2018 Waste Management Benchmarking and Performance Monitoring Report

Overview

The 2018 Waste Management Benchmarking Report is comprised of three (3) key areas for performance measurement:

1. Resource Productivity & Recovery Authority (RPRA) Residential Waste Diversion Rate
2. Blue Box Recycling Plan Performance Measures and Targets
3. 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
2018 Value:	56% in 2018
Variance to Target:	Target achieved
Benchmarking Result:	Niagara is above the provincial and comparator group averages of 50% and 52%, 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 2018, Niagara generated 198,485 tonnes of residential solid waste, which was a decrease of approximately 1.1% compared to 2017. However, as illustrated in Table 1, using the RPRA methodology, which allocates additional multi-residential disposal tonnages to Niagara, the 2017 and 2018 adjusted tonnages are higher at 201,273 and 198,921 tonnes, respectively.

Table 1 – Residential Material Diverted as a Percentage of Total Solid Waste Generated in 2017 and 2018 (*using revised 2012 methodology, which adjusted disposal tonnage)

Residential Waste Stream	2017 Tonnes	2017 Percent of Total Waste	2018 Tonnes	2018 Percent of Total Waste
Total Generated	201,273	100%	198,921	100%
Waste Disposed	87,553*	43%	87,786*	44%
Material Diverted	113,720	57%	111,135	56%

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 2012 to 2014, and 2017. However, most municipalities saw a decrease in 2015 and 2016. In 2018, over half of the municipalities decreased slightly from their 2017 level.

Table 2 – RPRA Residential Generation Rate Per Capita

Municipality	2018 Kg/Cap.	2017 Kg/Cap.	2016 Kg/Cap.	2015 Kg/Cap.	2014 Kg/Cap.	2013 Kg/Cap.	2012 Kg/Cap.
Large Urban							
Halton Region	364	372	375	389	413	406	412
Hamilton	394	415	397	405	419	411	407
London	383	409	399	407	405	401	398
Peel Region	362	360	361	362	368	366	366

Municipality	2018 Kg/Cap.	2017 Kg/Cap.	2016 Kg/Cap.	2015 Kg/Cap.	2014 Kg/Cap.	2013 Kg/Cap.	2012 Kg/Cap.
Toronto	285	283	280	296	310	317	319
York Region	318	314	316	326	336	328	342
Large Urban Average	**328**	**330**	**327**	**337**	**349**	**348**	**352**
Urban Regional							
Durham Region	383	376	377	380	385	378	380
Essex-Windsor	406	404	391	399	395	399	399
Niagara Region	421	439	427	435	442	437	438
Ottawa	355	362	352	362	367	372	366
Simcoe	457	476	473	475	465	461	469
Waterloo Region	327	329	330	347	346	354	348
Urban Regional Average	**380**	**385**	**379**	**387**	**389**	**390**	**389**

