Appendix H

Data Measurement Report

February 4, 2019

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1 Executive Summary

Background and Objectives

York Region is seeking to improve on how and what waste management data is gathered, tracked and reported (to council and internally). To do this, in May 2019, the Region commissioned Policy Integrity Inc. to thoroughly assess of current practices related to data gathering, performance measurement and reporting in York Region and its nine local municipal partners. The purpose of this review was to:

- Review effectiveness of current data management practices;
- Summarize and identify best practices related to data gathering, performance measurement and reporting methodology in other similar jurisdictions; and
- Make recommendations to better measure and report on progress on our waste reduction and diversion initiatives moving forward.

Data is an essential component of the SM4RT Living Plan. Collecting, analyzing and sharing data is crucial to understand current conditions, using evidence supports better operating and capital investment decisions, and determine if actions are moving the waste management system in the desired direction. Robust evidence helps to focus advocacy efforts with provincial and federal governments, and shows residents how much waste they produce and how it is being managed.

Key Findings

- York Region and our local municipalities play an important role in data collection and assessment in helping to provide a complete picture of performance.
- There is significant common ground on the importance of tracking and reporting of data:
    - Provides feedback as to what may or may not be working
    - Highlights potential issues
    - Informs day-to-day operational decision-making and planning (e.g., policies, programs, resource, infrastructure)
- York Region and our local municipalities want to continue to build and apply understanding of how collecting, combining and analyzing data efficiently from all sources can improve operations.
- The context and needs for each local municipality are different.
- The current data tracking and reporting system has deficiencies:
    - Concern over who the intended audience is for current reports and whether it is presented in a helpful manner for the specific audience
    - Interest in greater context to be provided along with data presented
    - Concern about the impact of market and legislative changes on current targets and the inclusion of leaf and yard waste in waste generation rates
    - Additional metrics may allow for better decision-making
- Data measurement should take into account trends related to recycling markets, producer responsibility requirements, climate change and concerns with weight-based metrics.

- The primary audience to report to is the Regional and local councils followed by local residents.

Recommended Actions for York Region

1. Combine the *Balanced Scorecard* and the *Annual Solid Waste Diversion Report* into one comprehensive report and expand the target audience to include both federal and provincial governments, local municipal councils and local residents.
2. Adapt the *Balanced Scorecard* to report on Regional trends, while offering a breakdown of local municipal trends grouped by population density.
3. Amend how waste reduction is measured to focus on residual waste and household organic waste. This, in turn, would entail resetting waste reduction targets to take these changes into account.
4. Continue to report on the amount of material diverted through municipal programs separately from the waste reduction / generation rates.
5. Explore the following additional metrics and consider for future reporting:
    a. Producer responsibility
    b. Accessibility
    c. GHG emission reduction
    d. Recycling efficiency
    e. Financial efficiency
6. Expand the Datacall spreadsheet to include contextual information to help explain changes to municipality's annual waste generation.

Table 1 below summarizes current reporting and next steps based on the recommendations of the report.

Table 1: Current Reporting and Recommended Next Steps

Current	Recommended (Immediate Changes)	Recommended (Within the Next 5 years)

• **Waste generation rate: kg of waste generated per capita separated by curbside streams and depot waste**
• **SM4RT Living Initiatives Metrics: Vary based on program, generally surround participation and engagement; not weight-based**
• **Diversion report includes tonnage reporting for all programs**
	• Waste generation rate: kg of waste generated per capita for residual waste and source separated organics only
	• Continue to track other diversion tonnage separately
	• Group local municipal partners by population density with separate analysis on trends
	• Combine *Balanced Scorecard* and the *Annual Solid Waste Diversion Report*
		• Explore additional metrics to align with available information and with measurement by other municipal governments, including:
		  ○ Producer responsibility
		  ○ Accessibility
		  ○ GHG emission reduction
		  ○ Recycling efficiency
		  ○ Financial efficiency

2 Introduction and Background

The Regional Municipality of York (York Region) is located directly north of the City of Toronto in Ontario, Canada. York Region covers 1,746 km^2 and is comprised of nine local municipalities: the Towns of Aurora, East Gwillimbury, Georgina, Newmarket, Whitchurch-Stouffville, Cities of Markham, Richmond Hill and Vaughan, and Township of King. In 2013, York Region and its local municipal partners developed the SM4RT Living Plan (Integrated Waste Management Master Plan), a roadmap that identifies more than 60 initiatives that set the course for waste management in the Region over the next 25 to 40 years. These initiatives include data collection, policies, and new public programs to reduce and divert waste.

Each year, progress on York Region's SM4RT Living Plan initiatives and overall system performance is reported to Regional Council through two key reports: the *SM4RT Living Plan Balanced Scorecard* and the *Annual Solid Waste Diversion Report*. Together, these reports provide information about the amount of overall material collected and processed by waste stream (e.g., household organics, leaf and yard (L&Y) waste, Blue Box, Waste Electrical and Electronic Equipment (WEEE), household hazardous waste (HHW), other diversion programs and residual waste):

- The *Balanced Scorecard* shows waste generation rates (kg/capita) for curbside and depot waste separately, and breaks it down by residential and small business. It reports on program-specific Key Performance Indicators (KPIs) such as:
    - Number of Repair Café participants
    - Number of items fixed at the Repair Café
    - Number of 'Good Food' outreach events and people engaged
    - Number of municipal textile collection bins and tonnes of textiles diverted
    - Number of curbside giveaway days
    - Number of presentations given to schools and students engaged
    - Number of multi-residential units that received promotional and educational materials
    - Number of backyard composters sold and tonnes of organics diverted as a result

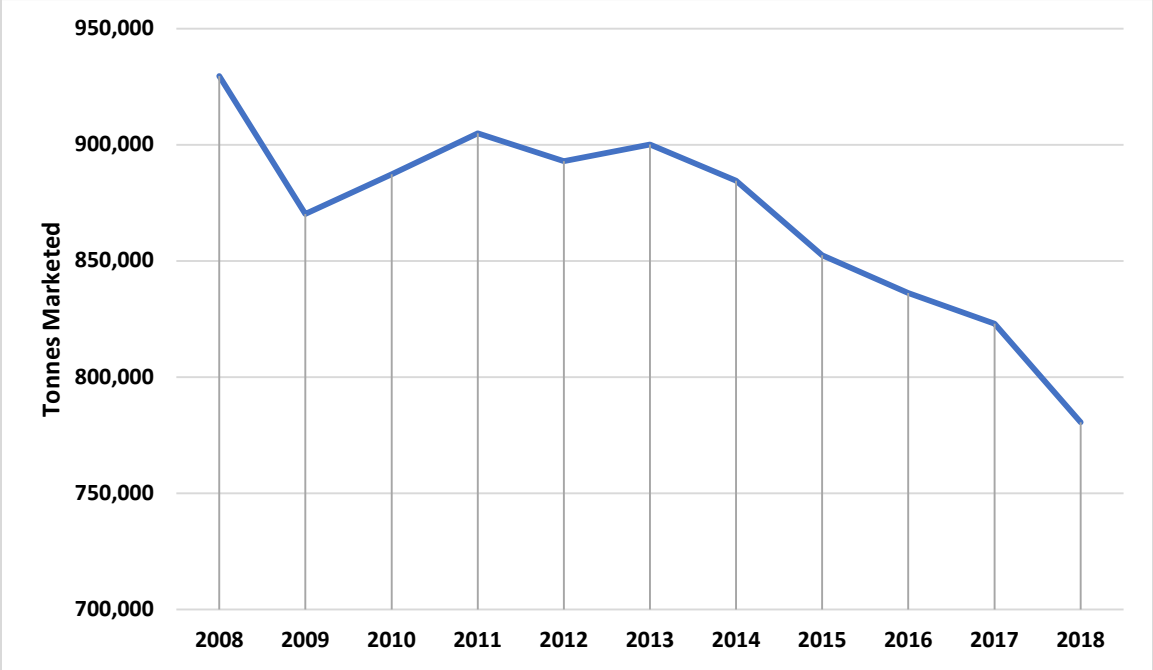
- The *Annual Solid Waste Diversion Report* reports on success of its diversion programs using a weight-based metric: tonnes collected. Other metrics it reports on include number of visits to Community Environmental Centres (CECs), number of WEEE collection events and summary of promotion and education campaigns.

While these metrics provide useful insight into the perceived efficacy of its waste management programs, a fundamental shift in the waste management sector has occurred since the SM4RT Living Plan was developed over five years ago. This shift necessitates that alternative KPIs be explored to monitor performance. These trends include:

- **The 'evolving tonne'**: Over the last decade, recycling programs around the world have experienced a dramatic shift in the mix of materials collected at the curb. These shifts include less newsprint and paper, lighter packaging, and new types of flexible packaging. Not only is the recycling stream changing, but so is the garbage stream, and even the green bin stream. This

change in the material mix, known as the 'evolving tonne', will have a significant impact on economics of municipal recycling programs for years to come. The evolving tonne is a result of packaging design changes (e.g., material substitution, light-weighting), lifestyle and societal trends that directly affect consumption of and demand for various products and packaging types (for example, more single-person households; rise of e-commerce; increasing internet usage for accessing and reading news vs. newspapers; demand for convenience; etc.). Figure 1 illustrates the change is having on the amount of blue box material marketed in Ontario with a 15% decrease over the last ten years. As each tonne continues to evolve, tracking performance and planning for the future using weight as a primary performance metric will become increasingly problematic, as weight is a continually moving target.

Figure 1: 10 Year Trend of Marketed Blue Box Tonnage in Ontario (2008-2018)



- **Growth in full producer responsibility regulations**: Over 170 regulated and/or voluntary extended producer responsibility (EPR) or stewardship programs are in place across Canada for materials such as WEEE, used oil, HHW, packaging (e.g., Blue Box), and tires. These programs remove certain materials from the municipal waste stream and require producers to be responsible for end-of-life management. Expanding EPR programs to cover materials such as carpet, mattresses and various construction and demolition (C&D) materials is expected over the next 10 years. These policies will reduce the amount of waste managed by municipalities as producers develop separate systems for these materials. The federal government and the provincial government have recently announced that implementation of full producer responsibility will be a focus in the years to come.

- **China's changing policies on imported recyclables**: For decades, the dominant market for many of the world's recycled materials was China. In 2018, China announced a ban on imports of 24 categories of recyclables and solid waste (including several plastic resins - PET, PE, PVC, PS and "other" plastics, textiles, unsorted mixed paper) and tightened its standards for impurities in scrap bales (China's standard for contamination is 0.5%). This new policy has had a dramatic impact on the recycling industry worldwide. It has led to an increased focus on reducing contamination, as high-quality material is more likely to find a market. Figures 2 and 3 show the impacts on commodity pricing, based on the Continuous Improvement Fund (CIF) Price Sheet, from 2015 to 2019 with major volatility in the markets for HDPE and a recent collapse in the fibre markets.[1] The CIF Price Sheet tracks the pricing received by municipalities across Ontario for these post-consumer commodities.

Figure 2: Polyethylene and High-Density Polyethylene Commodity Prices (2009-2019)

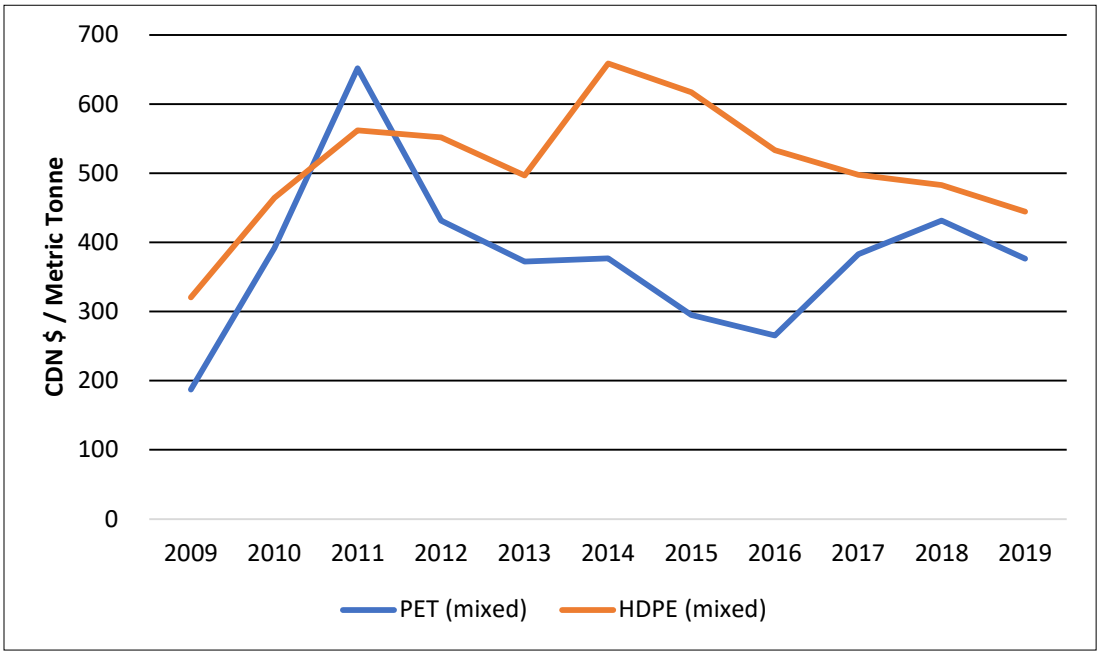
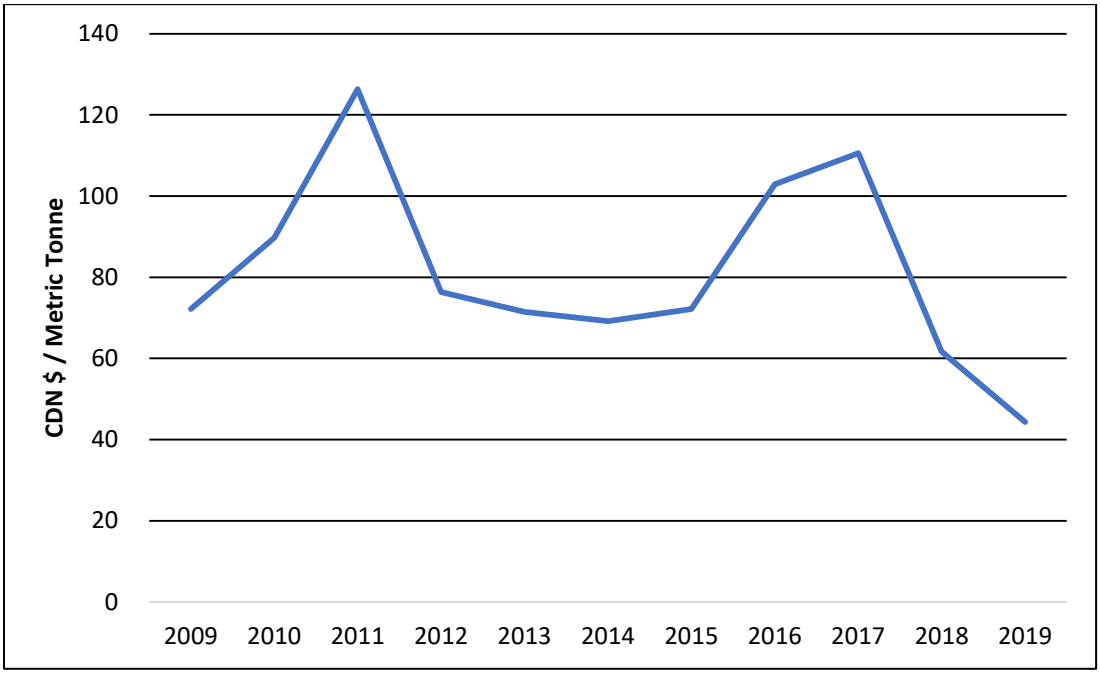


Figure 3: Newspaper Commodity Prices (2009-2019)[2]



- **Increased focus on climate change mitigation:** With increased focus on climate change, municipal waste management activities need to be considered as part of the bigger picture of large-scale mitigation of GHGs. The waste management industry influences GHG emissions in a number of ways, including direct and obvious sources of emissions like landfill gas emissions and tailpipe emissions from fleets of heavy collection trucks, but also through reduced emissions from recycling and reuse.

