

2017 Waste Management Benchmarking and Performance Monitoring Report

Overview

The 2017 Waste Management benchmarking report is comprised of three key areas for performance measurement:

- Resource Productivity & Recovery Authority (RPRA) Residential Waste Diversion Rate;
- Blue Box Recycling Plan Performance Measures and Targets; and
- Municipal Benchmarking Network Canada (MBNC) Performance Measures.

For each area/parameter, Niagara's target, the current value and how it compares to the target and other municipal comparators (where available) are described. The parameters reflect industry standard measurements for program or system performance, cost effectiveness and efficiencies.

Benchmarking and Performance Results

1. RPRA Residential Waste Diversion Rate

Niagara's Target: 56% by 2016 and 65% by 2020

2017 Value: 57% in 2017

Variance to Target: Target achieved

Benchmarking Result: Niagara is above the provincial and comparator group averages of 52% and 50%, respectively.

The RPRA residential waste diversion rate is calculated based on tonnes diverted in the following main categories:

- Recyclables material stream, which consists of marketed Blue Box material, electronics, scrap metal, construction/demolition material, asphalt shingles and other miscellaneous categories;
- Green Bin organics and leaf, yard and branch material; and
- Other material, which is primarily comprised of a RPRA calculated tonnage credit for grasscycling/grass ban, deposit-return, tires and backyard composting.

In 2017, Niagara generated 200,769 tonnes of residential solid waste, which was an increase of approximately 5.2% compared to 2016. However, as illustrated in Table 1, using the RPRA methodology, which allocates additional multi-residential disposal tonnages to Niagara, the 2016 and 2017 adjusted tonnages were even higher at 191,341 and 201,273 tonnes, respectively.

Table 1 - Residential Material Diverted as a Percentage of Total Solid Waste Generated in 2016 and 2017 (*using revised 2012 methodology, which adjusted disposal tonnage)

Residential Waste Stream	2016		2017	
	Tonnes	Percent of Total Waste	Tonnes	Percent of Total Waste
Total Generated	191,341*	100%	201,273*	100%
Waste Disposed	84,688*	44%	87,553*	43%
Material Diverted	106,653	56%	113,720	57%