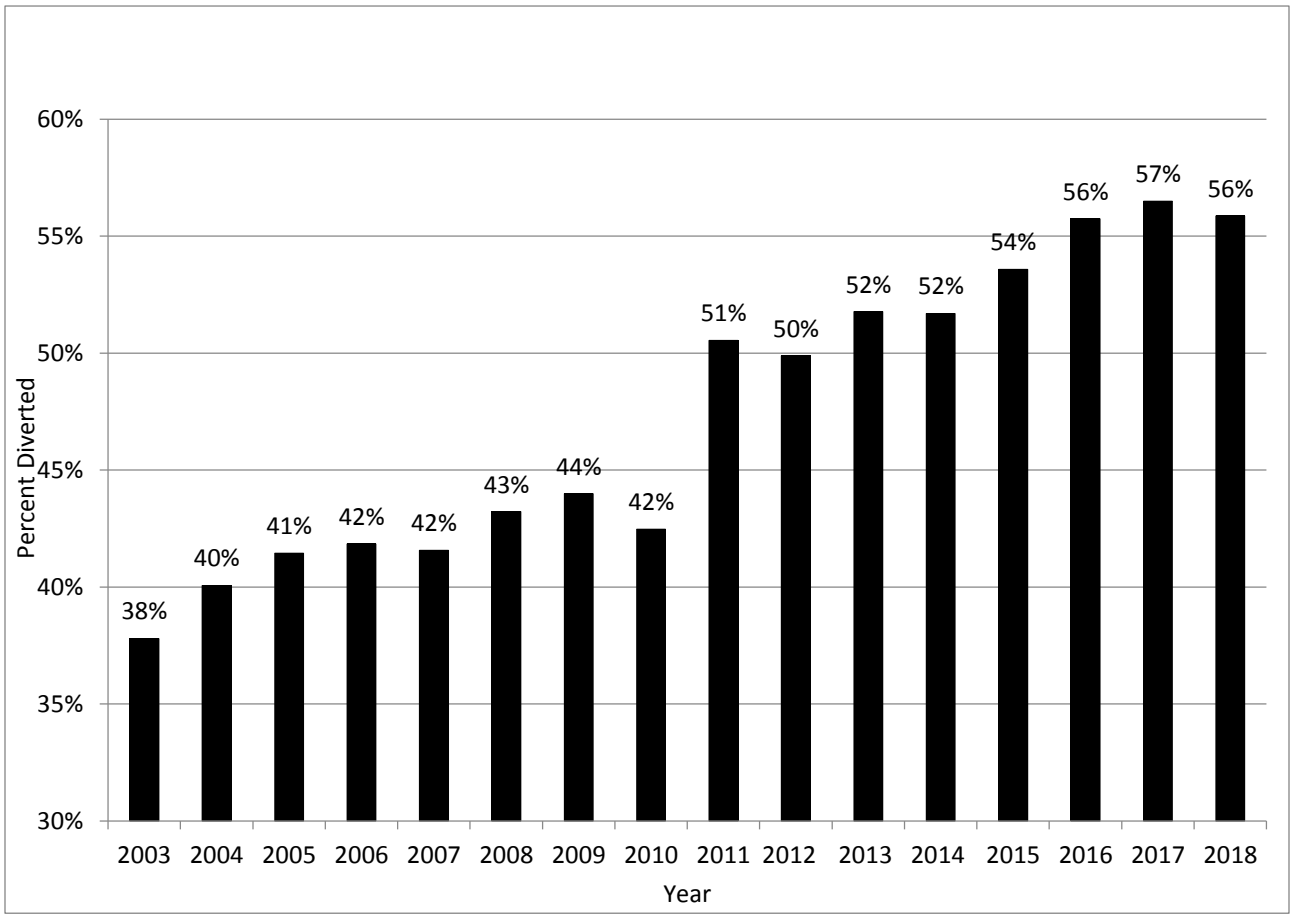
The overall trend in Chart 1 shows an improvement in Niagara's RPRA residential waste diversion performance between 2003 and 2018. Niagara's diversion rate of 56% increased by 14% compared to 2010, primarily due to the new collection service levels that were launched on February 28, 2011, as part of 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 (1) 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).

