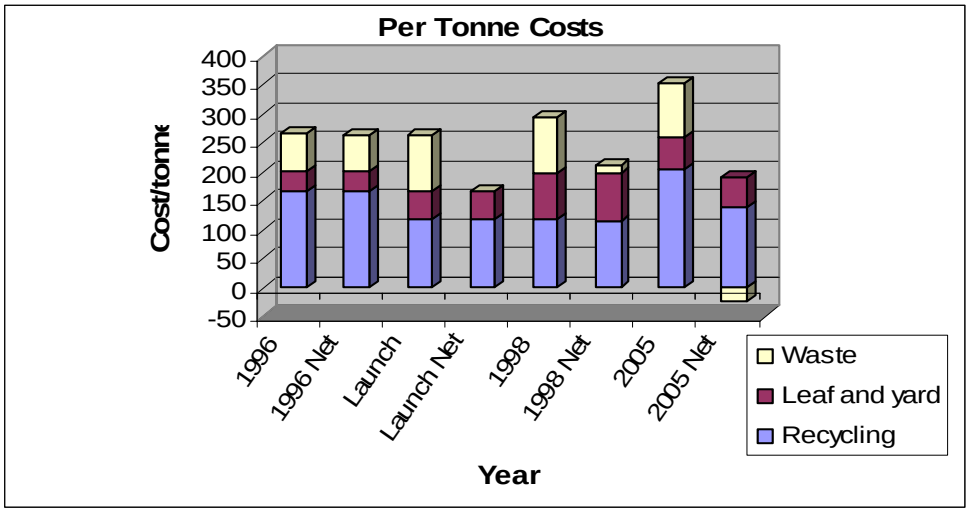


Table 3.5.4 Detailed per tonne costs

	1996 (gross/net)	Launch (gross/net)	1998 (gross/net)	2005 (gross/net/net[j])
Waste	$67 /$62	$96 / $2	$98 / $14	$94 / $-24
Recycling	$165 / $165	$119 / $119	$116 / $116	$205 / $139 /$205
Leaf and yard	$35 / $35	$47 / $47	$80 / $80	$53 / $53

3.5.3 Discussion

Given that there were no substantive changes in the waste management system (i.e., no program additions, frequency changes, new contracts, etc.), the immediate (launch and post-launch) impacts of Stratford's user pay program have perhaps been the closest fit to the 'expected' pattern in a user pay community, that is:

1. Decline in waste tonnage with introduction of user pay resulted in higher gross costs per tonne for waste;
2. Introduction of tag fee revenues to the system resulted in lower net costs per tonne for waste, and
3. Increase in recycling tonnage as a result of user pay resulted in lower per tonne costs for blue box collection/processing – a concrete example of the elusive 'next least cost tonne.'

The financial impacts of the introduction of user pay on total waste management system costs can be summarised as:

1. Reduction (37%) of total net system costs over the launch and immediate post launch period;
2. Reduction in total tonnes managed, and
3. Reduction in unit costs for new tonnes in the blue box.
4. Stratford's total tonnage (waste and diversion) is still lower in 2005, despite a single family household increase of 11% since 1996, with a total net system cost decrease of 53%, tag sale revenue offsets and sustained decrease in waste tonnages. The total net[/] (WDO funding removed from 2005 recycling) decrease was somewhat less (28%), but still noteworthy.
5. Summary of impacts on Stratford's blue box program:

	Post-launch year	% increase/decrease over pre-launch year
Tonnage	2,083T	+49%
Gross cost	$242,631	+5%
Net cost	$242,631	+5%
Unit cost	$116/T	-30%

3.6 The Town of the Blue Mountains

The Town of the Blue Mountains introduced its partial user pay program in October, 2003. Residents can set out one bag or container as part of the service, and the second bag or container must be tagged. Cost per tag is $1.00. Note that two bags/containers are the maximum limit of waste allowed at setout – additional bags/containers will not be collected. At the same time as the user pay program launch, weekly curbside blue box collection was also introduced. Tubs/lids, bottles and polystyrene were added to the blue box program at this time. The previous blue box program had been depot-based.