- **Technology and the ability to collect and manage data:** Advances in technology are making it easier and more affordable to collect and manage data in the waste management sector. This includes sensors on vehicles, collection bins and in processing facilities. These sensors allow operators to obtain more data including: weight of containers during pick-ups; time of pick-ups and GPS location of vehicles; how full a waste container is; operating procedures of drivers (e.g., safety); information about vehicles entering waste facilities (e.g., plate number, time of entry); and waste composition (via automated sorting mechanisms).

- **Densification:** As population increases in urban areas there is a need for higher density residential units; this includes medium density units such as stacked townhouses and high-density units such as high-rise apartments. There are additional challenges associated with servicing these units, they are often serviced by private sector waste collection companies as opposed to municipally operated or contracted waste collection. This can impact data captured by municipalities. It also poses challenges related to identifying ownership of waste.

In addition to the impacts of the trends noted above, the current focus on weight based performance metrics is problematic. It can result in unforeseen behaviours such as municipalities collecting heavy

materials like leaf and yard waste to increase performance, with little consideration of impacts of diverting those waste streams. As an example, grasscycling is much more beneficial than collecting grass clippings at the curb and transporting it to a processing facility. The focus on quantity (i.e., tonnage) can also mean that quality of the material stream is compromised, with low quality / contaminated materials sent to be recycled.

Needless to say, the above changes call for a rethinking of how data is managed and how success is measured. While the existing system of data collection represents a good start, advances in technology make it easier and less costly to collect and manage much more information. Changes to waste generation and management add challenges that need to be overcome.

Collecting, analyzing and sharing data is crucial to understand current conditions, to support better operating and capital investment decisions, and determine if actions are moving the waste management system in the desired direction. Robust evidence helps to focus advocacy efforts with provincial and federal governments, and shows residents how much waste they produce and how it is being managed.

This technical briefing note summarizes current practices in York Region related to data collection, performance measurement and reporting methodology (e.g., environmental, economic and social), while also capturing current opportunities and challenges. It also includes a number of recommendations for how York Region can better measure and report on progress on its waste reduction and diversion initiatives moving forward.

3 Methodology

An assessment of the current practices related to data gathering, performance measurement and reporting methodology was undertaken for York Region and its nine local municipal partners. Direct engagement (e.g., telephone interviews) with each of these entities helped to gain a better understanding of the following:

- How waste data is physically recorded (i.e., depot, curbside, other municipal facilities or operations)?
- What kind of waste data is collected (i.e., waste, recycling, reuse, litter)?
- How accurate and reliable is collected data?
- How is data reported and analyzed?
- How is data currently used to influence decisions?

Table 2 presents the list of contacts interviewed for the study.

Table 2: Municipal Contacts Interviewed as Part of Task 1 Research

Municipality	Interviewee(s)
York Region	Dennis Siu
City of Markham	Michael Dipasquale, Claudia Marsales
City of Vaughan	Kate Dykman
Town of Aurora	Al Downey, Greta Zinck
Town of East Gwillimbury	Larry Hollett, Jeff Meggitt
Town of Georgina	Rob Flindall
Town of Newmarket	Mark Gregory, Chris Kalimootoo, Amanda Romano
Town of Richmond Hill	Vlad Gaiu
Town of Whitchurch-Stoufville	Lori McNaughton
Township of King	Peyman Samimian

The project also involved a jurisdictional scan of data collection, reporting, and measurement approaches in other similar municipalities in Ontario (e.g., Peel, Durham, Waterloo, and Halton Regions, and Cities of Kingston, Ottawa, Guelph, London, and Saskatoon). For the section on recommended additional metrics, specific searches were undertaken to find examples of municipalities that reported on those recommended. This scan turned up examples in City of Leduc (AB), Regional District of North Okanagan (BC), Oxford County, City of Barrie, County of Frontenac, and Metro Vancouver (BC). A review of a number of European reports was also undertaken.

Draft recommendations were developed and discussed at a full day workshop with the nine local municipalities and York Region on October 15, 2019. Feedback from this session was used to make final alterations to the report and the recommendations.

4 Overview of Current Waste Management System

York Region's waste management system is jointly operated by the Region and its local municipal partners. The Region is responsible for transfer, processing, disposal, and marketing of end products, and for operating drop-off depots and providing programs, promotion and education services. The local municipalities are responsible for managing collection services for their respective communities, and for providing programs, promotion and education and customer service. Waste management collection services and programs vary by municipality. Some local municipalities offer special collection events for items like WEEE or HHW, and one municipality operates recycling depots.[3] Table 3 shows waste reduction and collection programs provided by each of York Region's nine local municipalities.

Table 3: Waste Reduction and Collection Programs Provided by York Region's Local Municipalities[4]

		Aurora	East Gwillimbury	Georgina	King	Markham	Newmarket	Richmond Hill	Vaughan	Whitchurch-Stouffville
Curbside Collection	Residual Waste	•	•	•	•	•	•	•	•	•
	Recycling	•	•	•	•	•	•	•	•	•
	Organics	•	•	•	•	•	•	•	•	•
	Leaf & Yard Waste	•	•	•	•	•	•	•	•	•
	White Goods	•	•	•	•	•	•	•	•	•
	Bulky Items	•	•	•	•	•	•	•	•	•
Special Events	Textile Diversion	•			•	•			•	•
	Education & Outreach	•	•	•		•	•	•	•	•
Multi-Residential Collection	Residual Waste	•		•		•	•	•	•	•
	Recycling	•		•		•	•	•	•	•
	Organics*					•		•		
	E-waste	•				•				
	Batteries	•				•				
School Collection	Recycling	•		•		•				
	Organics	•				•				
Municipal Facilities Collection	Recycling	•	•	•	•	•	•	•	•	•
	Organics	•	•	•		•	•	•	•	
	Batteries	•			•	•	•	•	•	
Public Space	Recycling	•	•	•	•	•	•	•	•	•

* Organics collection programs in mid and high rise multi-residential buildings

Most of the waste collected by local municipal partners is delivered to Region owned waste facilities or facilities under contract with York Region.

Currently, the northern six municipalities in York Region, (Towns of Aurora, East Gwillimbury, Georgina, Newmarket, Whitchurch-Stouffville, and King Township), collaborate on procuring waste collection services. Their relatively lower populations, ranging from 24,512 in King Township to 84,244 in Newmarket,[5] results in less resources available to manage waste services. In addition to achieving greater value in service delivery, the collaborative service delivery arrangement used by the northern six has generated cost savings and efficiency gains (it has been estimated that the joint solid waste collection contract will generate savings of approximately $11 million over the 10-year contract period[6]).

York Region's southern three municipalities of Markham (population 328,966), Vaughan (population 306,233), and Richmond Hill (population 195,022) have significantly larger populations and contract their waste collection services independently. Their relatively larger populations mean they tend to have more resources available to focus on waste reduction and diversion programs, and at the same time complex issues like waste contamination rates in the blue box.

5 Current Approach to Data Collection

Performance of York Region's various waste reduction and collection programs identified in the previous section is monitored by the Region and each of the nine local municipalities. Three main types of data are currently collected:

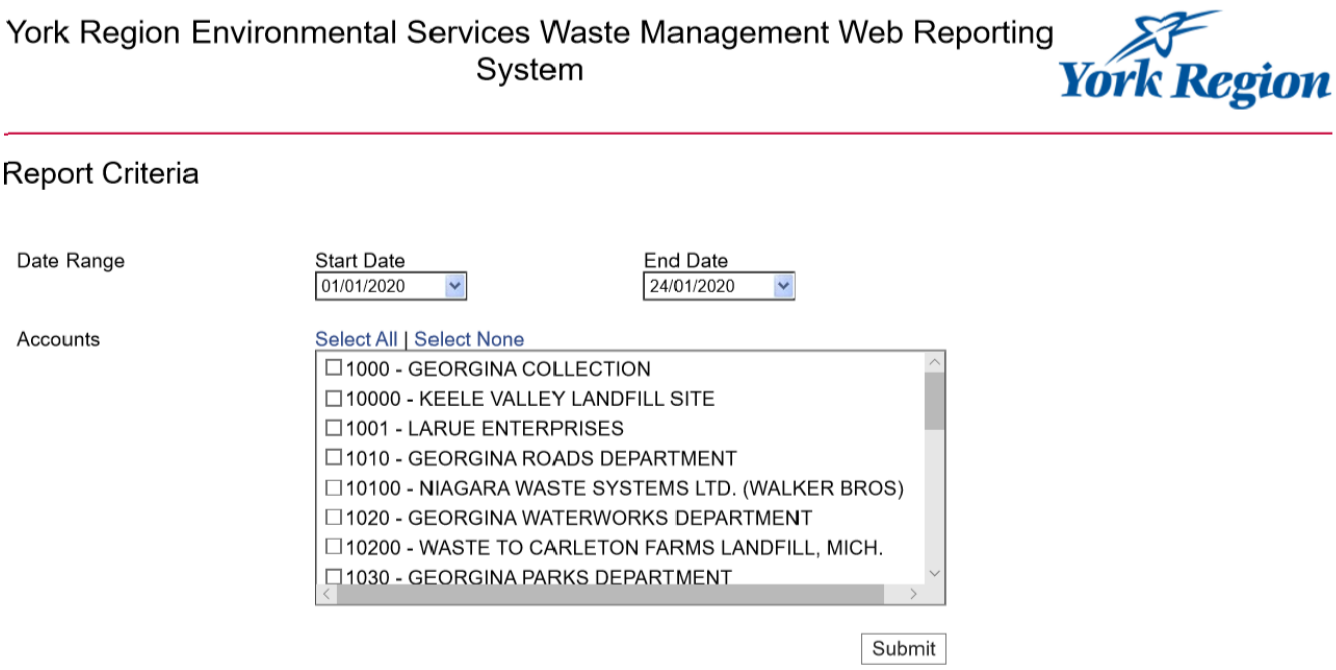
- **Weight Based Data**, which includes weight of waste materials managed by the Region and its local municipalities;
- **Operational Data**, which includes data on number of residents receiving servicing, health and safety, costing, residual rates, waste composition; and
- **Program Based Data**, which includes the amount of participants that have been involved with a program (e.g., backyard composters provided, attendees at a Repair Café or the number of queries to Bindicator)

This section explains the approach to data collection for each category of data.

5.1 Weight Based Data

Weight based data is primarily collected using the weigh scale software system at the Region's scale houses. Paradigm Software, which includes their CompuWeigh and WeighStation systems, has been installed at the Georgina Transfer Station, the Waste Management Centre, Miller Waste's Earl Turcott waste transfer station and the Region's CECs in Vaughan and Richmond Hill. Other weight-based data is collected and provided by the Region's waste processing contractors (Miller Waste's Bloomington Leaf & Yard Waste facility in City of Richmond Hill and Emerald Energy-from-Waste facility located in Peel Region). Through these systems, York Region confirms the amount of materials collected by type (e.g., Blue Box, green bin, leaf and yard waste, mixed waste, bulky goods, etc.) and generally by source (e.g., single-family residences and multi-unit residential). For some sources such as business improvement areas and schools, direct measurement of waste generated is not possible because stops are made as part of a mixed route that includes several sources. Estimates based on modelling can be made but reliability of the data may be an issue.

Figure 4: Search Capabilities through Paradigm Software package



In addition to recording inbound and outbound loads, Paradigm Software allows York Region to process financial transactions and track tonnage information for reporting, budgeting, and long-range planning.[7] It also offers capabilities for scheduled reporting, allowing the Region and its local municipal partners to receive reports on loads and make sure it is accurate by reconciling this information with invoices received by local municipal collection contractors with the Region's weigh scale tickets. The software also has tracking capabilities, allowing the Region to keep track of customer information, assignment of RFID tags to specific collection bins and trucks, and route transactions (See Figure 5). The use of RFID data and technology is used by most local municipalities in multi-residential collection, however the technology data reliability and accuracy continues to pose challenges. All municipalities in the Region have access to their waste data in the weigh scale software system.

Figure 5: Tracking Capabilities Through Paradigm Software Package

York Region Environmental Services Waste Management Web Reporting System

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Site Code	Trans Num	Bill Acct	Haul Acct	Truck	Date In	Time In	OFFENSE	OT Label	MT Label	MT Gross KG	MT Tare KG
ET	50337606	1400	2390	MW184107	02/01/2020	10:15:30	999-Not Specified	51-MARKHAM APARTMENTS	80-SOURCE SEPARATED ORGANICS	29800	17900
ET	50337610	1400	2390	MW154141	02/01/2020	10:41:57	999-Not Specified	51-MARKHAM APARTMENTS	10-SOLID WASTE	31830	17520
ET	50337620	1400	2390	MW162393	02/01/2020	12:19:00	13-Contaminated Load	50-MARKHAM CURBSIDE	10-SOLID WASTE	26513	25560
ET	50337620	1400	2390	MW162393	02/01/2020	12:19:00	13-Contaminated Load	50-MARKHAM CURBSIDE	50-COMINGLED BLUE BOX RECYCLABLES	30660	26513
ET	50337620	1400	2390	MW162393	02/01/2020	12:19:00	13-Contaminated Load	50-MARKHAM CURBSIDE	80-SOURCE SEPARATED ORGANICS	25560	17780
ET	50337624	1400	2390	MW162391	02/01/2020	12:10:26	999-Not Specified	50-MARKHAM CURBSIDE	50-COMINGLED BLUE BOX RECYCLABLES	28530	24210
ET	50337624	1400	2390	MW162391	02/01/2020	12:10:26	999-Not Specified	50-MARKHAM CURBSIDE	80-SOURCE SEPARATED ORGANICS	24210	17880
ET	50337631	1400	2390	MW124135	02/01/2020	12:42:36	999-Not Specified	51-MARKHAM APARTMENTS	10-SOLID WASTE	26910	17160
ET	50337663	1400	2390	MW112309	02/01/2020	13:37:30	999-Not Specified	50-MARKHAM CURBSIDE	50-COMINGLED BLUE BOX RECYCLABLES	29600	24900

Waste dropped off at four recycling depots managed by the City of Markham does not cross York Region's weigh scales at the point of drop-off. However, commingled blue box materials from these four Markham depots are subsequently transferred to Miller Waste's Earl Turcott Waste Management Facility and unloaded at the Region's blue box recyclable receiving area where the materials are weighed.