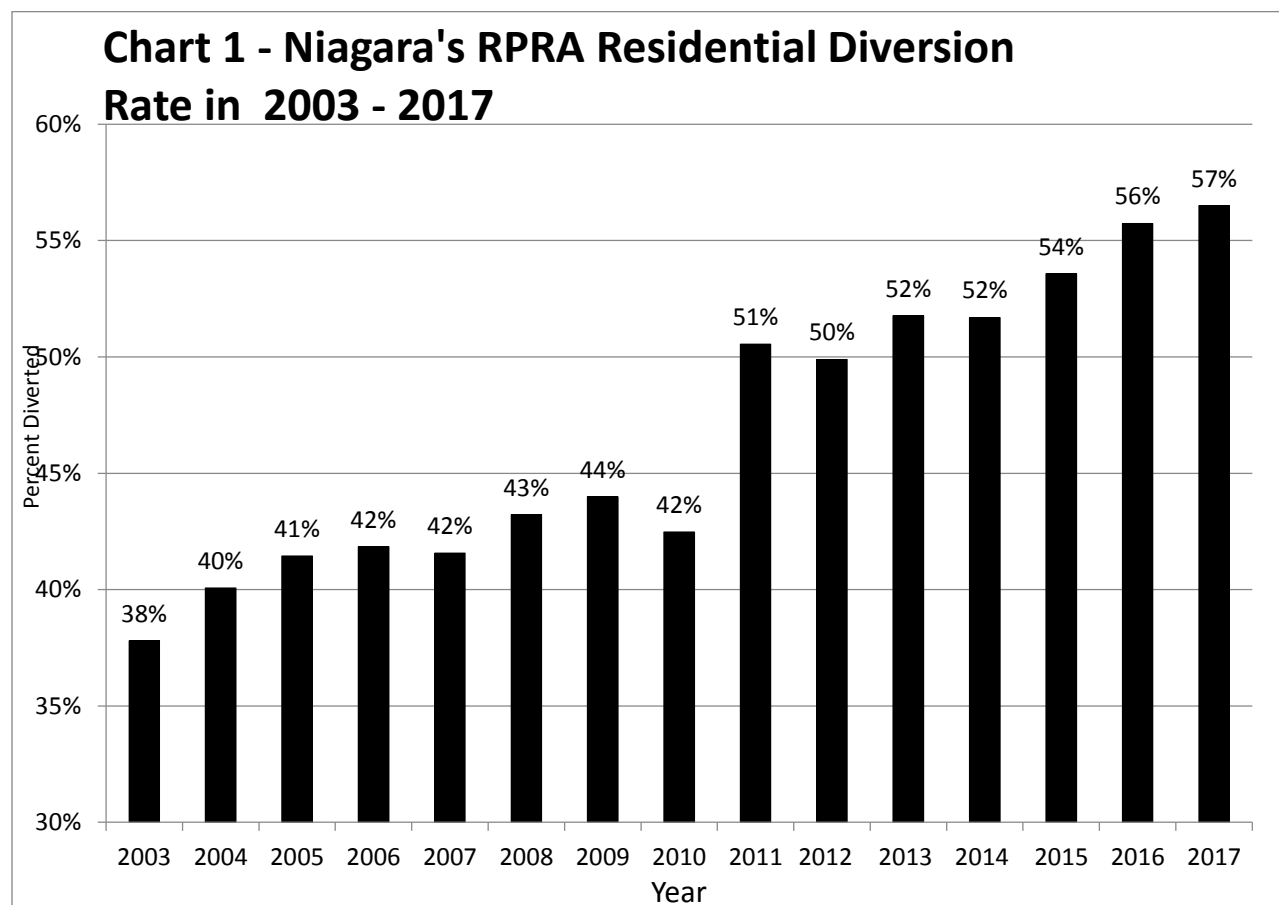
For comparison, Table 2 provides the residential generation rate per capita for Niagara's comparator group. The majority of municipalities have seen increases at least once from 2011 to 2014. However, all municipalities saw a decrease in 2015 and 2016. In 2017, over half of the municipalities increased slightly from their 2016 level.

Table 2 - RPRA Residential Generation Rate Per Capita

Municipality	2017 Kg/Cap.	2016 Kg/Cap.	2015 Kg/Cap.	2014 Kg/Cap.	2013 Kg/Cap.	2012 Kg/Cap.	2011 Kg/Cap.
Large Urban							
Halton Region	372	375	389	413	406	412	411
Hamilton	415	397	405	419	411	407	406
London	409	399	407	405	401	398	401
Peel Region	360	361	362	368	366	366	382
Toronto	283	280	296	310	317	319	323
York Region	314	316	326	336	328	342	335
Large Urban Average	330	327	337	349	348	352	355
Urban Regional							
Durham Region	376	377	380	385	378	380	383
Essex-Windsor	404	391	399	395	399	399	404
Niagara Region	439	427	435	442	437	438	421
Ottawa	362	352	362	367	372	366	390
Simcoe	476	473	475	465	461	469	413
Waterloo Region	329	330	347	346	354	348	355
Urban Regional Average	385	379	387	389	390	389	391

The overall trend in Chart 1 shows an improvement in Niagara's RPRA residential waste diversion performance between 2003 and 2017. Niagara's diversion rate of 57% increased by 15% compared to 2010, primarily due to the new collection service levels that were launched on February 28, 2011, as part of the new collection contract. The services and associated policies that increased diversion, through enhanced programs and behavioural change incentives, included:

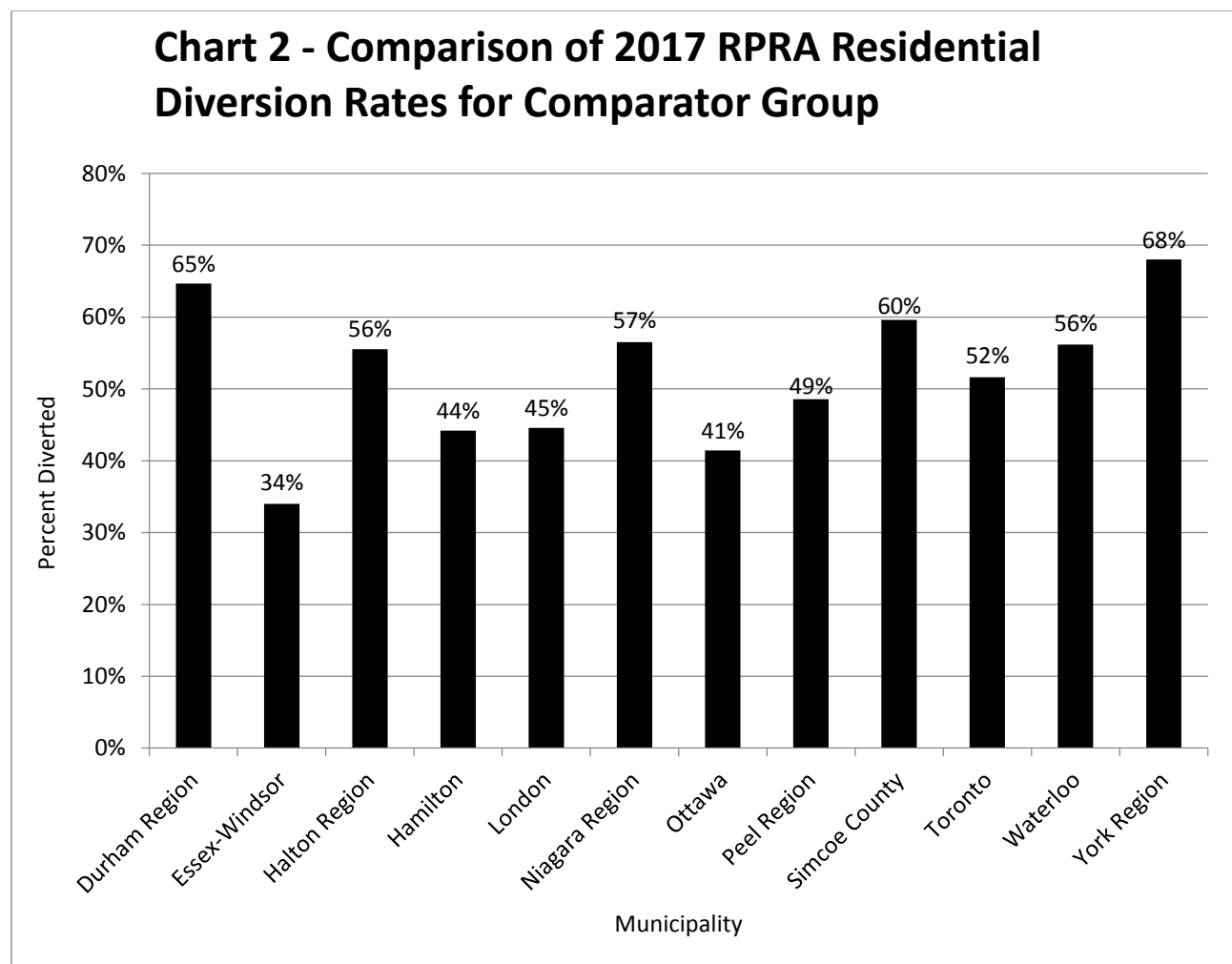
- Collection of both Blue and Grey Box material every week;
- Multi-residential recycling program;
- Green Bin organics program expansion to Wainfleet and West Lincoln and to multi-residential buildings up to six units across the Region;
- Reduction in garbage limits for households - one garbage container (bag/can) limit per residential unit (to a maximum of twelve containers);
- Increase in the cost of the garbage tags from \$1/tag to \$2/tag to reflect full cost recovery;
- Initiation of a partial construction and demolition (C&D) depot diversion program; and
- Addition of plastic containers and rigid plastic packaging with the numbers 3 and 7 and non-numbered to the Blue Box Program (all plastic containers and rigid packaging are now accepted).