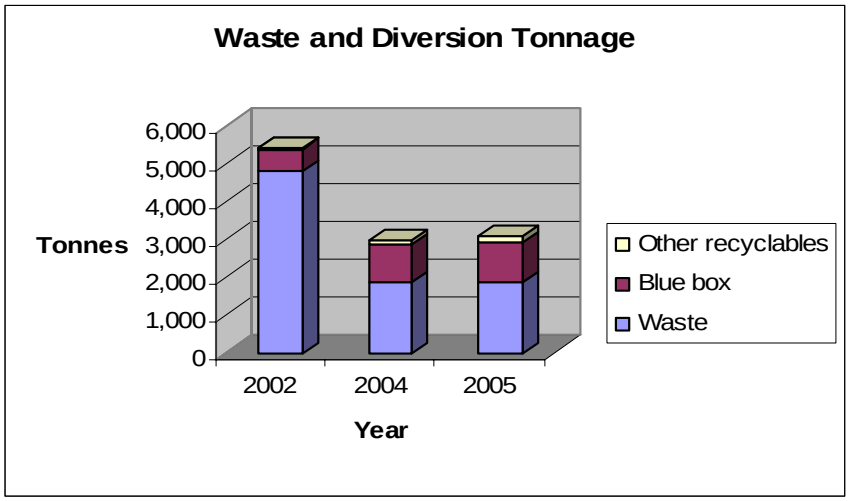
Garbage collection frequency was made weekly for all areas in the Town (prior to user pay, rural areas had bi-weekly waste collection). Because the user pay program was introduced so late in 2003, for the purposes of this study, 2004 has been used as the launch year.

3.6.1 Impact on Waste and Diversion Tonnage

Prior to the use of scales at the landfill site in 2003, waste tonnage had been estimated based on volume. Thus the dramatic reduction in waste in the user pay launch and post launch years (61%) may be partially attributed to the shift from volume estimation to actual weights.

Blue box tonnage increased significantly in the launch year (77%), compared with the pre-launch year, and increased a further 6% in the post launch year. Per household capture of blue box materials was 101 kg in the pre-launch year, increasing to 176 kg/hhld in 2005, the post-launch year.

Figure 3.6.1 Waste and diversion tonnage



3.6.2 Impact on Costs and Revenues

Table 3.6.1 provides an overview of the system impacts during the user pay implementation period. Comparison is made with the pre-launch year:

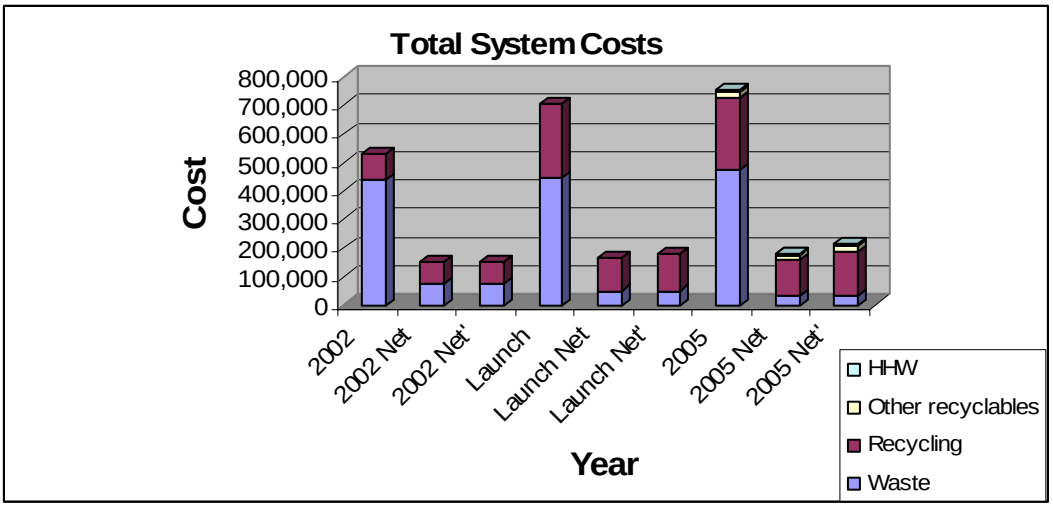
Table 3.6.1 Overview of user pay on waste management system costs

System component	Tonnage	Gross cost	Net/ Net[/] cost	Per tonne cost (gross/net/ net[/])	Cost/revenue drivers
Waste Launch year	↓	↑	↓	↑ / ↑	**Savings:** • Waste tonnage reduction: avoided collection/ disposal costs **Revenues:** • Tag sales and tipping fees greatly offset costs
Post-launch year	↓	↑	↓	↑ / ↑	