A small amount of waste data (likely under 1%) that the Region and the local municipal partners do not have access to including data on the amount of materials:

- Generated and/or diverted by multi-unit residential buildings that are serviced directly by private sector companies;
- Diverted through business take-back programs (e.g., textiles, bulky goods, fluorescent lights);

- Diverted through EPR and stewardship programs that do not use municipal infrastructure (e.g., used tires, used oil, WEEE, paint, batteries, cell phones, sharps and pharmaceuticals, alcoholic beverage containers deposit return system);[8] and
- Diverted in other ways, for example, through backyard composting, grass cycling, or informal reuse networks like Kijiji

York Region reports annually to the Resource Productivity and Recovery Authority (RPRA) Datacall the tonnage of Blue Box materials diverted through the Blue Box program and net costs incurred as a result of that program.

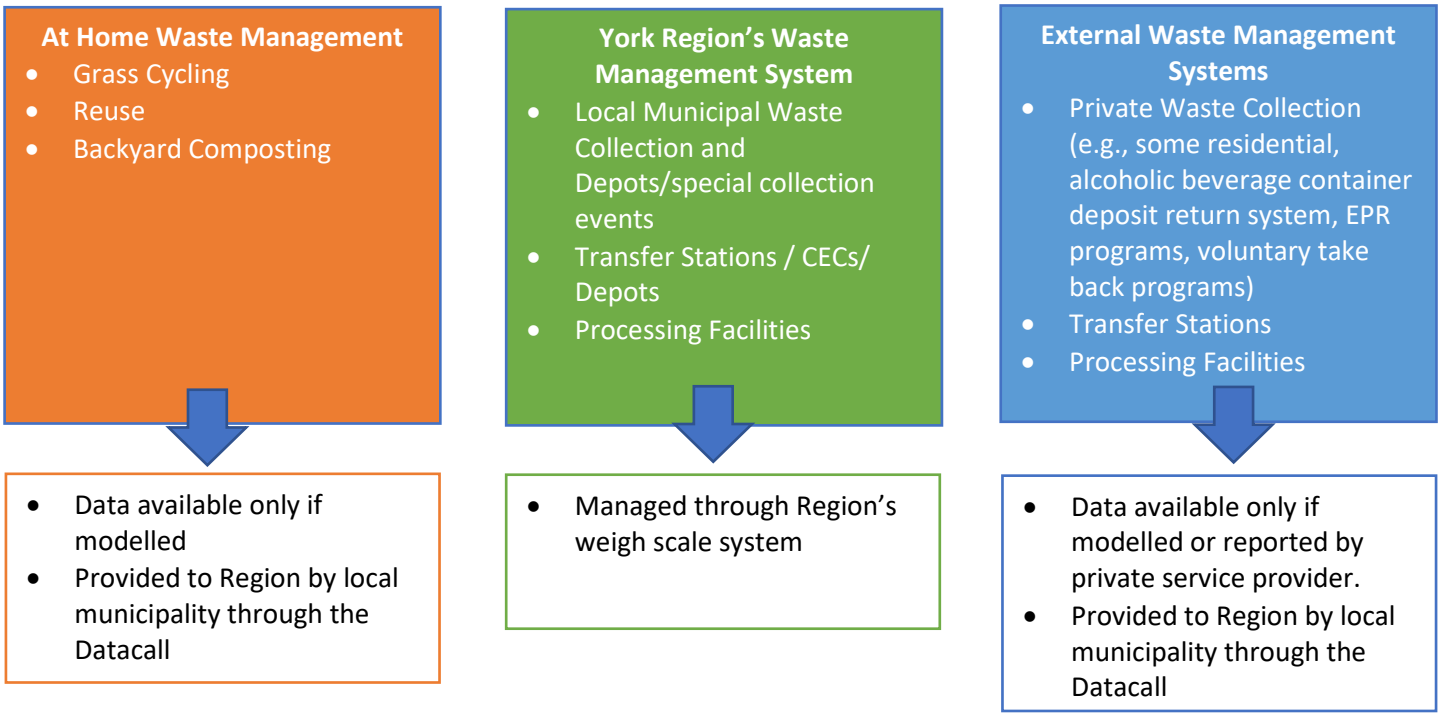
Since 2005, York Region has completed the RPRA Datacall on behalf of its nine local municipal partners. Because they do not have access to the RPRA Datacall system, York Region collects information from each local municipality using an Excel spreadsheet and then completes the entry on their behalf for a total York Region diversion number. The type of information that municipalities are required to provide include number of households serviced by the municipality's curbside collection contractor for different waste streams; percentage of non-residential waste collected curbside; cost details related to promotion and education and current blue box collection program; description of Blue Box best practice activities undertaken; curbside collection costs and depot costs. It also captures information related to the amount of other recyclables (i.e., batteries, WEEE, textiles) collected.

Because each local municipality prepares their budget documents and tracks invoices differently, verification of submitted data and record keeping is required. Each local municipality is required to obtain sign off on their Datacall submission from their Treasurer and the Region must receive a signed RPRA Certification Document before it can enter their data into the system in preparation for the Datacall.[9]

In addition to gathering information from the nine local municipalities, York Region prepares its own data on the Region's processing and disposal costs for York Region Treasurer sign off. York Region's submission includes information on all of their processors for Blue Box, organics, L&Y waste, WEEE, HHW, tires, scrap metal, and other small diversion programs.[10]

Figure 6 provides an overview of how waste materials flow within the Region and the local municipalities, and the data flows. The majority of waste generated flows through the York Region's Waste Management System, however as data is generally not available for the other two categories the exact percentages are not known.

Figure 6: Flow of Waste and Data within Local Municipalities



5.2 Operational Data

In addition to weight based data, the Region and its local municipal partners also gather operational data. This includes information on the following:

- **Program performance and cost**: This includes cost per household, residual rates related to recycling and organics diversion[11], number of complaints[12], missed collection, customer satisfaction surveys, and value of commodity outputs. This information is based on contracts with private service providers. Collection contracts are managed by local municipalities and the Region manages processing (e.g., recycling, organics processing, energy from waste, and landfill), transfer station and CECs, and HHW Depot contracts.[13]
- **Waste composition, contamination levels, and participation rates:** This data is collected through annual selective audits of single-family residences and multi-unit residential.[14] Curbside audits are completed related to participation rates but done less frequently. The Region's waste depots collect participation data using weigh scales (at the two CECs and GTS) or manual tracking (at the HHW depots).
- **Health and safety statistics:** This data is related to operation of various local and regional operations and is collected through contracts.

5.3 Program Based Data

The Region and local municipal partners collect data on various programs they operate including:

- Promotion and education programs such as Bindicator[15], Good Food Program[16], and Trash Blasters[17], and focused outreach to multi-unit residential buildings;
- Events to educate the public through presentations, workshops (e.g., Repair Café, business forums), events (e.g., curbside giveaway days) and other engagement opportunities;
- Social media and website engagements;
- Customer satisfaction to better understand concerns of residents related to overall systems; and
- Other programs such as distribution of backyard composters to residents.

Data captured through the Region and local municipal partner websites or social media accounts is relatively easy to quantify, as is distribution of backyard composters. In contrast, event related data such as curbside giveaway days can be difficult and time consuming to capture, estimate and consolidate, and accurate weight or participation data are not captured through current surveys.

5.4 Limitations Related to Waste Data Collection

Waste data is prone to issues related to accuracy and comparability. A recent report by the World Bank, entitled *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*[18], found that waste data can be unreliable for a number of reasons:

- Incomplete or inconsistent definitions
- Undefined words and phrases
- Lack of dates, methodologies, or original sources
- Inconsistent or omitted units
- Estimates based on unconfirmed or non-representative assumptions
- Difficulty with materials that flow through unconventional channels (e.g., Kijiji, Facebook Buy and Sell, returns, etc.)

Inconsistencies are also prevalent between levels of government, and as a result consolidated data varies. By way of example, reports on waste management are produced at various levels of government including:

- **Federal level**: Statistics Canada collects waste data through a biennial waste management industry survey that is sent out to both public and private waste operators in Canada.
- **Provincial level**: Provincial data related to residential waste management is collected annually as part of the RPRA Municipal Datacall process. This process is part of the Blue Box Program Plan to verify steward cost.
- **Local level**: Municipalities collect their own data and issue their own reports to Council and the public.

The recent announcement by the federal government on plastic waste[19] indicates that the federal government may be working to assist with establishing a common set of definitions and standards. However, at this point this is not available for the Region to use. See Section 7 for more detail.

6 Current Approach to Data Reporting

Each year, progress on SM4RT Living Plan is reported to York's Regional Council through the *Balanced Scorecard***,** which includes metrics on key elements of the waste management system, including waste generation rate, pilot program tracking and outreach efforts. It provides a summary of the progress toward the goals established by the Region and its local municipal partners, including the 2031 goal of reducing waste generation to 289 kg per capita, as well as a comparison of waste generation by category (e.g., residual waste, Blue Box recycling, green bin organics, leaf and yard waste and other recyclables) by each local municipal partner.

The *Annual Solid Waste Diversion Report* provides Council with information about the amount of overall material collected and processed by waste stream (e.g., green bin organics, leaf and yard waste, Blue Box, WEEE, HHW, other diversion programs and residual waste). The report includes information about promotion and education and the use of CECs. It is requirement of the Durham York Energy Centre's environmental compliance approval.

Figure 7 is a chart taken from the *Balanced Scorecard 2018 Highlights* document.[20] This chart shows how much garbage, blue box recyclables, household organics, L&Y waste, and other materials (e.g., HHW, WEEE, tires) was generated by York Region as well as each of its nine local municipalities on a kg/capita basis.

Figure 7: Page from York Region's Balanced Scorecard 2018 Highlights Report

Curbside Waste Generation Rate (kg/capita)

MUNICIPALITY	CURBSIDE COLLECTION: GARBAGE	BLUE BOX*	ORGANICS	YARD WASTE	SPECIAL PROGRAMS (Textiles, e-waste, batteries, scrap metal)	TOTAL CURBSIDE WASTE GENERATION RATE
Town of Aurora	99	78	76	38	2	293
Town of East Gwillimbury	78	71	74	38	<1	261
Town of Georgina	93	79	71	29	<1	272
Township of King	82	88	80	43	1	294
City of Markham	59	67	91	32	9	258
Town of Newmarket	83	75	73	38	<1	269
City of Richmond Hill	77	67	80	32	<1	256
City of Vaughan	88	65	83	31	<1	267
Town of Whitchurch-Stouffville	90	70	78	28	2	267
Overall Curbside Waste Generation Rate	**77**	**69**	**83**	**33**	**3**	**265**
2017 vs 2018	-1	-2	0	+2	+1	0

2031 TARGET TOTAL WASTE GENERATION RATE
289 kg PER CAPITA

Total Waste Generation Rate (kg/capita)

CURBSIDE WASTE GENERATION	YORK REGION DEPOT WASTE GENERATION RATE: RESIDENTIAL	SMALL BUSINESS	OTHER (YORK REGION TRANSIT, SCHOOL BOARDS, ROADS DEPARTMENT, N6 BIA)	TOTAL WASTE GENERATION RATE
265	21	7	6	299

Information presented in the *Balanced Scorecard* and the *Annual Solid Waste Diversion Report* is used both for internal decision-making and to inform Regional Council and residents as to the performance of the waste management system. The *Annual Solid Waste Diversion Report* is submitted annually to Ontario's Ministry of the Environment, Conservation and Parks to satisfy the Durham York Energy Centre Environmental Assessment condition for diversion reporting.[21] This waste data is submitted to the RPRA – the provincial agency responsible for regulating solid waste diversion in Ontario– annually as part of the RPRA Datacall.

7 Feedback Related to Data Approach

As mentioned in Section 2, Policy Integrity Inc. conducted interviews with the Region and the nine local municipal partners to gather feedback on York Region's current practices related to data collection and reporting. Five main comments emerged from those discussions:

1. Current approach to data collection and reporting is generally working
2. There is a need for better context related to data
3. Reports should be focused on the intended audience
4. There is a need to revisit how certain measurements are calculated

5. There is a need to explore additional metrics

Each of these are described in more detail below.

7.1 Data Collection Practices

When commenting on how data is currently collected through Paradigm and the Datacall spreadsheet, feedback was generally positive. Overall, local municipal partners found both systems easy to use and said they had access to the information they needed to inform decision-making. Although given some change over in staffing at the local municipal level, it would be helpful for the Region to ensure new staff are made aware of what data they can access.

One municipality did raise concern related to accountability of data being captured at the privately-run weigh scales at Earl Turcott. They wanted to ensure proper controls were in place to protect against tonnages being misallocated (e.g., non-contracted waste collection vehicles being assigned to the local municipalities). The local municipalities do have the ability to track waste management vehicles using GPS and audit the number of vehicle loads allocated to them through the weigh scales.

7.2 Importance of Context

As previously mentioned, the level of waste management collection services and programs vary from one municipality to another. Context is important to help decision-makers and the public better understand what the data means in relation to future actions that should be taken.

A number of municipalities raised concerns about the lack of context included in both the *Annual Solid Waste Diversion Report* and the *Balanced Scorecard*. Examples of concerns raised include:

- The southern three and the northern six municipalities are very different in terms of available resources, types of homes, access to depots, population density, etc., but the Balanced Scorecard groups them together.
- Data does not take into account the amount of small businesses that are serviced, the amount of the population that might be serviced by the private sector, the amount of waste managed from schools[22] and municipal buildings and differing demographics within each of these communities.
- Issues related to weather events that might have a large impact on the L&Y waste generated or waste related to property damage are not included.
- New programs introduced by local municipal partners and improved results are not highlighted. Meetings are booked between the local municipal partners and York Region to discuss relevant information but this could also be dealt with through an addition to the Datacall spreadsheet.
- While consolidated data is provided on the CECs, it does not provide any indication of how these facilities could be better used.

Some solutions offered by local municipal partners to enhance the context of both reports included the following:

- Illustrating municipality-specific trends and highlighting specific actions or events that may have impacted those trends.
- Grouping municipalities with similar contexts (e.g., northern six and southern three).
- Providing a breakdown of data related to each of the CECs to understand how they are currently being used (e.g., traffic volumes and main uses such as HHW management, L&Y waste, recycling, waste drop-off).
- Data could be used from RPRA Consolidated Datacall Report[23] to highlight provincial trends (e.g., light-weighting of packaging, changes to blue box material composition, diversion rates of other municipal programs).

7.3 Expand Intended Audience of Reports

Through the interviews it was discovered that many local municipal partners are unclear and confused about the intended audience for the *Balanced Scorecard*. In general, they do not find it overly helpful, other than to facilitate healthy competition between municipalities. The message as to what future actions audiences should take was also unclear.