The 2017 diversion initiatives that were implemented include the following:

- Unlimited recycling and organics collection at industrial, commercial and institutional and mixed-use properties outside designated business areas;
- Reusable materials drop-off depot at Niagara Road 12 Landfill; and
- Multi-Residential Recycling Ambassador Program launch.

Chart 2 below illustrates the 2017 RPRA residential waste diversion rates for Niagara and its eleven municipal comparators, which have a population greater than 250,000.



York, Durham, Halton and Waterloo have some of the highest diversion rates, which are generally attributable to every-other-week garbage collection. Simcoe County's diversion rate was also reported to be one of the highest at 60%, with a weekly one container garbage limit parallel to Niagara's program, and a very strong C&D depot recycling program.

Niagara is above the 2017 provincial average of approximately 50% diversion and higher than the average of the municipal comparator group, which is approximately 52%. In terms of ranking, Niagara is the 4th highest rate in the comparator group.

For comparison, Table 3 provides the residential diversion percentage by diverted material stream for the six top performing municipal comparators, including Niagara, based on 2017 RPRA data.

Table 3 - RPRA Residential Diversion Percentage by Material Stream for 2017 for Top Performers in Comparator Group								
Municipality	Deposit Return	Reuse	On-Property ¹	Blue Box	Other ²	Organics	MHSW	2017 Diversion Rate
York Region	1.75%	0.00%	4.14%	17.30%	12.28%	32.20%	0.35%	68.01%
Durham Region	1.47%	2.39%	5.24%	17.30%	16.86%	20.87%	0.52%	64.65%
Simcoe County	1.14%	0.05%	3.23%	15.88%	20.71%	18.21%	0.41%	59.63%
Niagara Region	1.26%	0.75%	5.28%	18.22%	7.48%	23.04%	0.47%	56.50%
Waterloo Region	1.68%	0.00%	6.41%	18.48%	2.83%	26.44%	0.34%	56.17%
Halton Region	1.48%	0.01%	4.27%	20.91%	4.45%	24.09%	0.34%	55.55%
Toronto	1.94%	0.00%	4.22%	15.46%	3.30%	26.44%	0.27%	51.64%
Comparator Group Average								52.08%
RPRA Ontario Average								49.68%

Notes:

- 1) On property includes backyard composting and grass-cycling
- 2) Other includes recyclables such as Waste Electrical and Electronic Equipment (WEEE), tires, and construction and demolition (C&D) materials

In Table 3, the organic material stream shows a wide range of diversion percentages (lowest being 18.21% in Simcoe to the highest at 32.20% in York), with the majority of the municipalities being above Niagara's rate of 23.04%. York, Halton, Toronto and Waterloo's higher organics diversion rates may be attributable to providing every-other-week garbage collection.

Another significant observation from Table 3 is that Simcoe County has an exceptionally strong C&D depot diversion program (included in Other Recyclables) of 20.71%, which is an anomaly compared to the other top performers.

The experience in the top performing municipalities, supplemented by the results of historical waste audit data for Niagara's low density residential sector, demonstrate good potential for future diversion growth in Niagara's organics program or potential for food waste reduction through the Ontario Food Collaborative.

Future increases in Niagara's residential diversion rate are expected to trend towards meeting the 2020 target of 65%, with the implementation of smaller diversion initiatives and continuation of the extensive Social Marketing and Education Plan, as outlined in WMPSC-C 2-2019.

Planned 2018-20 diversion initiatives include:

- Multi-residential textile diversion pilot program (2018-19);
- Porcelain and mattress recycling programs at the Region's landfill drop-off depots (2018-19);
- Bridge Street, Humberstone and Niagara Road 12 Drop-off Depot improvements and continued encouragement of separation of loads at the Region's drop-off depots to facilitate increased diversion (2018-20);
- Proposed Collection Service Options Stakeholder Consultation (2018-19); and
- Continued participation in the Ontario Food Collaborative and implementation of a Niagara Region specific food waste reduction strategy (2018-20).