System component	Tonnage	Gross cost	Net/ Net' cost	Per tonne cost (gross/net/ net')	Cost/revenue drivers
Bbox Launch year Post-launch year	↑ ↑	↑ ↑	↑ / ↑ ↑ / ↑	↑ / ↑ / ↓ ↑ / ↓ / ↑	**Costs**: • Move to curbside program and higher tonnage drive cost increase **Revenues:** • Material sales and WDO funding offset cost increase
Other diversion Launch year Post launch year	↑ ↑	N/A N/A	N/A N/A		
Overall WM system Launch year Post launch year	↓ ↓	↑ ↑	↑ ↑		**Costs:** • Increased gross costs driven largely by Bbox program **Revenues:** • Tag and material sales, tipping fees offset cost increase

Blue Mountains' total gross system costs have increased steadily over the user pay implementation period, driven largely by the increased cost of curbside recycling introduced in the user pay launch year. Gross waste collection costs have remained relatively stable over the three year period (Table 3.6.2).

Figure 3.6.2 Total system costs



Net waste management system costs, on the other hand, paint a very different picture. Despite the introduction of curbside recycling and move to weekly from bi-weekly waste collection in the rural areas of the community, net system costs increased by only 9% in the user pay program launch year, and a further 12% in 2005 (18 and 20, respectively for net' costs). The cost buffering effect was due in large part to the greatly increased revenues from blue box material sales and the year over year increase in tipping fee revenues. Tag sale revenues were a relatively minor

cost offset, and it is more likely that the strict waste limit (maximum 2 bags per setout) contributed to systems savings.

Table 3.6.2 Detailed costs and timeline

	2002 (Gross/Net/ Net[/])	Launch (Gross/Net/ Net[/])	2005 (Gross/Net/ Net[/])
Waste	$440,336 / $74,130	$444,754 / $50,018	$473,588 / $29,555
Recycling	$89,514 / $76,920 / $77,929	$261,996 / $112,660 / $128,778	$253,156 / $127,214 / $158,611
Other recyclables			$19,364 / $19,364
HHW			$6,524 / $6,524
Total	$529,850/$151,050/$152,059	$706,750/$162,678/$178,796	$752,632/$182,657/$214,054
	• Depot collection of recyclables (8) • Curbside waste collection, municipal (Thornbury: weekly; Collingwood Twp: bi-weekly)	• Bag tag program launched Oct. 2003 • Contracted curbside recycling program launched • Plastic tubs/lids, bottles and PS added to program • Contracted waste collection, weekly	
• Landfill owned by municipality, operated by contractor			

As already noted, tipping fees and blue box material sales have had the most significant impact on net system costs, and both increased substantially in the launch and post launch years (Figure and Table 3.6.3). As with other partial user pay programs, tag sales in Blue Mountains are not a significant revenue source. Tag sale revenue in Blue Mountains is capped by the fact that residents can only pay for one bag of garbage per setout, to a (theoretical) household maximum of 52 tags/dollars per year.