Feedback from local municipalities suggested that the annual Balanced Scorecard and Diversion Report could provide more value if the intended audience were better defined and potentially expanded to include the following:

- **Federal and provincial governments**, which the Region advocates to in order to create a more sustainable waste management system.
- **Regional and local councils (including staff and senior management)**, which use the information to identify problems or opportunities and inform decision-making around waste management programs;
- **Residents**, to inform them about the current system and provide them with feedback that may impact behaviour, such as waste generation and the proper management of waste; and

The following suggestions were made to improve the usefulness of the *Balanced Scorecard* and the *Annual Solid Waste Diversion Report*, for all intended audiences.

- Federal and provincial governments:
    - Include information highlighting actions that each level of government should be taking to improve waste diversion (e.g., the need for full EPR such as the percentage of overall residential waste currently managed under EPR schemes and what percentage of that material is still being managed in the residential residual waste stream).

- Local decision-makers:
    - Breakout data for each local municipality to illustrate trends. This could assist local municipal partners in better understanding what is working in their community or what actions from other communities could be adapted to theirs.

    - Information on specific CECs and other depots. This could help local municipal partners to tailor messages to better incent their use.
    - Focus on areas of future policy decisions such as need for organics processing capacity or consideration of utility-based pricing.
- Residents:
    - Breakout data for each of the local municipalities to illustrate five-year trends. This data could allow the local municipal partners to use this information to directly communicate with residents what is being done well and what could be improved.
    - Specific information on key areas of interest including where we need their assistance to improve (e.g., highlight of material used in local end markets, value of commodities, contamination rates).
    - Information on how residual waste is managed (i.e., landfilled or energy recovery).[24]

Most respondents say their local Councils and the Regional Council should be the primary audience for the report. Certain elements of the report would be helpful to keep residents informed.

7.4 Revisit Certain Metrics

As noted in Section 5, the *Balanced Scorecard* includes metrics on key elements of the waste management system, including waste generation rate (kg/cap) for various waste streams and sectors including garbage, recycling, organics, L&Y waste, other (HHW, WEEE, scrap metal, tires, etc.), and small business users at depots/CECs.

Although most were satisfied with the metrics currently used in the Balanced Scorecard, some of the local municipal partners expressed concerns about how some of the current metrics are calculated. This included:

- The appropriateness of including leaf and yard waste in waste generation rates given climate is a key driver of material generated and municipalities have limited ability to control the amounts generated beyond promoting grass cycling and on-site management of yard waste;
- Whether material dropped off by small business users at depots and CECs should be included in waste generation rates if inclusion of this material is important to the functioning of CECs and depots, and if the amount dropped off may be impacted by factors outside the municipal sphere (e.g., availability of drop-off options);
- Whether the waste generation rate should include waste from the residential sector only, and if so, how should residential be defined (e.g., long-term care homes, schools, community buildings). Currently, some municipalities include schools within their residential waste while other municipalities do not;
- The use of a per household waste generation rate as well as a per capita waste generation rate to better account for different demographics within each community.

7.5 Value of Additional Metrics

When asked what other metrics could be included in the Balanced Scorecard to increase its usefulness for local municipalities, responses varied widely. A couple of municipalities suggested that financial metrics such as an all-in cost per capita or cost per household would be useful to better illustrate the value per money of the service, while others didn't see any value in including such information. A couple of municipalities felt that including a contamination rate[25] to better illustrate issues in sorting residential recyclables would be useful, especially given the current climate of the recycling industry and how contamination has become a hot topic. Related to this metric, some municipalities stated that providing a recycling rate[26] – as opposed to just a collection rate – would be useful as it would better illustrate the amount of materials actually recycled after all the contaminants are removed. At the same time, concern was raised over what would be included in the definition of contamination should this metric be added. Respondents felt these metrics could assist decision-makers and the public in helping to achieve the goals of the SM4RT Living Plan.

8 Metrics Reported by Other Municipalities

Like York Region, most municipalities collect a substantial amount of data related to waste collection, operations, and specific programs. Table 4 shows the types of data collected by municipalities across Ontario, including weight based data, operational data, and program based data.

Table 4: Types of Waste Data Collected by Municipalities Across Ontario

Category	Types of Data	Common measurements used
Weight Based	• Total waste managed • Capture rates by point of collection	• Total tonnes • kg/capita • kg/household
Operational	• Residual / contamination rates and main contaminants • Recycling rate • Cost per tonne / household / capita / stop • State of Good Repair Rating • Number of injuries/ accidents (workers/public) • Lost Time • Disability claims • Training hours • Collection (time off the road, missed collections, downtime) • Number of complaints / resolutions • Number of collection points (e.g., single family, multi-residential, institutional, business) • Commodity values • Participation rates	• % of contamination in the recycling or green bin • % of materials collected that were recycled • $ to improve and maintain infrastructure • # hours of lost time due to injuries • # of WSIB Claims • $ of WSIB Claims • % of the population within x km of a depot

Category	Types of Data	Common measurements used
	• Total visits to CECs (residents / small business) • % of households covered by municipal curbside collection programs • Accessibility	• % of single-family and multi-residential home serviced
Program Based	• Number of events / interactions • Surveys / customer satisfaction • Promotion and education • Specific program metrics (e.g., sales of backyard composters)	• # of direct impressions • Number of units distributed • Number of events held

The jurisdictional scan also revealed that while most municipalities in Ontario utilize a similar suite of public KPIs to measure the performance of their waste management programs, *what* they include in those calculations and *how* they define various metrics often differs, which makes it difficult to compare the performance of different municipalities.

City of Toronto included in their latest Long-Term Waste Plan[27] that:

The annual report card presents the opportunity to report on the current year, highlight accomplishments, and present minor adjustments. It is recommended that an annual report card documenting the performance of the waste management system be prepared in the spring of each year. At a minimum, this report card should include data on performance measures. In addition to the performance of the current year, a comparison to the baseline should be provided with commentary where appropriate to address items such as:

- Programmatic or facility changes that were implemented that could have impacted quantities managed, tonnes diverted, etc.;
- Waste generation anomalies (e.g., severe weather event);
- Changes to external influences such as changes to Provincial or Federal legislation;
- Any other internal or external factors that impacted the Waste Strategy implementation;
- Contract changes with City contracted service providers; and,
- Identification of potential trends, such as a year over year increase in waste generation that should be monitored to assess the potential for future system impacts.

This is well aligned with York Region's practices. Collaboration with Toronto and other municipalities across Ontario could help improve consistency in reporting across the province and provide context and insights on trends through cross-comparison.

8.1 Residential Waste Generation Rates

One metric that is tracked and reported on by most municipalities is the total tonnage collected through municipal Blue Box programs, Green Bin organics programs, and residual waste programs. While this is a useful metric, municipalities are interpreting and measuring residential waste generation in different ways. For example, some municipalities include:

- Only residential waste collected at the curbside and at the depot;
- Small quantities of small business waste that might be collected at the curbside or at the local depot;
- Waste collected from schools and other community buildings;
- Materials that do not leave the household (e.g. grasscycling, backyard composting, reuse);
- Residential waste collected by private entities (e.g. alcohol deposit return system, EPR programs that manage materials within or outside of municipal programs, private voluntary takeback programs, residences managed outside of the municipal waste management system).

It is important to note that the differences above are likely small from a quantitative perspective but ideally measurements should align.

Ideally the manner in which waste generation is measured should assist with the intended outcome sought:

- If the number is intended to allow the municipality to promote waste reduction, it may not make sense to include materials that are not consumed and cannot be reduced such as L&Y waste and grasscycling. It also needs to take into account the amount of waste generated that flows outside of the municipal jurisdiction (e.g., tires, WEEE, HHW, mattresses, white goods that are returned through business channels). This will increasingly be an issue if the province continues to implement full EPR programs.
- If the number is intended to measure the amount of material the municipal government is managing, one would not want to capture materials that do not enter the system.

Waste generation rates can also be reported in different ways. Toronto for instance measures waste generation on a kg/household basis, while York Region measures it on a kg/capita basis. There are benefits and challenges with each of the ways in which municipalities measure and report on their waste generation rates (see Table 5).

Table 5: How Waste Generation Rates are Presented

Measurement	Benefits and Challenges
Total Waste Generation	Allows for a comparison of trends over a period of time but does not take into account population growth or the amount of households receiving servicing
Total Waste Generation per capita	Allows for a comparison of trends over a period of time that takes into account population growth within the municipality. Municipalities often do not know the percentage of the population that is not serviced by the municipality (i.e., as

	municipalities densify, increasingly multi-unit residential buildings are serviced by non-municipally contracted collection). These numbers are dependent on Statistics Canada population projections, which are completed every four years. If projections are incorrect they can cause problems. These rates could be impacted by whether households are only serviced mid-year, and not all households serviced will be occupied.
Total Waste Generation per household	Allows for a comparison of trends over a period of time that takes into account only the households serviced by the municipality. These calculations are known based on collection contracts. The numbers could be impacted by changes in the amount of people living in one household or household size, whether households are only serviced mid-year, and not all households serviced will be occupied.

The waste generation rate is used to measure waste reduction. Some municipalities also use a more specific measurement. For example, Toronto measures food waste reduction (kg/cap) by performing waste audits that look at the composition of waste, specifically by looking at the amount of wasted food, packaged food and food waste in all waste streams.

8.2 Residential Waste Diversion Rates

In addition to tracking waste generation, a diversion rate (%) is also usually reported. This is typically calculated by dividing the tonnes collected for recycling (including organics) by the total tonnes generated (tonnes of residential waste collected + tonnes of recycling collected), but usually excludes reuse, recycling or disposal through non-municipal programs such as alcoholic beverage containers, WEEE, textiles, batteries, mattresses, appliances or other materials managed by the private sector. However, some communities like the City of Toronto[28] include a much wider range of materials in their waste diversion figures, including backyard composting, grass cycling, and deposit return materials. These numbers are modelled and included in the equation. Some municipalities also discount the amount of non-residential waste that was collected in either the recycling or disposal stream, while others do not.

8.3 Other Environmental Metrics

Environmental metrics such as greenhouse gases (GHG) avoided or GHGs related to residential waste operations, or landfill volume filled (m3/year) are other examples. The City of Toronto currently reports GHG emissions related to waste management using the Global Protocol for Cities (GPC), but it is worth noting that this does not account for the benefits (or emissions reductions) resulting from waste diversion.

York Region currently does not report annually on environmental metrics such as GHG avoided.

8.4 Financial Metrics

Financial KPIs, such as net operating cost per household or net operating cost per tonne, are another suite of indicators that some municipalities have decided to measure and report on. In the City of Guelph's *Solid Waste Resources: Business Service Review (Final Report)*[29], the City reports on the cost of providing its various waste management services, including its three-stream waste collection, public drop-off, source separated organics processing, MRF, HHW depot, transfer station, and residual disposal. Both the net service cost as well as the net cost/tonne are shown for each program. The City of Toronto also tracks and reports out on program costs, including the cost of solid waste disposal and diversion per tonne. None of the municipalities surveyed measured or reported on the costs associated with litter pick-up.

8.5 Contamination Rates

The contamination rate is another KPI that is reported on by some municipalities, but not many. This is typically defined as the percentage of material in the recycling or composting stream that is not targeted for collection and therefore is not recycled. In its 2018 Annual Report, the City of Guelph[30] reported on the amount of tonnes that were rejected at its composting facility due to contamination. In the City of Saskatoon's 2018 Integrated Waste Management Report,[31] the City reports a contamination rate separately for single-family curbside recycling collection, multi-family residential recycling collection, as well as a contamination rate for material collected at recycling depots specifically. They also track and report on recycling contamination rates by neighbourhood. It is important that the definition of contamination needs to clearly defined.

8.6 Reuse Rates

Although not tracked or reported on by many of the municipalities surveyed, reuse is another KPI that is sometimes used to measure progress towards municipal waste management goals. Durham Region reports[32] on the total tonnes of material collected for reuse in its annual waste management report, and the City of Toronto reports a combined figure for tonnes of material collected at reuse centres, depots, and Environment Days. Peel Region also reports on the tracks and reports on the tonnage of reusable goods recovered at CECs.[33]

Metro Vancouver commissioned a report in 2018 to estimate of the tonnes diverted through reuse activities. In addition to developing an estimate of reuse activities, the report provides a methodology used to prepare the estimate so that Metro Vancouver staff can replicate and expand the estimate in future years.

9.0 Recommendations

Going forward, York Region needs to continuously improve how it tracks, measures, and reports on the performance of various elements of its waste management system. As a result of the work completed as part of Technical Memo 1, Policy Integrity Inc. has developed a number of recommendations for changes to York Regions' and its local municipal partners' approach to data measurement and reporting. These recommendations are discussed in detail in the following sub-sections.

While other recommendations were considered, including the use of emerging technologies and tracking reuse, which were discussed in Technical Memo 1, these recommendations are not core to meeting the objectives of the SM4RT Living Plan in the next five years. One of the core issues with tracking reuse is that these activities occur outside of municipal activities, as a result they are resource intensive to track or highly dependent on modelling. York Region can track engagement related to reuse programs they run, however at this point tracking Regional reuse activities is not seen as feasible.

9.1 Enhanced Approach to Reporting

Recommendation 1: Expand the intended audience for the *Balanced Scorecard* and the *Annual Solid Waste Diversion Report* to include both the federal and provincial governments, local municipal councils, community partners and residents. Given the short time frame between when these reports are released it would helpful to combine them into one report.

A significant amount of time is spent developing the *Balanced Scorecard* and the *Annual Solid Waste Diversion Report*, however, these efforts do not appear to be commensurate with the value offered. By expanding the audience beyond the Regional Council to include the federal and provincial governments, local municipal councils, and local residents, the *Balanced Scorecard* could be utilized in a number of different ways (see Table 6). It is however important to emphasize the primary audiences should continue to be the Region and Local Councils followed by local residents.

Table 6: Expanding the Audience for the *Balanced Scorecard*

Audience	Objective	Means
Federal & Provincial Governments	• Illustrate provincial/federal action (or inaction) towards enacting EPR regulations • Illustrate deficiencies in federal or provincial regulations or oversight and enforcement • Provide reporting related to federal or provincial targets (e.g. Food and Organic Waste Policy Statement)[34]	• Provides the ability to submit to either level of government • Reinforces the need to continue to advocate for change that is outside the means of municipalities
Regional and Local Municipal Councils & Staff	• Provide update on progress of new and ongoing SM4RT Living initiatives', identify risks (e.g., contamination, increasing waste generation) and opportunities to be explored	• Continue to report through both Regional and Local Municipal Councils • Additional trending data for each municipality will allow local municipalities to make more informed policy and programming decisions

Local Residents	• Provide positive feedback to local residents on how system is functioning and what areas can be improved	• Allow for parts of the *Balanced Scorecard* to be used by local municipal partners to communicate with residents (e.g., waste calendars)
Community Partners	• Recognition of how they are contributing and attract/inspire new community partnerships	• Include profiles of the work being done with local community partners to reduce waste, promote reuse or encourage recycling.
Other Municipalities	• Ability to compare common metrics to identify shared issues	• Allow for comparison and discussion through the various municipal associations.

Recommendations that follow will provide details on additional metrics that will allow the *Balanced Scorecard* to reach these broader audiences.

Of course, the additional amount of time and effort required to amend the *Balanced Scorecard* to reach this expanded audience is only worthwhile if the details within the scorecard are going to be used. While there is always a risk that the additional metrics will not be utilized, recommended changes should not result in a significant increase in workload.