Drivers, such as every-other-week garbage collection or provincial policy changes (i.e. extended producer responsibility, organics diversion strategy), will likely be needed to instigate more substantial diversion rate increases, particularly in the organics program area.

The Region is reviewing other methods to measure its waste diversion, which may be applied in future years. Metrics, such as the reduction of waste on a per capita basis, are being reviewed. Reduction (e.g. reducing avoidable food waste and reuse efforts) is difficult to measure using the traditional RPRA diversion rate calculation.

2.0 Blue Box Recycling Plan Performance Measures and Targets

The Blue Box Program's specific goals, which align with Council's objective of 65% diversion from disposal, are to increase the diversion of residential Blue/Grey Box materials from disposal and extend the life of existing landfills.

Key Blue Box Program objectives, which are related to the targets and benchmarking exercise, include the following:

- Optimizing collection and processing, in order to improve Niagara's performance factor (ratio of the program's net cost per tonne and its recycling rate) relative to other municipalities, which increases the program funding amount;
- Continuous improvement, including monitoring and reporting of Blue Box diversion successes against recycling targets;
- Facilitating the achievement of the various Blue Box Program performance measurement targets;
- Increasing program participation and recovery of Blue Box materials, while lowering residue rates; and
- Increasing level of customer (Regional service user) satisfaction.

The following section discusses Niagara's progress in achieving these goals and objectives. Niagara's 2017 program results are compared to:

- Targets set in the 2016-2021 Niagara Region Blue Box Recycling Plan; and
- Eleven municipalities that have a population greater than 250,000 for the RPRA parameters and the RPRA provincial average.

The performance measures were defined in previous RPRA best practice requirements. The measures are based on outputs from the annual RPRA datacall process and data collected from curbside waste composition studies/audits, which are completed intermittently when introducing program changes.

Baseline Blue Box Program data from 2015 and 2016 curbside waste audits, and in some cases historical trends, were used as a general basis for developing targets for the performance measures. Targets have also been established considering approved program changes, targeted communications and processing facility improvements. Other municipal data were also used as a reference for developing targets for some measures.

RPRA Performance Measures

The RPRA utilizes a standard methodology (Generally Accepted Principles or GAP analysis) for municipal waste management reporting and residential waste diversion calculations. The performance measures, which are an output of the RPRA datacall process, are described below with associated Niagara targets. Data from eleven

municipal comparators, which have populations greater than 250,000, are referenced for comparison and benchmarking purposes.

2.1 Blue Box Residue Rate

Niagara's Target:	4.2% in 2015, decreasing to 4.0% by 2018
2017 Value:	5.8% (based on residential tonnes disposed)
Variance to Target:	Target not achieved
Benchmarking Result:	Niagara is well below the Province-wide multi-stream (two or more streams) residue rate of 9.6% for 2017. The average single stream residue rate is higher at 18.8% for 2017.

Blue Box residue rate is defined as the percentage of collected Blue Box material that is rejected during processing. Residue typically includes non-recyclable material such as take-out coffee cups and other contaminants. The residue is then disposed resulting in less revenue, as the material cannot be sold to recycling end markets.

Niagara Region achieved a residential Blue Box residue rate of 1.8% in 2011 and 2012, and 1.7% in 2013 and 2014. The 2015-17 Blue Box residue rates increased from 4.5% to 5.8%, due in large part to a lack of an end market for low-value mixed plastic.

2.2 Net Cost per Tonne Marketed

Niagara's Target:	\$203/tonne in 2015, further decreasing and remaining below the average of the comparator group for each year.
2017 Value:	\$148/tonne
Variance to Target:	Target achieved
Benchmarking Result:	Niagara had the second lowest net program cost in 2017 (\$148/tonne) in the comparator group, and was well below the averages for the comparator group (\$235/tonne) and Province-wide (\$296/tonne).

A key performance indicator for the Blue Box Program is the net program cost per tonne marketed, as calculated by RPRA. This parameter includes the net cost for Niagara's Recycling Centre (i.e. processing, collection contract and program support costs (e.g. staff, promotion and education, etc.). The net cost reflects the revenue from the sale of recyclables.