Chart 1 - Niagara Region's RPRA Residential Diversion Rate in 2003-2018

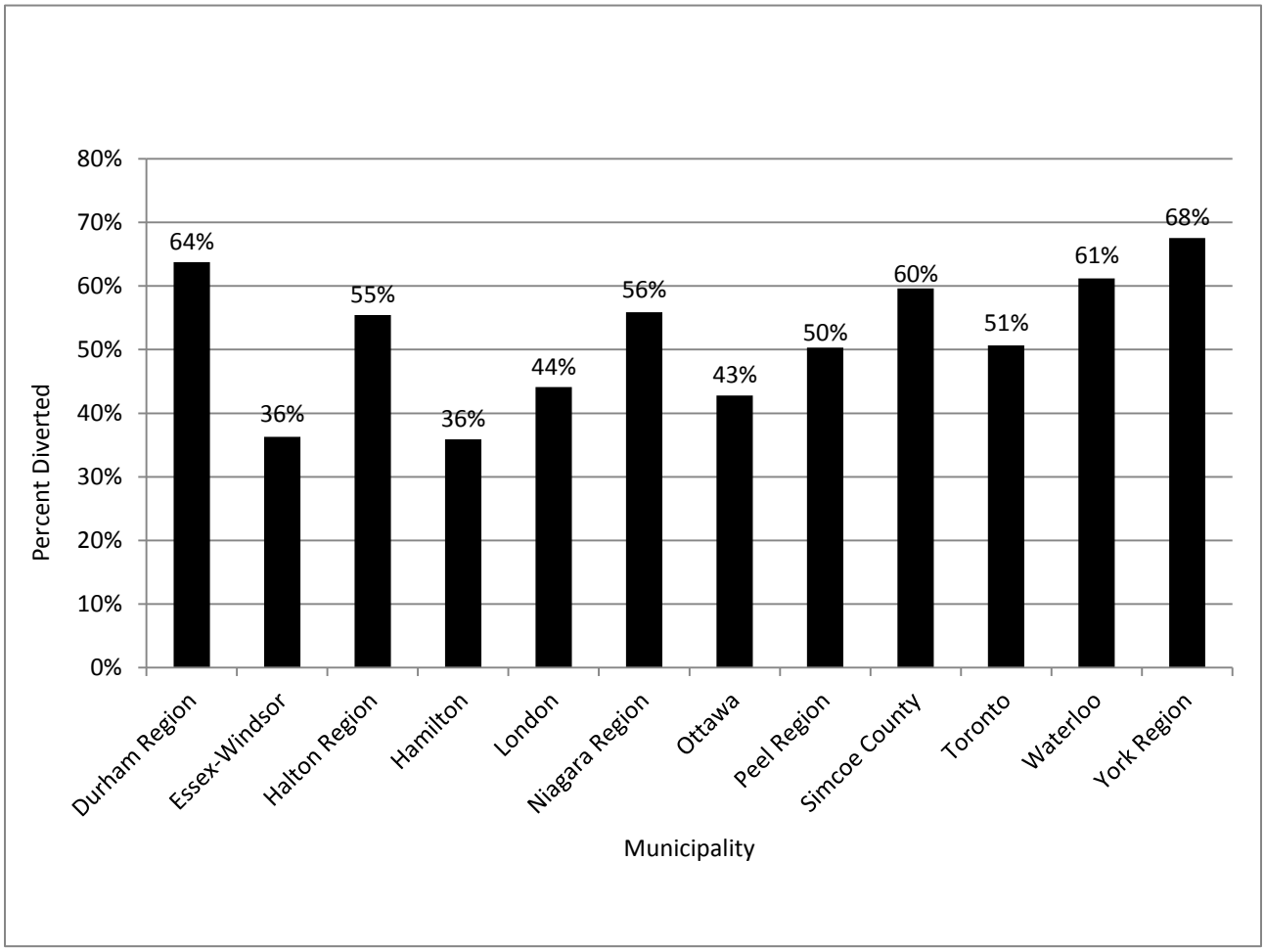


The 2018 diversion initiatives that were implemented include the following:

- Unlimited recycling and organics collection at schools, local area municipal and Niagara Regional facilities;
- Multi-residential textile recycling pilot program;
- Bottles for Charity recycling pilot program at Niagara Road 12;
- Porcelain recycling pilot program at all landfill and recycling drop-off depots.

Chart 2 below illustrates the 2018 RPRA residential waste diversion rates for Niagara and its eleven municipal comparators, which have a population greater than 250,000.

Chart 2 - Comparison of 2018 RPRA Residential Diversion Rates for Comparator Group



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 2018 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 5th highest rate in the comparator group.

For comparison, Table 3 provides the residential diversion percentage by diverted material stream for the six (6) top performing municipal comparators, including Niagara, based on 2018 RPRA data.

Table 3 – RPRA Residential Diversion Percentage by Material Stream for 2018 for Top Performers in Comparator Group

Municipality	Deposit Return	Reuse	On-Property[1]	Blue Box	Other[2]	Organics	MHSW	2018 Diversion Rate
York Region	1.73%	0.00%	4.31%	17.30%	10.75%	33.10%	0.33%	67.52%
Durham Region	1.44%	2.77%	5.27%	16.75%	15.83%	21.24%	0.47%	63.76%
Waterloo Region	1.68%	0.00%	6.32%	18.52%	2.76%	31.63%	0.29%	61.21%
Simcoe County	1.19%	0.12%	3.28%	16.46%	18.43%	19.70%	0.42%	59.60%
Niagara Region	1.31%	0.57%	5.39%	18.02%	6.65%	23.49%	0.43%	55.87%
Halton Region	1.51%	0.01%	5.07%	18.54%	2.11%	27.87%	0.32%	55.43%
Toronto	1.94%	0.00%	4.38%	12.03%	3.46%	28.63%	0.23%	50.66%
							Comparator Group Average	**51.96%**
							RPRA Ontario Average	**49.66%**

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 19.70% in Simcoe to the highest at 33.10% in York), with the majority of the municipalities being above Niagara's rate of 23.49%. York, Halton, Toronto and Waterloo's higher organics diversion rate 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 18.43%, 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 and/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 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 in addition to the service level changes to begin October 2020. However the 65% diversion target will likely not be realized until a full year of every-other-week garbage collection has been in place.