Many other municipalities reviewed as part of the jurisdictional scan target their annual reports to larger audiences, which typically includes local residents, but the focus has not been on other levels of government. Given the attention at both levels of government on full EPR and the focus on advocacy in York Region's SM4RT Living Plan, it makes sense to expand the intended audience in this way. The provincial and federal governments have important roles to play in assisting the Region to meet its current objectives.

It also makes practical sense to combine the two reports together. Currently the *Balanced Scorecard* is released in June, while the *Annual Solid Waste Diversion Report* in September. Combining these reports would help to ensure all relevant data is in one place and should help to reduce efforts in producing two separate documents.

Recommendation 2: Adapt the *Balanced Scorecard* to report on Regional trends, while offering a breakdown of local municipal trends grouped by population density.

As shown in Figure 8, the *Balanced Scorecard* breaks out curbside waste generation data by local municipality for each of the key material streams (i.e. garbage, blue box, organics, and L&Y waste). This specific breakdown of performance for each local municipality appears to be unique to York Region as compared to other Regional governments in Ontario. None of the other Regional governments including Durham, Niagara, Peel or Waterloo appear to provide this level of feedback. However, these

Regional governments do all differ in relation to how waste collection services are provided (i.e., at the Regional level rather than by the local municipality).

Figure 8: Performance Summary Table from York Region's 2018 Balanced Scorecard

Curbside Waste Generation Rate (kg/capita)

MUNICIPALITY	CURBSIDE COLLECTION				SPECIAL PROGRAMS (Textiles, e-waste, batteries, scrap metal)	TOTAL CURBSIDE WASTE GENERATION RATE
	GARBAGE	BLUE BOX*	ORGANICS	YARD WASTE		
Town of Aurora	99	78	76	38	2	293
Town of East Gwillimbury	78	71	74	38	<1	261
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Town of Newmarket	83	75	73	38	<1	269
City of Richmond Hill	77	67	80	32	<1	256
City of Vaughan	88	65	83	31	<1	267
Town of Whitchurch-Stouffville	90	70	78	28	2	267
Overall Curbside Waste Generation Rate	**77**	**69**	**83**	**33**	**3**	**265**
2017 vs 2018	-1	-2	0	+2	+1	0

As it is currently presented, the *Balanced Scorecard* does not provide enough context to allow the local municipalities to make informed policy and programming decisions. While page 4 of the *Balanced Scorecard 2018* notes that there are "external factors such as housing types, population growth, seasonal population and climate change which all affect the rate differently per municipality," it does not provide further detail. Integrating such information would provide helpful feedback for local councils, staff and residents, and allow for a better means of comparison. This could be achieved by grouping the local municipalities by population density, for example, by having one table summarizing the performance of the northern six and another for the southern three municipalities (see Figures 9 and 10). Additional context should also be included, whether it be provincial, Regional or municipality-specific information, such as weather-related events, contamination rates[35], end-markets (both local and foreign), and new programs that may be influencing outcomes.

Figure 9: Curbside Waste Generation Rates (i.e., garbage and source separated organics) of the Southern Three Local Municipalities

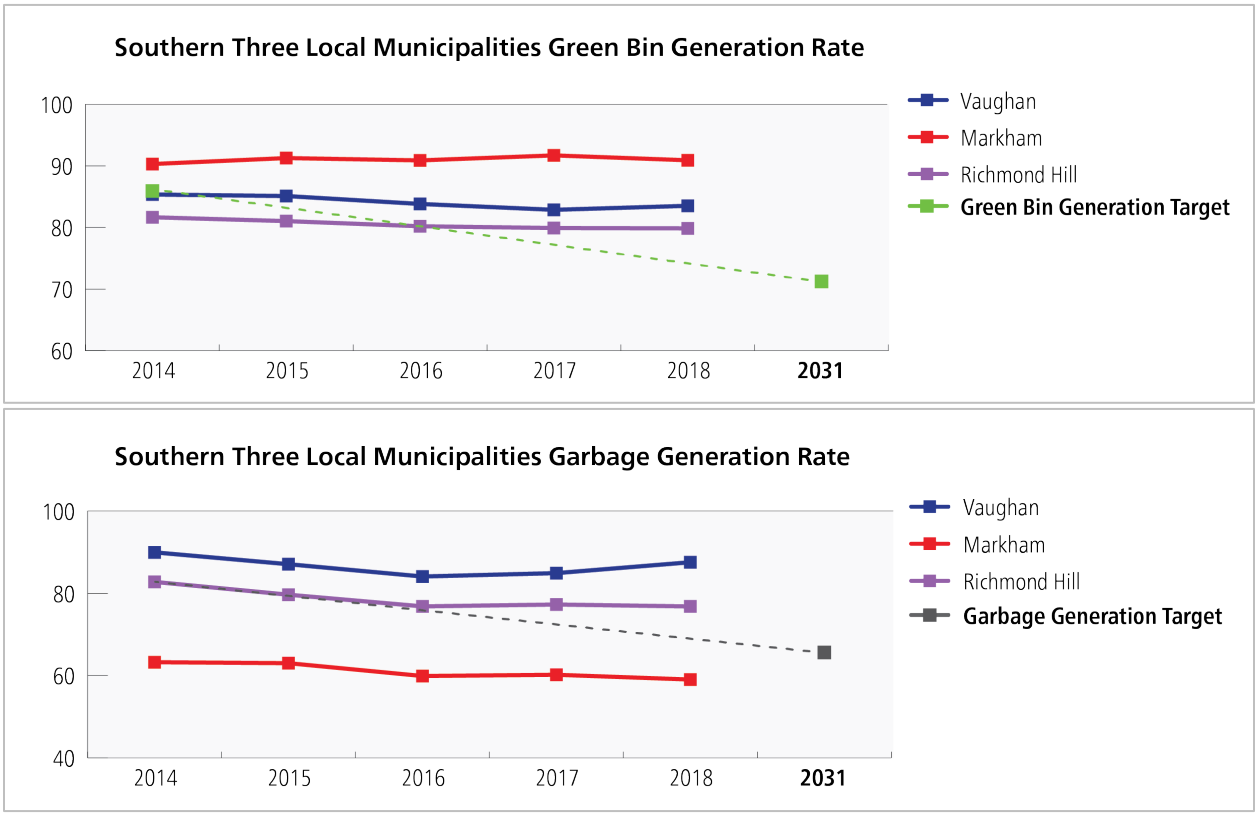
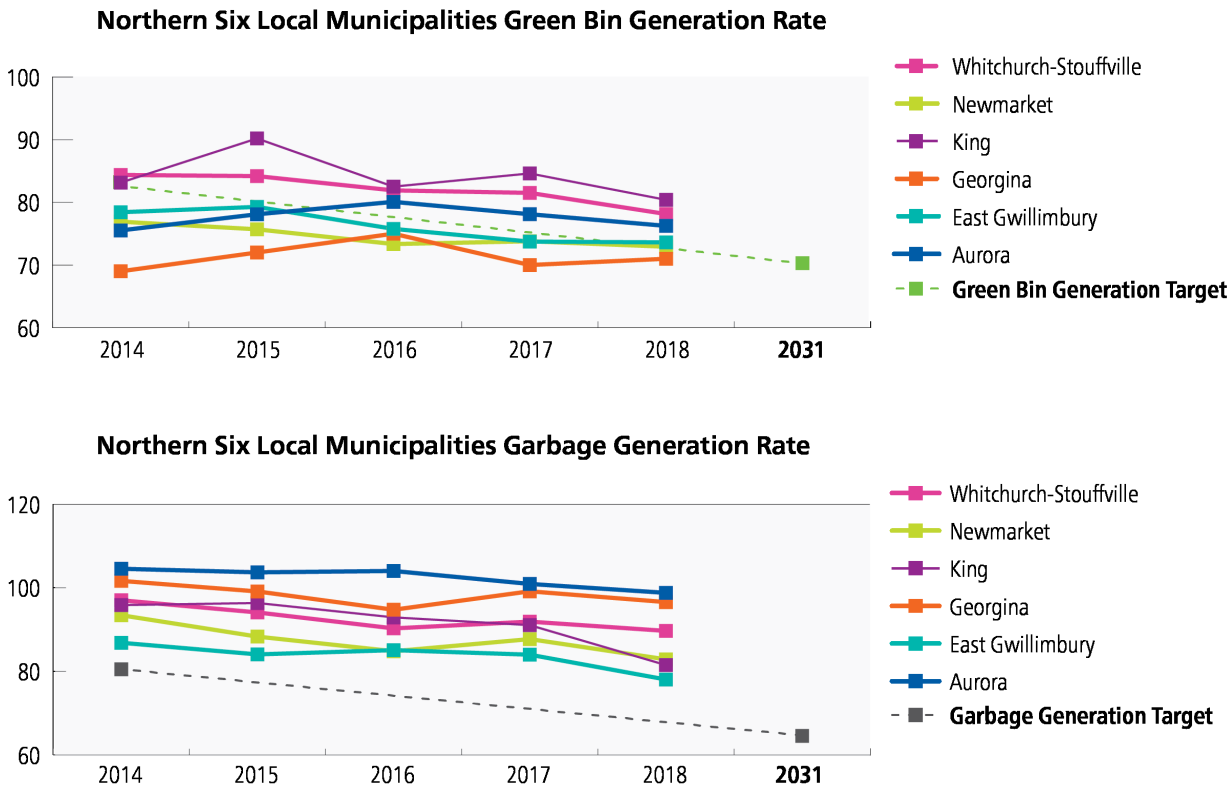


Figure 10 Curbside Waste Generation Rates (i.e., garbage and source separated organics) of the Northern Six Local Municipalities



In addition to providing more context, it is recommended that the *Balanced Scorecard* include separate tables for each local municipality that show five-year trends for key metrics, such as waste reduction (see Figure 11). This would assist with decision-making for local councils and staff. Currently, curbside performance trends for garbage, blue box, organics and leaf and yard waste are only shown for the Region as a whole. This context needs to come from the local municipalities; given their role in collection they will often have a greater understanding of their curbside collection programs (see Recommendation #6).

Figure 11: Sample Handout Outlining Curbside Collection Trends for Local Municipalities

Similar trends could also be established and reported related to annual contamination rates (See Figures 12 and 13).

Figure 12: Curbside Contamination Rates of the Southern Three Local Municipalities Based on Seasonal Blue Box Audits

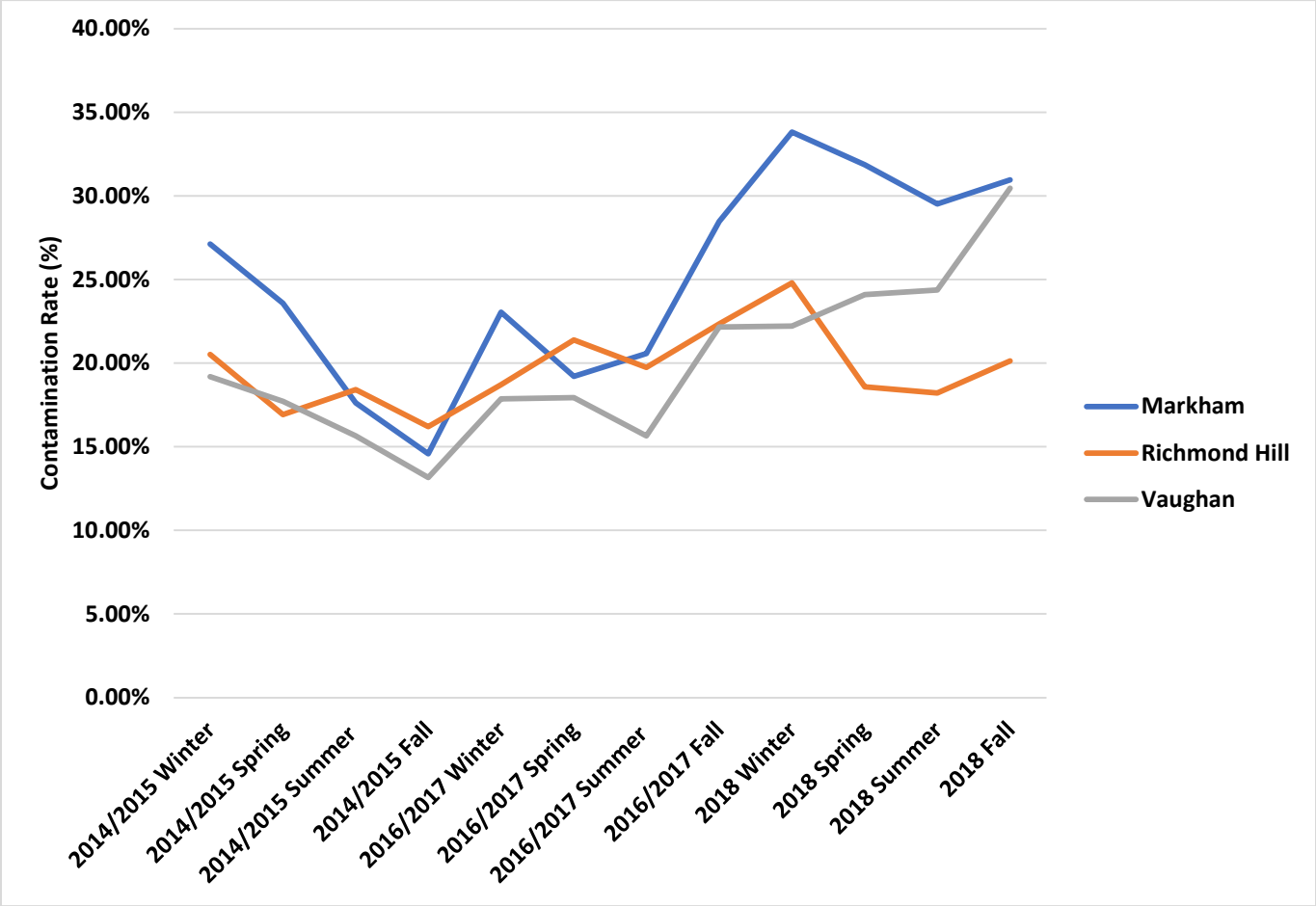
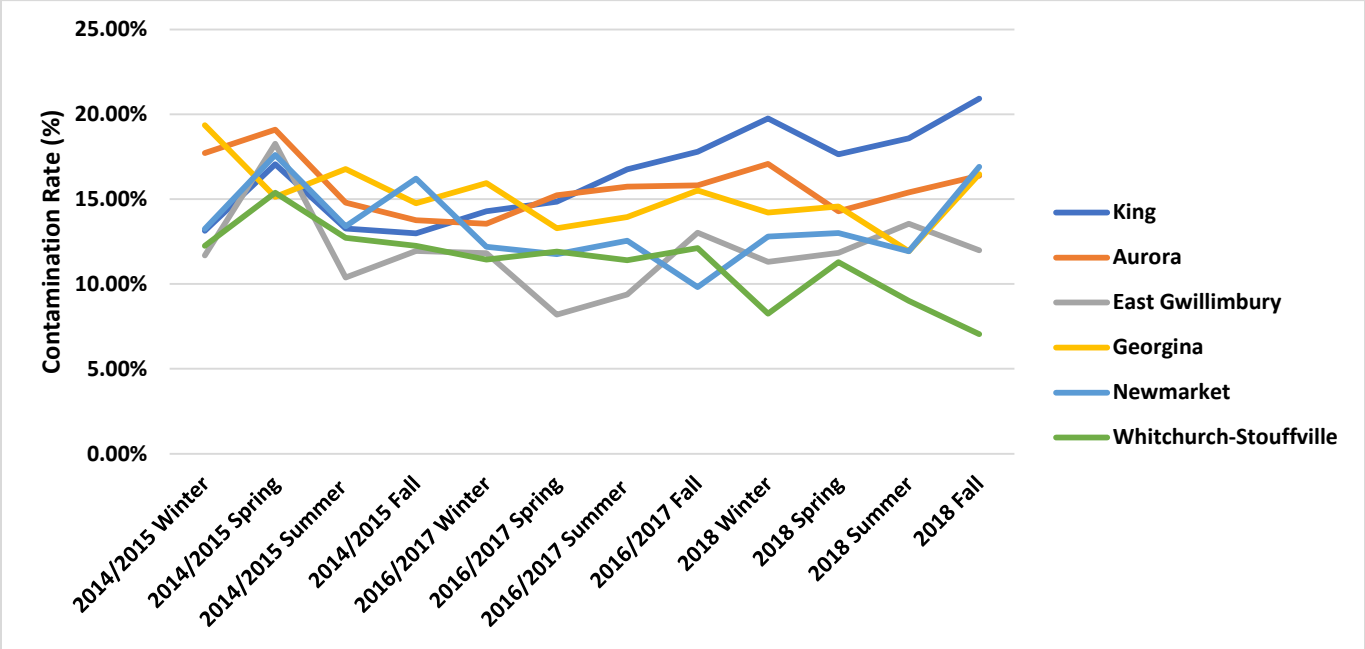