As Table 4 indicates, Niagara's net residential Blue Box cost per tonne marketed was approximately \$148 in 2017, which was a 21% decrease compared to 2016. Niagara had the second lowest net program cost in 2017 and the second lowest net program cost in

2016 (\$188/tonne). Niagara was well below the 2017 comparator group weighted average of \$269/tonne and the 2017 Province-wide weighted average of \$296/tonne.

Table 4 - RPRA Net Program Cost Per Tonne Marketed in 2016 and 2017				
Municipality	2017			2016
	Blue Box Tonnes Marketed	Total Net Cost	Net Cost Per Tonne Marketed ³	Net Cost Per Tonne Marketed ³
Large Urban				
Halton Region	43,741	\$7,888,451	\$180.34	\$175.27
Hamilton	35,538	\$9,259,540	\$260.55	\$279.77
London	22,748	\$5,874,013	\$258.23	\$278.48
Peel Region	82,092	\$25,749,839	\$313.67	\$307.82
Toronto	120,692	\$53,867,953	\$446.33	\$434.40
York Region	65,618	\$16,490,060	\$251.30	\$235.04
Large Urban Average	370,430	\$119,129,856		
	Simple Average ¹		\$285.07	\$285.13
	Weighted Average ²		\$321.60	\$316.71
Urban Regional				
Durham Region	43,507	\$12,703,845	\$291.99	\$301.01
Essex-Windsor	23,534	\$3,545,614	\$150.66	\$182.22
Niagara Region	36,671	\$5,415,186	\$147.67	\$188.13
Ottawa	59,668	\$7,160,441	\$120.01	\$146.11
Simcoe	24,460	\$5,276,457	\$215.72	\$233.57
Waterloo Region	36,088	\$6,676,839	\$185.01	\$232.25
Urban Regional Average	223,929	\$40,778,383		
	Simple Average ¹		\$185.18	\$213.88
	Weighted Average ²		\$182.10	\$210.19
Comparator Group Average	Simple Average ¹		\$235.12	\$249.51
	Weighted Average ²		\$269.04	\$277.47
Ontario Grand Total (Weighted Average ²)			\$295.62	\$301.29

¹ Simple average of per tonne values.

² Weighted averages are group total costs or revenues divided by total group tonnage.

³ Niagara's program includes a wide range of materials which, in some cases, is greater than those collected by other municipalities and will increase the net cost per tonne marketed.

Niagara currently has a cost effective program in comparison to other jurisdictions. The Urban Regional group is defined as municipalities with a population greater than 250,000 and less than four people per square km.

As part of the Region's 2016-2021 Blue Box Recycling Plan, this target was re-evaluated and updated, considering more recent market conditions and other relevant factors, including various capital project efficiency improvements implemented at the Recycling Centre, such as optical sorters, aluminum separator, and a Polystyrene Densifier System to manage the polystyrene independently from mixed plastics. This produces higher revenues from the Region's mixed plastics stream.

Waste Composition Studies and Visual Audit – Program Monitoring Parameters

Waste composition studies and curbside visual audits are typically completed to measure performance changes as a result of introducing a program change or when industry stewardship funding becomes available for these activities.

A waste composition study is defined as a formal, structured process used to quantify the amount and type of waste, recyclables and organics being generated and diverted. A waste composition study, which included 170 household set-outs, was conducted across all twelve area municipalities in the fall and winter of 2010, and in the spring and summer of 2011, after the start of the new collection contract and service levels. A follow-up, four-season waste composition study was completed in 2015/2016. Both studies received CIF funding.

Visual curbside audits, which have been completed annually since 2007, provide data regarding participation and set-out rates. As part of an earlier "It Takes Three Campaign" properties were randomly audited by Waste Management interns to determine if recyclables that had been set out at the curb were being properly sorted and prepared for pick up. Door-to-door visits to each audited home have occurred in 2012 and 2013 to promote the 'Blue Box Ins and Outs' campaign. The Gold Star Recycler program was also carried out in conjunction with the audits in order to provide a visible and tangible reward, a form of thanks and public recognition for residents' waste diversion efforts. In the summer of 2014, approximately 146,700 low density residential properties across the Region were surveyed by students over a two week period. Visual audits were not completed in 2015, 2016 and 2017, due to a reallocation of intern resources. However, visual curbside audits may be undertaken in future years.