Planned 2019-20 diversion initiatives include:

- Implementation of every-other-week garbage collection, and a four (4) bulky item limit per collection, as part of the new waste collection contract (October 2020);
- Implementation of a communication strategy and public education campaign for the new waste collection contract (summer 2020);
- Implementation of waste management web/mobile application for collection day look up, collection day reminders, notifications, and item search tool (October 2020);
- Continuation of the multi-residential textile diversion pilot program (2019-20);
- Continued participation in the Ontario Food Collaborative and implementation of a Niagara Region specific food waste reduction strategy (2019-20);
- Mattress recycling program at the Region's landfill drop-off depots (2019); and,
- 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 (2020)

Provincial policy changes (i.e. extended producer responsibility, organics diversion strategy), will also 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. 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 2018 program results are compared to:

- Targets set in the 2016-2021 Niagara Region Blue Box Recycling Plan; and
- Eleven comparator 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 comparator municipalities that have a population greater than 250,000 are referenced for comparison and benchmarking purposes.

1.1 Blue Box Residue Rate

Niagara's Target:	4.2% in 2015, decreasing to 4.0% by 2018
2018 Value:	6.8% (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 9.8% for 2018. The average single stream residue rate is higher at 20.3% for 2018.

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 2015-18 residue rates increased from 4.5% to 6.8%, 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.
2018 Value:	$222/tonne
Variance to Target:	Target not achieved
Benchmarking Result:	Niagara had the fourth lowest net program cost in 2018 ($222/tonne) in the comparator group, and was well below the

averages for the comparator group ($313/tonne) and Province-wide ($374/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 $222 in 2018, which was a 50% increase compared to 2017. The main reason for the increase in 2018 was a decrease in revenue from the sale of recyclables. However, Niagara had the fourth lowest net program cost in 2018 and the second lowest net program cost in 2017 ($148/tonne). Niagara was well below the 2018 comparator group average of $313/tonne and the 2018 Province-wide average of $374/tonne.

Table 4 – RPRA Net Program Cost Per Tonne Marketed in 2017 and 2018

Municipality	**2018 Blue Box Tonnes Marketed**	**2018 Total Net Cost**	**2018 Net Cost Per Tonne Marketed [3]**	**2017 Net Cost Per Tonne Marketed [3]**
Large Urban				
Halton Region	38,780	$9,197,472	$237.17	$180.34
Hamilton	34,341	$12,051,944	$350.95	$260.55
London	21,832	$7,014,243	$321.28	$258.23
Peel Region	81,775	$30,052,636	$367.50	$313.67
Toronto	95,138	$61,075,282	$641.96	$446.33
York Region	65,812	$24,481,602	$371.99	$251.30
Large Urban Average	337,678	$143,873,178		
	Simple Average[1]		$381.81	$285.07
	Weighted Average[2]		$426.07	$321.60

Municipality	2018 Blue Box Tonnes Marketed	2018 Total Net Cost	2018 Net Cost Per Tonne Marketed [3]	2017 Net Cost Per Tonne Marketed [3]
Urban Regional				
Durham Region	43,278	$14,790,439	$341.75	$291.99
Essex-Windsor	23,158	$4,950,951	$213.79	$150.66
Niagara Region	35,855	$7,941,830	$221.50	$147.67
Ottawa	56,330	$11,522,545	$204.55	$120.01
Simcoe	24,831	$7,137,916	$287.46	$215.72
Waterloo Region	36,450	$7,286,372	$199.90	$185.01
Urban Regional Average	219,901	$53,630,053		
	Simple Average[1]		$244.83	$185.18
	Weighted Average[2]		$243.88	$182.10
Comparator Group Average	Simple Average[1]		$313.32	$235.12
	Weighted Average[2]		$354.22	$269.04
Ontario Grand Total (Weighted Average[2])			$373.52	$295.62

Notes:

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 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 (4) 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 local 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 (4) season waste composition study was completed in 2015/2016. Both studies received CIF funding.

Visual curbside audits, which have been completed since 2007, provide data regarding participation 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 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. Visual audits were not completed in 2015 and 2016, due to a reallocation of intern resources. In 2017 and 2018, visual curbside audits of Blue and Grey Recycling Boxes were completed at approximately 1,000 low-density residential households. Those audit results meeting 'perfect' or 'near-perfect' criteria were given an "I'm a Gold Star Recycler" recycling box and an informative door hanger to encourage and reward their proper set-out practices.