Figure 13: Curbside Contamination Rates of the Northern 6 Local Municipalities Based on Seasonal Blue Box Audits



These types of trends might be helpful in other seasonal audit areas to track green bin contamination and recyclables or food waste in the residual stream. The key will be to optimize the accuracy of the data being collected through these audits, ensure consistency in how they are completed and to ensure they are focused on key issues.

9.2 Changes to Existing Metrics

Recommendation 3: Amend how waste reduction is measured to focus only on residual waste and household organic waste. This would entail resetting waste reduction targets to take these changes into account.

Waste reduction is currently the key metric used by York Region to measure progress, but its utility will become increasingly compromised by the manner in which it is measured. The waste reduction rate includes:

- Yard waste, which is heavily influence by external factors that municipalities have little ability to control;
- Small business waste dropped off at depots and CECs, which helps to ensure the viability of these locations; and
- Products and packaging (e.g., used tires, WEEE, alcoholic beverage containers, mattresses, white goods) which are increasingly being managed outside of municipal waste streams through full EPR programs, deposit return schemes or voluntary take back programs.

If the Blue Box does transition to full EPR in the next few years, York Region may not be able to measure how these materials are being managed. It is likely that various industry groups will decide to establish independent programs to manage various components of the residential waste stream for which they will be responsible, as is already the case with used tires, WEEE, and HHW. Not only is obtaining data from a multitude of stewardship organizations and programs challenging, but the level of data granularity required (i.e., at the municipal level) is usually not available. Some municipalities, like the City of Toronto, model data related to materials managed outside of the municipal sphere. This is, however, time-consuming and likely not very accurate.

Instead of tracking waste from all sources and streams with a single metric, York Region should focus on curbside streams that have the most potential for waste reduction. Curbside streams represent almost 90% of the tonnes managed in the system and are trackable with accurate scale data. Tonnage is reliably attributable to individual local municipalities based on truck data collected through Paradigm allowing for better tracking of trends at a local level. Measuring waste generation in the curbside garbage and green bin streams aligns with priorities identified in the SM4RT Living Plan, including food waste reduction, increasing reuse of textiles and other durable items, reducing packaging and single use items, monitoring impacts of EPR implementation on residential garbage stream.

It is recommended that waste generation be tracked in the following ways:

- Residual waste collected curbside (per capita): Residual waste collected through depots and CECs should not be included in the calculation as it is difficult to allocate to separate municipalities and includes waste from small businesses.
- Source separated organics (SSO) generated and collected through green bin programs (per capita): Ideally, the amount of green bin waste generated will decrease over time as a result of improved food waste reduction, however, York Region's green bin program also collects many materials that cannot necessarily be reduced such as inedible food waste, sanitary products and pet waste. Periodic audits of green bin materials, as is currently done, would assist with better understanding what materials are diverted through the green bin and how effective programs have been in reducing the edible food waste portion.

Implementation of the above changes would represent a substantial shift in how waste reduction / generation is measured in York Region and, as such, would necessitate establishing new waste reduction targets.

It appears based on current trends that York Region's targets may already need to be updated as they are currently set to overachieve its SM4RT Living Plan waste reduction target. An assessment has been undertaken of the last five years of data related to curbside collected residual waste and SSO. Note that historic curbside data is not available before this point as it is combined with depot material. Over that time period, per capita residual waste across York Region decreased by roughly 6%, from 82.61 kg/capita in 2014 to 77.66 kg/capita in 2018.

Based on an analysis of this data, the work undertaken by the Region and its local municipalities, and future efforts planned, a new target could be established to reduce York Region's curbside residual

waste by 20% (based on 2014 levels) by 2031. This would bring total curbside residual waste down to 66 kg/capita. Setting the reduction target as a percentage over a period of time better allows York Region to take into account fluctuations that might happen year over year. It is important to understand that these efforts could be impacted be impacted by broader trends (e.g., weaknesses with global commodity and changes in consumption patterns) or one-year anomalies such as flood damage. This is why it will be helpful to view the data based on trending and to re-evaluate the targets on regular basis.

Collection of SSO over this same time period has remained relatively stable with 84.23 kg/capita collected in 2014 and 82.90 kg/capita in 2018, a decrease of under 2%. Local municipalities are currently collecting anywhere between 48.52 kg/capita and 90.90 kg/capita annually. The Region will want residents to divert more organic waste away from disposal which may increase total per capita but also decrease the amount of edible food waste. It is difficult to assess the amount of edible food waste that is being put in the green bin versus other products (e.g., diapers, inedible food, paper towels).

The Region should continue to pursue a 15% reduction target for SSO (based on 2014 rates) by 2031. This would bring total curbside SSO down to 71.59 kg/capita. It should be noted that this remains an aggressive target that may need to revised based on curbside waste composition audits. While the Region can reduce edible organics that are being disposed of through food waste reduction activities, it cannot deal with increases in inedible waste disposed of including a potential increase in compostable packaging (fiber based or plastic based) or based on more food preparation at home.

Recommendation 4: Continue to report on the amount of material diverted through municipal programs separately from the waste reduction / generation rates.

The Region should continue to report separately on other materials (e.g., L&Y waste, blue box materials, etc.) being collected and diverted. This information is still helpful to understand the effectiveness of these programs and to assist with decision-making. The data should however be separated from the waste reduction data.

9.3 Introduction of Additional Metrics

Although the waste reduction / generation rate is an important metric, it is not necessarily the most engaging and does not cover all of the objectives set out in the SM4RT Living Plan, such as providing convenient, accessible and efficient collection programs to single-family and multi-residential homes or advocating to the province to make producers responsible for the end-of-life management of their products.

Recommendation 5: To further expand and improve upon the Region's approach to data measurement, introduce additional metrics in the following areas:

- **a. Producer responsibility (internal)**
- **b. Accessibility (report every five years)**
- **c. GHG emission reduction (report annually)**

d. **Recycling efficiency (report annually)**
e. **Financial efficiency (report annually)**

These metrics should be implemented in the next five years once appropriate information is obtained and municipalities can align with the reporting in other municipalities. Some flexibility is necessary when these metrics are implemented, as the Region, in some cases will need a system to obtain the appropriate data and to ensure the methodology is rigorous. Ideally it would also be helpful that they are using a similar approach to other municipalities to avoid potential confusion. Regional staff have already begun work with other municipalities in the Greater Toronto and Hamilton Area to create greater alignment in data measurement.

Some of these metrics are more important to the Region than to the local municipalities and not all need to be tracked on annual basis. Accessibility and financial efficiency, for example, could be tracked on a five-year cycle as the numbers reported should be relatively consistent year to year. Producer responsibility is similar but reporting could be done internally and shared when appropriate. As the Region and the Province implement new programs and policies, the list of performance measures should be reviewed to ensure that future performance is appropriately tracked.

9.3.1 Producer Responsibility

Under the current waste framework, municipalities generally manage most residential waste generated within the municipality as well as some commercial waste generated by small businesses along municipal collection routes, and in some cases, waste for which the municipality holds special collection events. Municipalities also typically manage the waste generated within their own operations, for example, at parks, municipal buildings, etc.

In late 2016, Ontario proclaimed the *Waste Free Ontario Act,* comprising of the *Resource Recovery and Circular Economy Act* (RRCEA) and the *Waste Diversion Transition Act* (WDTA). At the heart of this piece of legislation is the idea that producers in Ontario should be physically and financially responsible for the end-of-life management of their products or packaging.

It is likely that York Region will continue to manage residential residual waste, L&Y waste and household organics, however, it is likely more products and packaging will be managed by producers. Furthermore, according to Ontario's *Strategy for a Waste-Free Ontario* and the most recent provincial discussion paper, *Reducing Litter and Waste in Our Communities,* future regulations under the Act are expected to designate a number of new materials for EPR, including: small appliances, power tools, rechargeable batteries, fluorescent bulbs and tubes, clothing and textiles, mattresses, carpet, C&D waste, and furniture. The federal government has also recently included full producer responsibility as part of Phase 1 of the Canada-wide Action Plan on Zero Plastic Waste.[36]

As advocacy for full producer responsibility was identified as part of the SM4RT Living Plan, it would be helpful to measure progress. The percentage of the waste stream for which producers are responsible could be measured through the following equation:

$$\frac{\text{Total residential materials diverted in Ontario through full producer responsibility}[37]}{\text{Total residential waste generated}[38]}$$

It is important to note, however, that some of these metrics might be outside the municipalities' purview under a full producer responsibility regime, which could have a major impact on how municipalities collect and report data, including RPRA's Datacall. In the *Residential GAP – Manual on Generally Accepted Principles (GAP) for Calculating Municipal Solid Waste System Flow*[39], the residential component of stewardship and deposit-return programs is calculated by allocating certain percentages. Specifically, in GAP, 50% of beverage containers and 5% of oil and tires collected through stewardship programs are assumed to be from residential sources. Figures 14 and 15 provide an illustration of the percentage of residential waste materials that is covered by EPR (full or partial) in Ontario.

Figure 14: Residential Materials Covered and Not Covered by EPR in Ontario

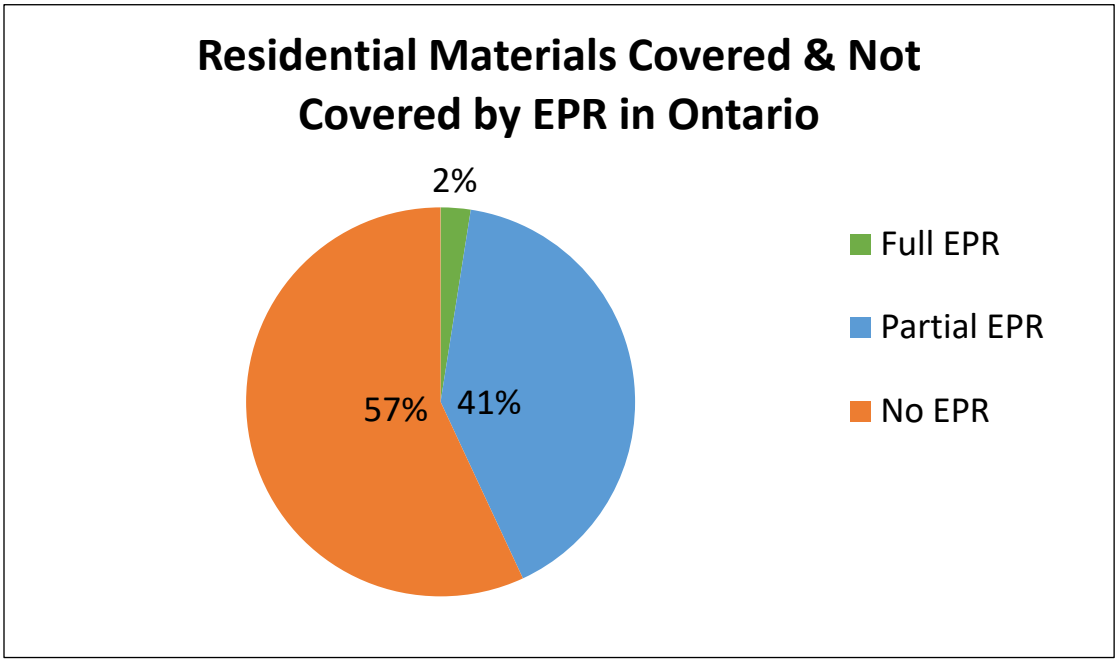
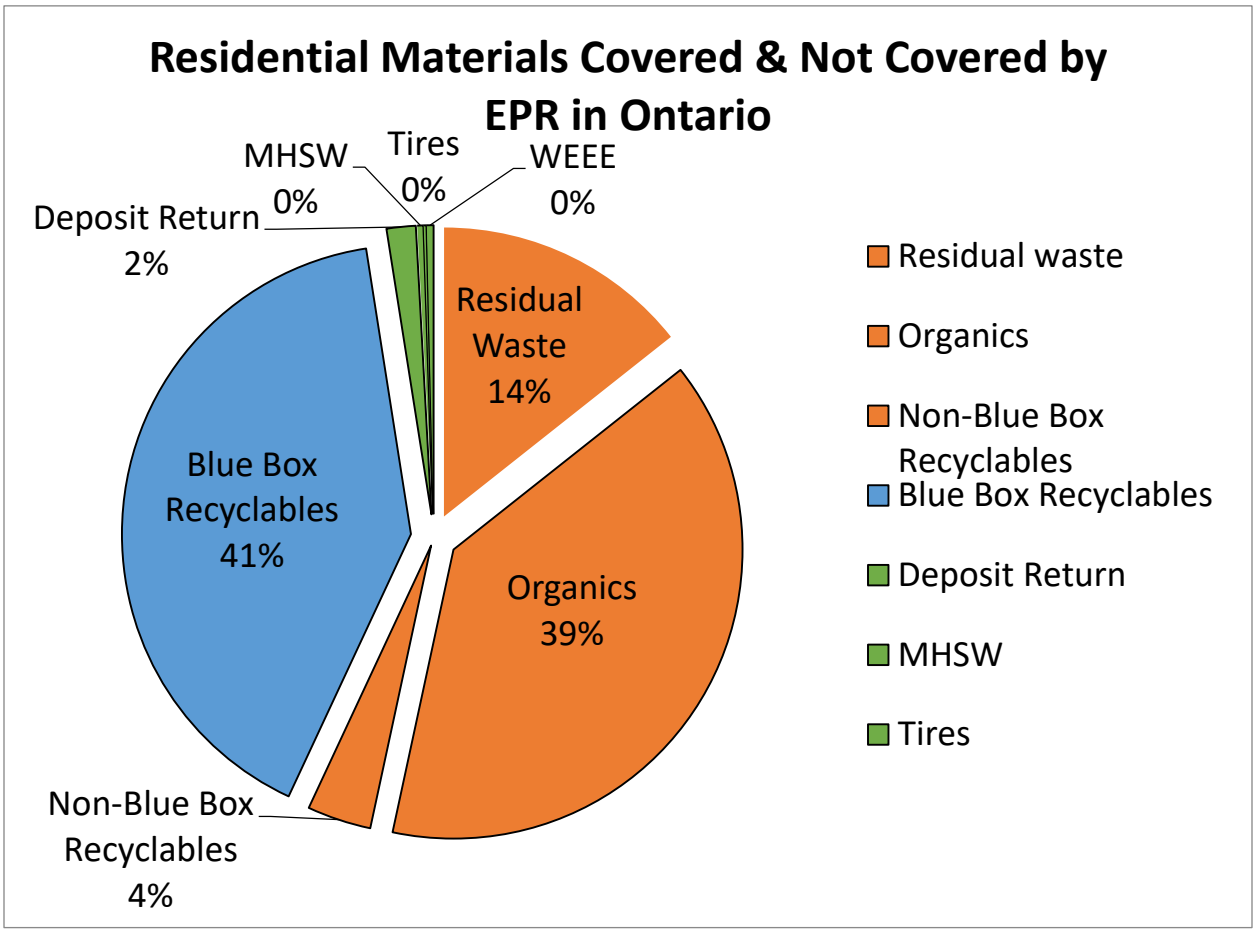