Key performance measures, which are based on visual audits and surveys, are identified below. The Blue Box capture rate is a measure that is based on waste composition study data and was measured in 2015/2016. The capture rate is defined as the amount of Blue Box recyclables set out for recycling, divided by the total amount of Blue Box recyclables set out for recycling, plus the recyclables left in the garbage.

2.3 Participation Rates

Niagara's Target: 82% from 2016 to 2021
2016 Value: 82% (2015/16 curbside waste audits)
Variance to Target: Target achieved

It is anticipated that the 2017 participation rate remained the same as the 2016 rate.

The participation rate is defined as the percentage of households on a curbside collection route who set out recyclables at least once in a consecutive two-week period.

As illustrated in Table 5, the trend has been towards an improved participation rate, which is attributable to the introduction of new services in 2011, the targeted social marketing and education campaigns and program maturity. Based on the 2015/16 Region waste audit results for the low density residential sector, the average Blue Box participation rate dropped slightly compared to the rate measured as part of visual audits, which were completed as part of the 'Blue Box Ins and Outs' campaign. However, the trend has been an overall improvement since 2011, and the target has been achieved for this measure. Minor variations may be attributable to the season and the number of households not setting out any material due to being away.

Table 5 - Blue Box Participation Rates

Waste Audits and It Takes Three Survey Period	Participation Rate
2006 - Stewardship Ontario Waste Audits	57%
2004-2007 - Region Waste Audits	58%
2010 - Region Waste Audits	71%
2010 - 'It Takes Three' Visual Survey	70%
2011 - Region Waste Audits	74%
2011 - 'It Takes Three' Visual Survey	73%
2012 - 'Blue Box Ins & Outs' Visual Audits	83%
2013 - 'Blue Box Ins & Outs' Visual Audits	88%
2014 – Curbside Visual Survey	85%
2015/16 – Region Waste Audits	82%

2.4 Set-Out Rates

Niagara's Target: 2.0 boxes (or containers) set out per hhld per week in 2016 to 2021

2016 Value: 2.0 boxes (or containers) were set out per hhld per week

Variance to Target: Target achieved

It is anticipated that the 2017 set-out rate remained the same as the 2016 rate.

The set-out rate is defined as the average number of Blue/Grey Boxes or other recycling containers placed at the curb for pick-up on a per household basis, per week. The average number of full container equivalents, in addition to the actual number of containers set-out, are included in Table 6 for the waste audits conducted between 2004 and 2016.

The average set-out was at its lowest in the 2010 audits, at one container per household, per week, and appears to be an anomaly compared to the other audit periods. The 2011 to 2016 set-out rates did improve compared to 2010, but are still generally in line with the 2006/2007 data. The larger Blue Box capacity made available in recent years may explain why there is little improvement in this parameter overall.

Table 6 - Blue Box Program – Waste Audit Set-Out Rates

Audit Period	No. of Boxes (or other Containers) Per Household Per Week	No. of Equivalent Full Boxes (or other Containers) Per Household Per Week
Fall 2004	1.3	Not measured
Summer 2005	1.2	Not measured
Spring 2006	1.4	1.3
Summer 2006	1.5	1.5
Fall 2006	1.5	1.5
Winter 2007	1.5	1.4
Fall 2007	1.6	1.3
Fall and Winter 2010	1.0	1.0
Spring and Summer 2011	1.6	1.4
Summer 2012	1.6	Not measured
Summer 2013	1.6	Not measured
Summer 2014	1.5	Not measured
Summer 2015	1.5	1.4
Fall 2015	1.3	1.1

Table 6 - Blue Box Program – Waste Audit Set-Out Rates		
Audit Period	No. of Boxes (or other Containers) Per Household Per Week	No. of Equivalent Full Boxes (or other Containers) Per Household Per Week
Winter 2016	1.4	1.2
Spring 2016	1.5	1.3

Monitoring Plan

Niagara Region's 2016-2021 Blue Box Recycling Plan was completed in 2016, as part of WMPSC-C 1-2017.