Figure 3.6.3 Total system revenues

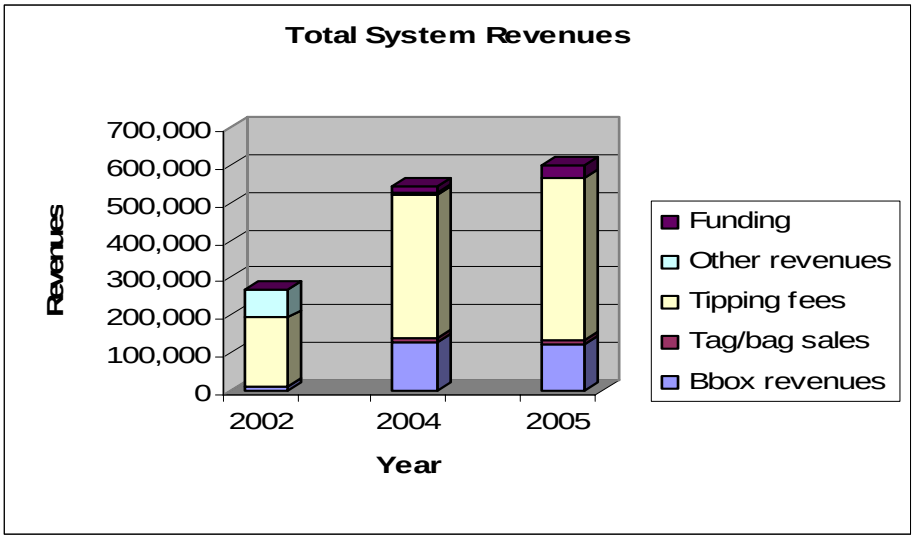
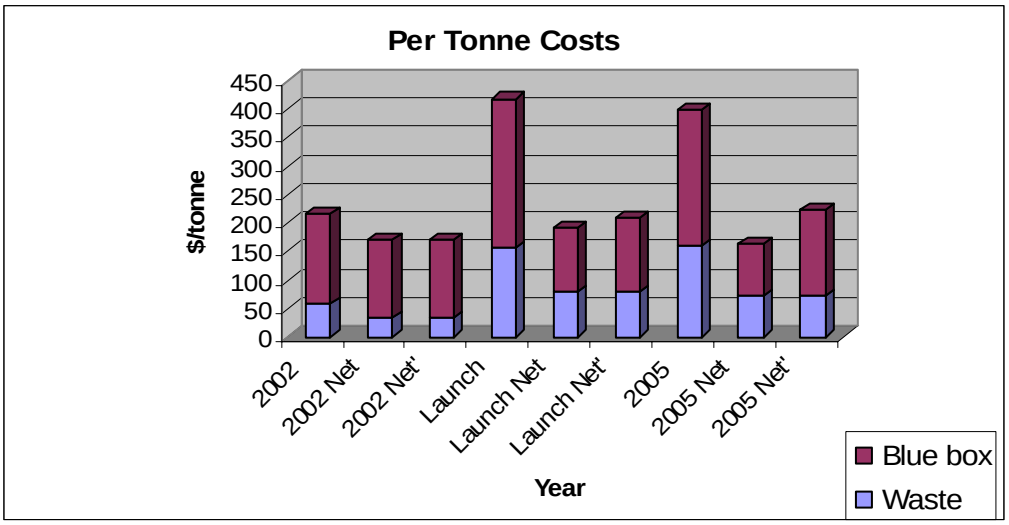


Table 3.6.3 Detailed system revenues and timelines

	2002	Launch	2005
Bbox revenues	$12,594	$133,218	$125,942
Tag/bag sales	0	$10,008	$9,042
Tipping fees	$183,037	$382,495	$432,768
Other revenues	$76,660	$2,233	$2,223
Funding	$1,009	$16,118	$31,397
Total	$273,300	$544,072	$601,372
	• Tipping fees volume based	• Tipping fees (2003 on)= $5.00 minimum charge to $98/tonne • Tag=$1.00 • Scale installed at landfill 2003 • Other revenues include bin rentals, fees/service charges, BYC sales	

The increase in blue box costs and tonnes resulting from the move to curbside collection and the motivation provided by user pay and bag limits on waste is reflected by substantially higher gross blue box unit costs. Net unit costs have declined, however, offset by increased revenues and WDO funding in the launch and post-launch years. With WDO funding taken out of the equation, however, (net'), blue box costs increased by 65% in the launch year, and 104% in the post launch year, when compared with 2002, the pre-launch year.

Figure 3.6.4 Per tonne costs



Waste tonnage decline is marked by higher unit costs (gross and net) in the launch and post-launch years.

Table 3.6.4 Detailed per tonne costs

	2002 (gross/net/net')	Launch (gross/net/net')	2005 (gross/net/net')
Waste	$58 / $34	$156 / $80	$160 /$72
Blue box	$158 / $136 / $138	$262 / $113 / $129	$240 / $91 / $150

3.6.3 Discussion

The Town of the Blue Mountains partial user pay program is a very good example of a 'self-limiting' system in that total tag sale revenues are more or less fixed by the strict waste setout limits. The combination of user pay and bag limits has created a sealed system that might be expected to drive participation in any diversion program that assists residents in keeping within their allowable waste setout limits. The concurrent move to a curbside recycling program further drives the behaviour change by making it much more convenient.