Figure 15: Breakdown of Residential Materials Covered and Not Covered by EPR in Ontario



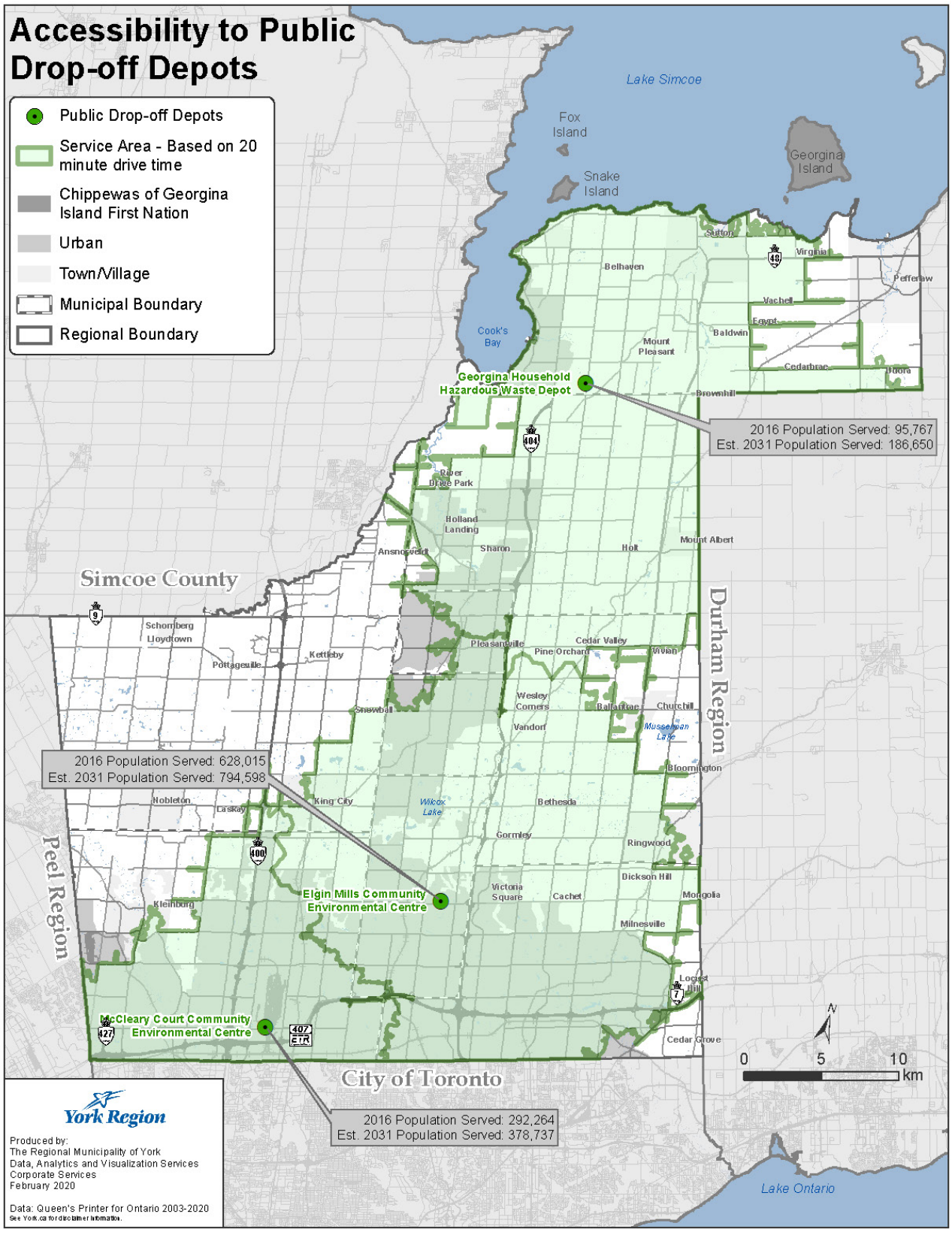
This would help to provide a constant reminder on the need for continued advocacy to both levels of government. Given this provides a province-wide context, it is something other municipalities could also include in their reports and help to measure.

As products and packaging transition to full producer responsibility, it will also be important to ensure outcomes are being met and that these materials are not continuing to end up in the municipal residual waste stream. A KPI that measures the amount of designated products and packaging in the municipal residual waste stream (i.e. litter, disposal) could also be useful. This could be tracked through audits of mixed waste loads delivered to the Region's transfer, organics, and disposal facilities to identify quantities of obligated materials. Although these audits can be costly, it is in the interests of all municipalities to ensure outcomes are being met. By working through the municipal associations, it might be efficient to co-fund and co-ordinate audits.

9.3.2 Accessibility

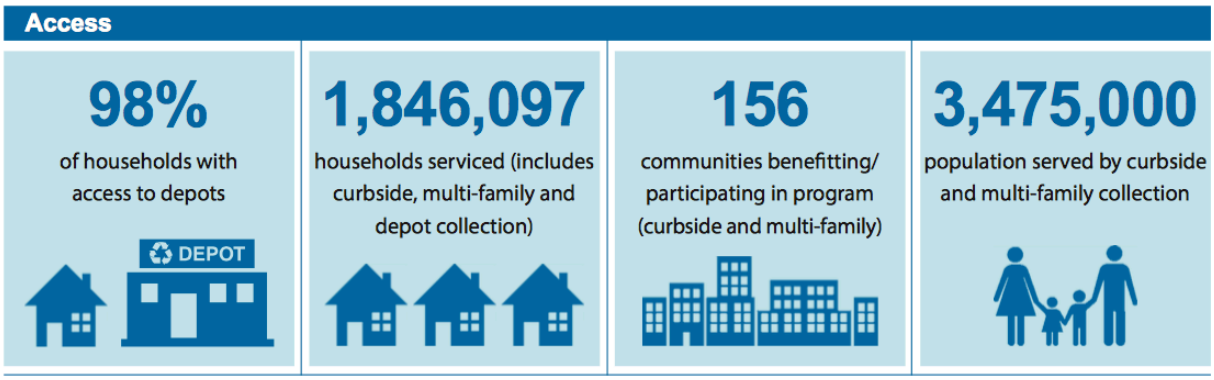
Factors such as travel distance to depots and bin/service locations have been found to have a significant influence on whether or not residents will participate in diversion programs. KPIs surrounding availability and accessibility are therefore critical.

Examples of KPIs that measure access to waste management services include percentage of households (single-family and multi-residential) serviced with municipal curbside programs (residual waste, recycling, and organics); distance (in drive time or kilometers) to the nearest CEC or public drop-off depot; and density of CECs/public drop-off depots in a given geographic area, or population nexus (i.e., percentage of population within *x* km of a CEC).[40] For the first KPI (% of buildings serviced by municipal curbside programs), this data can be obtained from municipal contracts or municipal planning documents, by dividing the number of households serviced by the total number of households in the Region. For the second and third KPIs, access can be determined using a combination of Geographic Information Systems (GIS) software and population data obtained either from municipal planning departments or Statistics Canada.


Accessibility to Public Drop-off Depots
Public Drop-off Depots
Service Area - Based on 20 minute drive time
Chippewas of Georgina Island First Nation
Urban
Town/Village
Municipal Boundary
Regional Boundary
Lake Simcoe
Fox Island
Snake Island
Georgina Island
Cook's Bay
Georgina Household Hazardous Waste Depot
2016 Population Served: 95,767
Est. 2031 Population Served: 186,650
Simcoe County
Durham Region
Peel Region
City of Toronto
Lake Ontario
2016 Population Served: 628,015
Est. 2031 Population Served: 794,598
Elgin Mills Community Environmental Centre
McCleary Court Community Environmental Centre
2016 Population Served: 292,264
Est. 2031 Population Served: 378,737
0 5 10 km
York Region
Produced by:
The Regional Municipality of York
Data, Analytics and Visualization Services
Corporate Services
February 2020
Data: Queen's Printer for Ontario 2003-2020

Several stewardship programs include accessibility indicators within their annual reports. The Electronic Products Stewardship Association (EPSA), for example, reports on the total number of collection sites per province as well as the percentage of the province's population within a certain distance (measured in minutes or km) of EPRA drop-off centre .[41] Recycle BC is another organization that reports annually accessibility indicators to describe access to printed paper and packaging (PPP) collection services in the province such as: single-family and multi-family households receiving household collection service, number and service area locations of depots accepting PPP, etc. (see Figure 16).[42]

Figure 166: Accessibility Indicators Reported Annually by RecycleBC



In addition to tracking and reporting on the above KPIs, which are largely quantitative in nature, Dr. Calvin Lakhan of York University[43] recommends that this information be supplemented with qualitative data, as this information can provide more insight into the drivers of participation. Dr. Lakhan explains that the often-quoted mantra "Build it and they will come" does not always apply to waste management programs, especially for activities that require households to bring their material to a designated site or drop-off or there is an additional cost. He notes that while collection services may be offered to residents, some may not participate for a number of reasons, including lack of interest or motivation, lack of knowledge regarding collection schedules, lack of adequate space for waste storage, etc. To this point, it would be helpful if a combined report included information on the amount of transactions and tonnage managed at the various depots and CECs.

9.3.3 GHG Reduction

The waste management industry influences GHG emissions in a number of ways, and can have a significant positive contribution to limiting emissions through diversion activities. The Ontario Waste Management Association (OWMA) estimates that Ontario's recycling programs reduce GHG emissions by 14.5 $MTCO_2$ equivalents each year—equal to almost 9% of the province's total emissions in 2014.[44] As reducing emissions and mitigating climate change becomes an issue of increasing priority for national and provincial governments, measuring the GHG benefits (in terms of annual tonnes of CO_2 emissions avoided or reduced) of municipal waste management programs will become increasingly relevant.

The City of Toronto is one example of a municipality that reports on GHG emissions related to waste management. The city currently uses a first order decay model to calculate the emissions from methane in any given year from both historical waste and current waste going to landfill.[45] For the 2017 GHG emissions inventory, staff took a closer look at how emissions were being calculated from the collection and management of solid waste in the city and determined that Toronto had been over reporting waste emissions from the private sector over the past few years. Part of this was due to the lack of available data regarding private sector waste quantity and composition. To solve this issue, staff adjusted the quantity of waste by using a currently estimated ratio of publicly-managed versus privately-managed waste in Ontario, which is about a 40:60 ratio.[46] In addition to changes made to correct emissions attributed to waste managed by the private sector, expert advise from the C40 Cities network was sought and concluded that Toronto may want to adjust its methodology from a first order decay method to a methane commitment method for future calculations.[47]

Other municipalities that use GHG as a metric include:

- The Region of Waterloo: tracks estimated GHG emissions (tonnes) reduced to-date due to reduction of organics in the landfill.[48]
- The Region of Peel: In its *Roadmap to a Circular Economy* report[49], it specifically notes "tonnes of greenhouse gas emitted as a result of residential waste operations" as one of the performance indicators that the Region tracks and will continue to track going forward.
- Regional District of North Okanagan (RDNO) (BC): The Region's 2018 "Current Solid Waste Management System Report"[50] states that "RDNO will conduct annual inventories of GHG emissions and seek opportunities for reducing emissions. With respect to solid waste management, RDNO will include fuel management reporting requirements to populate the corporate GHG emissions inventory."
- City of Leduc (AB): The City's 2015 Greenhouse Gas Inventory[51] reports solid waste tonnage amounts and related GHG emissions resulting from disposal in landfill.

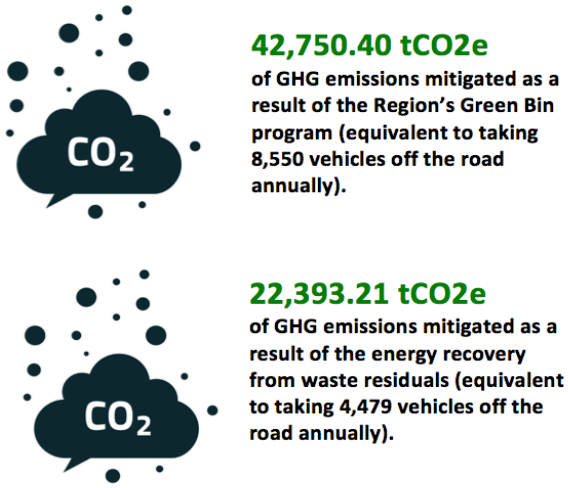
A number of tools have been developed to help municipalities estimate how many emissions can be saved in waste management. One example is Environment and Climate Change Canada (ECCC)'s Greenhouse Gas Calculator for Waste Management;[52] the calculator helps users construct two distinct scenarios (baseline and alternative) for managing the same quantity and composition of municipal solid waste. The calculator then automatically calculates the GHG emissions and energy savings that would result from implementing the alternative scenario. The calculator can be used to assess the GHG emission reductions from different waste management practices including recycling, composting, anaerobic digestion, incineration, and landfilling, which can be helpful for understanding the benefits of starting a new program (such as a Green Bin organics program) or expanding existing programs.