Key performance measures, which are based on visual curbside audits and waste composition studies, are identified below.

2.3 Blue Box Participation Rates

Target: 82% from 2016 to 2021

2018 Value: 72%

Variance to Target: Target not achieved

The Blue Box participation rate is defined as the percentage of low density residential households on a curbside collection route who set out recyclables at least once in a consecutive two (2) 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 curbside waste audit and the 2017 visual audit results, the Blue Box participation rate decreased, compared to the participation rates measured as part of previous visual audits completed, as part of the 'Blue Box Ins and Outs' campaign. However, the 2018 Blue Box participation rate improved from 2017. Minor audit 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

Curbside Waste Audits and Visual Audits	**Average Participation Rate**
2006 - Stewardship Ontario Waste Audits	57%
2004/07 – Niagara Region Curbside Waste Audits	60%
2010 – Niagara Region Curbside Waste Audits	71%
2010 - 'It Takes Three' Visual Audits	70%
2011 – Niagara Region Curbside Waste Audits	74%
2011 - 'It Takes Three' Visual Audits	73%
2012 - 'Blue Box Ins & Outs' Visual Audits	83%

Curbside Waste Audits and Visual Audits	Average Participation Rate
2013 - 'Blue Box Ins & Outs' Visual Audits	88%
2014 – 'Blue Box Ins & Outs' Visual Audits	85%
2015/16 – Niagara Region Curbside Waste Audits	82%
2017 – 'Blue Box Ins & Outs' Visual Audits	62%
2018 – 'Blue Box Ins & Outs' Visual Audits	72%

2.4 Blue Box Set-Out Rates

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

2016 Value: 1.5 boxes (or containers) were set out per hhld per week

Variance to Target: Target not achieved

It is anticipated that the 2018 Blue Box set-out rate remained the same as the 2016 rate as no significant program changes have occurred over the last few years.

The Blue Box 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 Blue Box set-out rate was at its lowest in the 2010 audits, at one (1) container per household, per week, and appears to be an anomaly compared to the other audit periods. The 2011 to 2016 set-out out rates did improve compared to 2010, but are still generally in line with the 2006/2007 data. The larger Blue/Grey Box capacity may explain why there is little improvement in this parameter overall.

Table 6 – Blue Box 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
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 Performance Measures

A subset of MBNC parameters, which are related to cost effectiveness, are used in this benchmarking review. In 2018, Niagara had the lowest cost per tonne of the majority of its eight (8) comparator municipalities for the following parameters:

- Garbage Collection Cost per Tonne;
- Garbage Disposal Cost per Tonne;
- Diversion Cost (Collection and Processing) Cost per Tonne; and
- Solid Waste Average Operating Cost per Tonne

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

Table 7 contains the results for the eight (8) comparator municipalities that participated in MBNC and are included in the RPRA comparator group (not all the RPRA municipal comparators participate in MBNC). There is a considerable amount of variation between the results of these municipalities, which may be related to differences in their waste management programs (i.e. bi-weekly vs. weekly garbage, no Green Bin program, single vs. dual stream recycling). The MBNC average applies to these eight (8) comparator municipalities only.

Table 7 – MBNC 2018 Performance measures (for All Property Classes)

Municipality	Garbage Collection Cost per Tonne	Disposal Cost per Tonne	Diversion Cost (Collection & Processing) Cost per Tonne	Average Operating Cost per Tonne
Durham Region (1)	$153.57	$117.72	$250.12	N/A
Halton Region (3)	$157.50	$49.58	$216.16	$207.17
Hamilton	$139.84	$377.14	$288.75	$411.57
London (3)	$102.15	$24.78	$128.78	$68.19
Niagara Region (3)	$87.26	$83.78	$132.81	$135.63
Toronto	$90.23	$163.87	$432.97	$307.87
Waterloo Region	$181.52	$144.92	$152.88	$191.20
Windsor	$89.75	$95.09	$180.27	$273.53
York Region (2)	N/A	$139.92	$141.82	N/A
MBNC Average	**$125.23**	**$132.98**	**$213.84**	**$227.88**

Notes:

1. Durham Region does not report Average Operating Cost per Tonne, as they do not have complete responsibility for all collection throughout the entire Region.
2. York Region does not report local municipal garbage collection information.
3. London and Niagara's Disposal Cost and Average Operating Cost per Tonne exclude the Landfill Liability amount. Halton's lower Disposal Cost per Tonne was due to a reduction in landfill operating-related expenditures

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.