Blue Box Recycling Plan Summary

Based on the recommendations outlined in the KPMG Blue Box Program Enhancement and Best Practices Assessment Project Report, positive diversion results in other jurisdictions and stakeholder input, improvements to the Regional Blue Box Program have been implemented and other drivers to increase participation/capture rates, as part of the 2016-2021 Blue Box Recycling Plan. Every effort is being made to ensure the program is performing well (i.e. operated efficiently and in a cost-effective manner).

3.0 MBNC

A subset of MBNC parameters, which are related to cost effectiveness, are used in this benchmarking review. In 2017, Niagara was lower than the MBNC average for the following parameters:

- Operating Cost for Garbage Collection per Tonne - All Property Classes;
- Operating Cost for Solid Waste Disposal per Tonne - All Property Classes;
- Operating Cost for Solid Waste Diversion per Tonne - All Property Classes; and
- Solid Waste Average Operating Cost per Tonne - All Property Classes.

On an annual basis, Niagara's Operating Garbage Collection, Waste Disposal, Waste Diversion and Average Cost per Tonne parameters are typically lower than the MBNC average, which demonstrates that Niagara's programs are cost effective.

Table 7 contains the results for nine municipalities that participated in MBNC and are included in the RPRA comparator group (not all the RPRA municipal comparators participate in MBNC). There was a considerable amount of variation between these municipalities. The MBNC average applies to these nine municipalities only.

Table 7 - MBNC 2017 Performance Measures (for All Property Classes)				
Municipality	Operating Cost for Garbage Collection per Tonne - All Property Classes	Operating Cost for Solid Waste Disposal per Tonne - All Property Classes	Operating Cost for Solid Waste Diversion per Tonne - All Property Classes	Solid Waste Average Operating Cost per Tonne - All Property Classes
Durham Region ⁽¹⁾	\$86.34	\$135.16	\$198.05	N/A
Halton Region	\$159.06	\$55.56	\$207.68	\$209.94
Hamilton	\$142.82	\$106.33	\$185.54	\$194.43
London	\$95.21	\$26.99	\$109.53	\$69.28
Niagara Region	\$93.80	\$73.26	\$105.02	\$117.13
Ottawa ⁽²⁾	N/A	N/A	N/A	N/A
Toronto	\$129.57	\$108.70	\$372.65	\$266.13
Waterloo Region	\$164.18	\$91.45	\$157.27	\$160.55
Windsor	\$109.45	\$111.33	\$102.00	\$154.70
York Region ⁽³⁾	N/A	\$117.15	\$115.97	N/A
MBNC Average	\$122.55	\$91.77	\$172.63	\$167.45

Notes:

- 1) Durham Region does not report Solid Waste Average Operating Cost Per Tonne, as they do not have complete responsibility for all collection throughout the entire Region.
- 2) As of 2016, Ottawa no longer reports their results, as part of MBNC Datacall.
- 3) York Region does not report local municipal garbage collection information.

Some municipalities may have reported a lower cost per tonne compared to Niagara because of differences in their waste management programs (e.g. no Green Bin organics (Windsor, London); bi-weekly garbage (Durham); single-stream recycling (Halton), etc.). In addition, some municipalities do not collect styrofoam (Halton, Windsor) or film plastic (Windsor), which are more costly to process.

Conclusion

Continued improvements to Niagara's waste management programs and program performance have occurred over the last several years. Niagara has met the majority of the established targets and is generally performing better than its comparator group and/or

provincial averages. Niagara's 2016-2021 Blue Box Recycling Plan outlines potential changes to further improve performance in waste management program areas.

Benchmarking and performance reports will be completed annually, in order to compare changes in performance over time, results against targets and results against other municipal comparators. Every effort is being made to ensure Niagara's waste management system is operated efficiently and cost-effectively.