Another example is the Scottish Carbon Metric.[53] Launched by Zero Waste Scotland in 2013, the Carbon Metric quantifies the whole-life carbon impacts of more than 30 different waste materials, providing policy makers with an alternative to weight-based measurement and allowing them to focus their efforts on those waste materials with the highest carbon impacts and greatest potential carbon savings.[54] Ricardo Energy & Environment's 'local authority carbon league table'[55] is a similar example. This carbon tool uses tonnage data and the weight of waste by material by disposition (reuse,

recycling, composting, energy recovery, and landfill) and multiplies each weight by the relevant carbon emission factors for that specific material and waste management destination. The contributions from each material fate are added up and divided by the total weight to arrive at an Average Emission Factor (AEF) for the municipality. The AEF is an indicator of how much CO_2 has been produced for each tonne of waste handled expressed as kg CO2e per tonne of waste.

According to Dr. Calvin Lakhan of York University, measuring the carbon impacts associated with different waste management activities has proven to be an inexact science and remains a challenge. Part of the challenge is that very few municipalities readily have access to the data required to make such calculations, such as data on regional energy grid mix, total distance travelled for waste collection and transport to transfer station / material recovery facility (MRF), knowledge of end market destinations and end use applications, etc.[56] Rather than spending significant resources to estimate GHG emissions avoided as a result of its waste programs, York Region can rely on calculators already developed through ECCC or the OWMA that take into account how residual wastes are managed and the diversion of household organic waste. See Figure 17 for an example of how this information could be reported on.

Figure 177: GHG Emissions Avoided in York Region as a Result of the Region's Green Bin Programs and Residuals Sent to Energy-Recovery



9.3.4 Recycling Efficiency

While the growing trend towards single-stream blue box collection programs such as York Region's has resulted in higher participation rates, it has also produced unintended negative consequences, including higher contamination rates of incoming materials. This, in turn, results in higher costs, lower yield rates, and increased equipment downtime and maintenance. Contamination is also a problem when it comes to measuring performance, because when recycling rates are reported without accounting for the weight of contaminants or material lost through the sorting process, the rates end up inflated.

With a greater focus being put on quality of recycled materials to ensure there are markets to sell them, measuring and tracking the level of contamination in municipal programs, both in bins and at the processing center, will become increasingly important. Lower contamination rates and higher recycling efficiency rates help keep costs down and allow municipalities to obtain higher values for their recyclable commodities. Jim McKay, former general manager of waste management service for the City of Toronto, estimates that each percentage point decrease in contamination could reduce recycling costs in Toronto by $600,000-$1 million annually.[57] Additional fees often apply to waste collection and processing contracts if their contamination rates get too high.

This is where the importance of a recycling efficiency metric comes in. A recycling efficiency metric measures how much material was actually recycled (i.e., reprocessed into new products) after accounting for contamination, moisture, and other material that is lost or discarded through the sorting process. Related to this is the residue rate, which can be defined as the percentage of collected material that is rejected during processing.[58] According to the *Residential GAP – Manual on Generally Accepted Principles (GAP) for Calculating Municipal Solid Waste System Flow*[59], this type of data can typically be obtained from MRFs through records of tonnes marketed, purchase orders, etc., or in the case of cities where recyclables are taken directly to market without interim processing, or for white goods (most of which go directly to market), quantities recycled can be obtained from the contractor.

This recommendation to add 'Recycling Efficiency' and/or 'Contamination Rate' as a metric is in line with recent work by the European Commission to define new rules for the calculation, verification, and reporting of recycling targets that have been set in the Waste Framework Directive (WFD). In accordance with the revised calculation rules to measure recycling rates, the point of measurement of recycling has been moved to the input of the final recycling facility, after all sorting has taken place. In other words, recycling has to be measured at the stage within the recycler, where no further losses occur to the material that enters the recycling operation. If this is not possible to measure (e.g., because recycling takes place overseas or material was handled through third-party brokers), then output sorting can be measured under the condition that there is proof that the waste is recycled and the percent losses are made clear with sufficient evidence.[60]

The recommendation is also in line with the Canadian Standards Association (CSA) Guideline for accountable management of end-of-life materials[61]. The recycling efficiency rate proposed by CSA attempts to account for the net amount of material that is actually recycled, similar to the EU's new calculation rules. The Guideline defines recycling efficiency as follows: "The amount of material recycled as a percentage of the amount of targeted material collected (inbound) minus reuse and shrinkage. The recycling efficiency rate must reflect the net mass balance of all processing of that material, not simply one service provider's gate-to-gate efficiency rate." The Guideline indicates that to measure the recycling efficiency rate, service providers must provide evidence of how materials were managed through to their final point of disposition. As well, the Guideline indicates that all service providers that receive and manage material must establish a tracking system for "controlling, weighting or counting, and documenting total inbound and outbound materials." CSA clearly states that in the absence of reasonable proof from the secondary service provider that all materials sent to them were recycled, the primary service provider cannot claim 100% recycling of the materials. Rather, they can only claim the percentage of material that as actually utilized by the secondary provider. To

ensure that the data being reported is accurate and reliable, the CSA suggests conducting data verification audits on a periodic basis.

While many municipalities perform waste composition studies to measure the percentage of non-solicited materials in the Blue Box and Green Bin, most currently do not publicly report on or measure contamination, and those that do often measure it differently. For example:

- In its *Roadmap to a Circular Economy Report,* Peel Region states that a contamination rate by program (i.e., percentage of non-solicited materials in the Blue Box, Green Bin, etc.) will be reported on a yearly basis, measured and reported separately for curbside and multi-residential programs. However, this information does not appear to be publicly available at this time.
- In its 2019 Solid Waste Rates and Fees document, the City of Toronto reports that its blue box contamination rate was approximately 29% based on audits that took place between January and October 2018.[62]
- In the City of Saskatoon's 2018 Integrated Waste Management Report, the City reports a contamination rate separately for single-family curbside recycling collection, multi-family residential recycling collection, as well as a contamination rate for material collected at recycling depots specifically. They also track and report on recycling contamination rates by neighbourhood.

This could be illustrated by showing the percentage difference between what is collected versus what is marketed.

In addition to recycling efficiency and contamination metrics, qualitative information on the end markets of materials may also become more salient as foreign countries like China increasingly turn away Canadian recyclables. Highlighting these markets could help to ensure better confidence in the system.

In 2012, the Resource Association in the UK took a similar approach establishing a voluntary Charter entitled the *End Destinations of Recycling Charter* which allowed local governments in England and Northern Ireland to commit to. In doing so, they agreed to provide the public with comprehensive information about the end destination of materials collected for recycling at least on an annual basis.[63] Figure 18 provides an illustrative example from West Sussex in the UK as to how they inform their residents of how recyclables are managed.

Figure 188: West Sussex Recycling End Markets Destinations[64]

Recycling Quality: Communications
Recycling End Destination Markets

Note: The data in the attached tables significantly contributes to the countywide recycling rate published on the home page of www.recycleforwestsussex.gov.uk. Further to the information published in these tables, there are other recyclable materials collected by our District and Borough partners at bring banks across West Sussex that are not reflected in these tables.

This table shows what has happened to the recycling collected from your home over the last year.

2014/15 Ford Materials Recycling Facility	Weight Sold (tonnes)	Market / End Use	UK		Mainland Europe		Rest of World	
			%	Tonnes	%	Tonnes	%	Tonnes
News and Pams (baled Newspapers and Magazines)	13293	Recycled	100%	13293	0.0%	0	0.0%	0
Mixed Paper (baled)	23790	Recycled	0.0%	0	0.0%	0	100%	23790
OCC (baled Old Corrugated Cardboard)	3781	Recycled	0.0%	0	0.0%	0	100%	3781
Clear PET Bottles (baled Polyethylene terephthalate)	1797	Recycled	100%	1797	0.0%	0	0.0%	0
Colour PET Bottles (baled Polyethylene terephthalate)	389	Recycled	82.8%	323	17.2%	67	0.0%	0
HDPE Bottles 80/20 Blend (baled High-density polyethylene)	1704	Recycled	100%	1704	0.0%	0	0.0%	0
PP (baled Polypropylene)	446	Recycled	96.8%	431	0.0%	0	3.2%	14

York Region does not need to provide this amount of detail but some tangible examples would be beneficial to residents (see Table 7).

Table 7: Blue Box End Market Destinations

	China	Europe	India	Malaysia	Ontario	Quebec	US
2019	0%	0.53%	31.16%	0%	57.39%	4.23%	6.70%
2018	7.19%	0%	39.80%	0.77%	40.05%	3.16%	9.03%
2017	60.26%	0%	0%	0%	32.32%	2.80%	4.32%
2016	63.34%	0%	0%	0%	30.35%	2.74%	3.58%
2015	61.39%	0%	0%	0%	34.40%	1.88%	2.33%

There is a concern that many are interpreting the latest report by ECCC as only 9% of plastics put in residential Blue Box programs are properly recycled. The report is actually referring to the fact that only 9% of all plastics generated in the entire economy are properly recycled. Providing greater transparency could help to dispel some of these myths.

9.3.5 Financial Efficiency

A key indicator used by municipalities across Ontario to measure the efficiency of their waste management programs is cost per tonne. While tonnage is a clear driver of costs in municipal programs, cost per tonne is becoming less meaningful as a measure of performance as a result of trends such as the light-weighting of products and packaging. Instead, the number of households in a Region or municipality may be a more appropriate driver to consider, especially for collection

operations and in cases where municipalities pay per stop. As opposed to cost/tonne, cost/household or cost/capita would demonstrate the Region's ability to keep costs low while maintaining good service levels.

While most municipalities in Ontario and Canada continue to report on a cost per tonnage basis, the jurisdictional scan identified several municipalities that report on a cost per household or capita basis, including:

- Peel Region: A 2017 report[65] to Council by the Waste Management Strategic Advisory Committee shows the estimated 2016 collection costs per household, which was determined by dividing the total payments to the contractors in 2016 by the approximate number of households serviced by the contractor.
- Town of Canmore (AB): In its 2016 Public Works Annual Report it reports out an annual cost per household for residential waste collection, and shows the trend for the last three years (2014-2016).[66] It also shows an annual cost per capita; one figure which takes into account the City's permanent population and another that considers the total population (permanent + seasonal).
- Region of Waterloo: In its 2018 Transportation and Environmental Services Annual Report[67], the Region states that all waste management services cost taxpayers an average of $148/household per year.
- City of Barrie: Barrie's 2012 Solid Waste Management Strategy[68] shows the gross costs ($175/household total) and net costs ($127/household) for delivering each of the City's waste management programs including garbage collection, blue box recycling, SSO composting, L&Y waste, MSHW, landfill, and miscellaneous.
- County of Frontenac: The County's 2019 Waste Management Review[69] reports 2016 and 2017 net waste management operating costs for each municipality, as well as the net cost per capita and per household.

The cost per household metric is already identified by the RPRA's Municipal Datacall. Ideally, separate cost/household values could be measured and reported for single-family and multi-residential units, however a cost/total household figure is sufficient if the breakdown is not available.

Table 8: Cost/Household KPIs

KPI	Formula
Single Family Cost per Tonne	(SFH waste activity and contract cost + **SFH overhead cost)** / (SFH tonnes)
Multi-residential Cost per Tonne	(Non-SFH waste activity and contract cost + **Non-SFH overhead**) / (Non-SFH tonnes)
Total Cost per Household (Single Family - Curbside)	(SFH waste activity and contract cost + **SFH overhead cost**) / (SFH units)
Total Cost per Household (Multi-residential/ ICI/ Town - Container)	(Non-SFH activity and contract cost + **Non-SFH overhead cost**) / (Non-SFH units)

9.4 Additions to Type of Data Collected

Recommendation 6: Expand the Datacall spreadsheet to include some additional contextual information.

Given the recommended changes proposed, York Region will need to collect additional contextual information from the local municipalities. The following questions could be added to the Datacall spreadsheet to gather this information with little additional workload:

- What programmatic changes may have impacted quantities managed, tonnes diverted (e.g., increased spending in areas such as promotion and education, changes to curbside collection program, new multi-residential buildings receiving municipal collection)?
- Were there any anomalies that could have impacted waste generation (e.g., severe weather)?
- Collection cost per household for all waste streams including any administrative, promotion and education or program-based costs.
- Updates about curbside enforcement (e.g., contamination) or other growing areas of concern such as litter.

[1] Community Improvement Fund. "The CIF Price Sheet…how does it stack up to other Indices?" Available at https://thecif.ca/the-cif-price-sheet-how-does-it-stack-up-to-other-indices/.
[2] Ibid.
[3] York Region, Sustainable Waste Management. June 2018. "Final Report: York Region Full Cost Accounting Study – CIF project #975." <https://thecif.ca/wp-content/uploads/2018/10/975-York_Final_Report.pdf>
[4] York Region. "2017 Annual Solid Waste Diversion Report." <https://www.york.ca/wps/wcm/connect/yorkpublic/d8756aa5-d518-4a06-b401-e87288ea7e64/2017Diversion+Report_WEB.pdf?MOD=AJPERES>
[5] Statistics Canada 2016 Census.
[6] Yeats, B. and The N6 CAOS. December 2014. "The York Region N6: Innovation in Municipal Shared Services." *Public Sector Digest.* Available at https://publicsectordigest.com/article/york-region-n6-innovation-in-municipal-shared-services
[7] Report to York Region Council. "Procurement of Weigh Scale Software for York Region Management Facilities," May 2011. Available at http://archives.york.ca/councilcommitteearchives/pdf/rpt%205%20cls%206-8.pdf
[8] There are a few examples where local municipalities partner with organizations to collect recyclables (e.g., WEEE and batteries), where they do receive information about the amount of material collected annually. One example is Raw Materials Company, who provides the Region with an annual tonnage report to inform them of the amount of batteries they collected throughout the year.
[9] Affidavit of David Gordon. Arbitration to Determine the 2014 Steward Obligation for the Blue Box Program, April 2014. Available at http://www.amo.on.ca/AMO-PDFs/Waste-Management/Blue-Box/Affidavits/D-Gordon-Statement_Sworn-2014-04-04.aspx.
[10] Ibid.
[11] Organic processing facilities process York Region's and other client's materials at the same time, making it difficult to assess specific residual rate.
[12] York Region does not have access to complaints to the call centre related to changes to servicing or enforcement measures (e.g., addressing contamination levels at the curb).
[13] There are some minor exceptions where the local municipalities run community environmental centres.
[14] Single-family residences and multi-residential curbside audits are done on yearly rotating basis. Audits are also undertaken at the material recovery facility on a regular basis.
[15] An on-line tool that allows residents to query how waste materials should be managed (e.g., Blue Box, Green Bin, Garbage).
[16] Provides residents with educational materials to help reduce food waste.
[17] Program that provides inspiration, tools and resources to assist elementary schools to reduce their waste and improve reuse and recycling efforts at school and at home.
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[25] Contamination rates need to be properly defined (e.g., packaging or products that are clearly not recyclable, such as a garden hose in the Blue Box, as compared to a soiled pizza box in the Blue Box).
[26] Note a recycling rate would need to be based on York Region not each of the local municipalities given the materials are co-processed.
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[28] City of Toronto. 2016 Performance Measurement and Benchmarking Report. Available at https://www.toronto.ca/wp-content/uploads/2018/04/90c4-WasteManagement2016-Final-AODA.pdf.
[29] City of Guelph. Solid Waste Resources: Business Service Review (Final Report). Available https://guelph.ca/wp-content/uploads/council_agenda_052818-1.pdf#page=82.
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