The overall financial impacts on Blue Mountains' waste management system with the introduction of user pay (plus curbside recycling and tonnage based tipping fees) include:

1. Moderate (21%) increase in total waste management system costs in the launch and post launch years, despite the move to more costly curbside blue box collection;
2. Significant (83%) increase in blue box tonnage in the launch and post launch years, with substantial net per tonne cost reduction (33%) – new tonnes at vastly reduced net costs, and
3. Dramatic drop in waste tonnage (61%).
4. Summary of impacts on Blue Mountains' blue box program:

	Post-launch year	% increase/decrease over pre-launch year	% increase/decrease over pre-launch year Funding removed (net[1])
Tonnage	1,885T	+86%	
Gross cost	$253,156	+183%	
Net cost	$127,214	+65%	+103%
Unit cost	$91/T	-33%	+9%

4.0 Conclusion and Recommendations

Prior to initiating this study, certain facts were known about the effect of user pay, or pay as you throw on a municipality's waste management system. Residential user pay programs result in:

1. A decrease in waste disposed, and
2. An increase in material diverted, particularly through the blue box.

Other facts were assumed, but not actually widely reported:

1. As waste tonnages decline (and collection/disposal) costs remain relatively constant, unit cost per tonne of waste managed generally increases;
2. As blue box and other divertable tonnage[12] increases (and collection/processing) costs remain relatively constant, unit cost for blue box and other divertables generally decreases.

Thus, implementing a user pay program could be considered the most efficient means to increasing blue box capture, and achieving that goal in the most cost effective manner.

Analysis of the system impacts in each of the six study municipalities has revealed that moving materials from the relatively cheaper disposal stream to the more costly recycling stream comes at a price. In every program studied, gross total system costs increased on user pay program launch, largely driven by higher recycling program costs. Other cost increases at program launch (e.g., tag purchase, distribution, promotion and education, customer service, program administration, monitoring) were minor in comparison.

Conversely, in the full user pay programs, net total system costs declined with the launch of user pay, as did net′ (net prime) total system costs (Woodstock). Not surprisingly, and underscoring the difference between full and partial programs, net total system costs did not decline in the partial programs. This emphasizes the buffering effects of tag sale revenues for all waste disposed. Note that removal of MOE funding from the equation (net prime) for the City of Brockville results in a decrease in total waste management system costs.

Did the move to user pay result in lower unit costs for blue box materials diverted? In some cases, yes: In Woodstock, Stratford and Blue Mountains, user pay moved substantial tonnes into the blue box, and net per tonne costs declined. In Orillia, Marathon, and Brockville, user pay also moved substantial tonnes into the blue box, but net per tonne costs increased.

It needs to be re-emphasised that only two of the programs studied, Blue Mountains and Woodstock, were launched recently enough that blue box program cost increases were offset by WDO funding. Any municipality currently considering user pay should factor this cost offset into its financial planning. Conversely, the potential financial impact on blue box programs resulting from loss of funding[13] has been illustrated in this report. Any municipality that is currently considering user pay should be aware of the potential reduction in blue box funding that may result from the cost containment measures enshrined in Blue Box Best Practices.

The results of this analysis indicate that while moving to a user pay program can increase gross waste management system costs, revenues resulting from the implementation of a full user pay program should be expected to offset these increased costs.

It is recommended that any municipality that is planning a user pay program should consider going to a full user pay program right at the launch, ensuring that tag prices generate sufficient revenues to offset potential diversion program cost increases in the short term, and so that the system has sufficient buffering capacity to accommodate longer term diversion program plans such as source separated organics.

[12] With the obvious exception of HH/HSW

[13] As experienced by those municipalities that launched their user pay programs in the mid 1990's

4.1 Study Limitations

It has been noted that “the next least cost tonne is the one that is currently going in the garbage,” and yet the present limited methods for accounting disposal vs. diversion costs do not support this. Budget figures for disposal, even accounting for long term considerations such as post closure landfill costs, site search/development, and facility construction consistently fail to factor in any of the externalities that should be included in a full cost accounting for waste collection and disposal, be they environmental, social or even political costs.

For this reason, and given that the present study was constrained by conventional accounting practices, a diverted tonne often costs more than a disposed one. Because user pay shifts tonnage from disposal to diversion, the costs for the total waste management system are often seen to increase. A true and full cost accounting would paint a very different picture.

In addition, it was found that there were a number of variables that had an impact on component program and total waste management system costs in the study municipalities. These include, but are not limited to, the conclusion of the MOE blue box subsidy in the mid 1990’s, and the start of WDO funding for blue box programs in 2004. These factors had substantial impacts on blue box program costs, particularly for programs such as those in the present study that experienced blue box tonnage increases as a result of user pay.