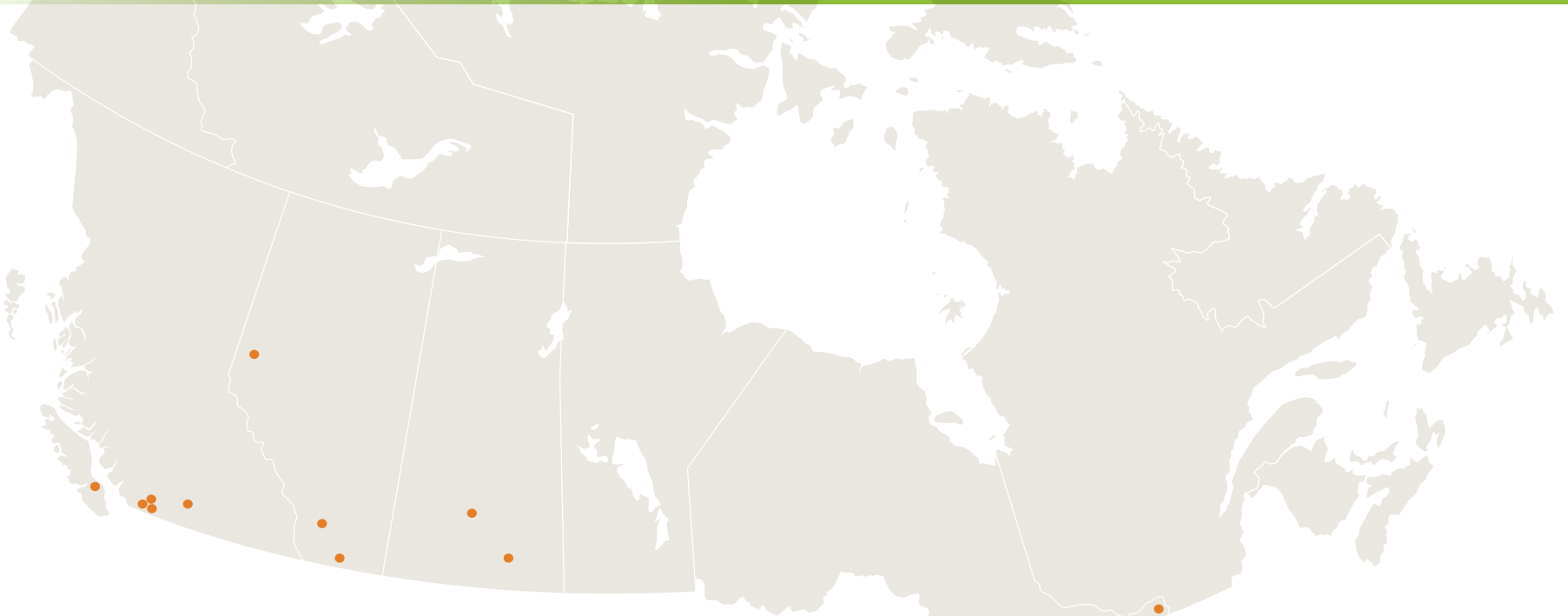




# National Solid Waste Benchmarking Initiative





*Our choices at all levels – individual, community, corporate  
and government – affect nature. And they affect us.*

– by David Suzuki

# Executive Summary

The second iteration of the National Solid Waste Benchmarking Initiative (NSWBI) was kicked off on April 2, 2012 in Quebec City, Quebec along with the National Water and Wastewater Benchmarking Initiative. With the first annual report completed, this was our first opportunity to receive feedback from our solid waste members.

The feedback from the first iteration was incorporated into the second iteration report. The key changes in this report are summarized below:

- Waste flow diagrams provide a good snapshot of the solid waste services and responsibilities for each community. The font size and the thickness of the directional arrows were increased so that the diagrams would be easier to read.
  - All graphs and summaries were enlarged to a full page and updated to take into consideration the revised definitions.
  - Tables were reoriented and used larger fonts to make the tables easier to read and compare.
  - Population figures incorporated best municipal estimates first and Statistics Canada figures second if municipal estimates were not available.
  - Canada-wide solid waste information (from Statistics Canada) were only used in the report if it was consistent with the NSWBI approach.
- Graphical data included 2010 and 2011 data which helps start assessing trends.
  - Public education comparisons were incorporated into the second report.
  - Quick reference charts showing what other communities include in their programs were developed and presented next to the graphical charts.
  - Definitions of the various benchmarking parameters were refined and updated as per the discussion from the kick-off workshop.



The data collection process was vastly improved for the second iteration. The data collection sheets were simplified and reflected the refined and updated definitions. The approach and layout from the Water and Wastewater Benchmarking group were also adopted and this should make data collection even easier in the next iteration. A significant change in our service level approach is our understanding of “curbside customers” which encompasses more than single family (SF) residents.

Solid waste management finances are the most important performance measure according to the NSWBI members. The second iteration report includes a financial summary in the Community Profile section that highlights the overall solid waste program budget, funding sources (i.e. property taxes, utility fees, tipping fees, etc.) and program expenditures such as collection and processing costs. This information helps explain how much curbside customers are charged for solid waste services, public education costs and the largest expenditures of the solid waste program. It also introduces how solid waste reserves can be utilized in a solid waste management program.



The solid waste finances summaries also provide some clues on how some communities manage their funds. Some communities plan for new services and use their reserves to save and pay for new programs and capital improvements. There are also examples where a style financing approach is used and charged directly to the customers for the new services. Most communities also use a combination of these approaches.

A new sub-section entitled, “Challenges and Future Considerations”, was included in the Community Profiles section. This is an interesting area that helps members understand the solid waste challenges that each community faces, the unique aspects of their program and the new initiatives that are being considered, studied or piloted.

The second iteration report also summarizes the regulatory framework for solid waste management across Canada. These regulatory requirements typically explain why certain communities manage their solid waste in a certain manner.

Two benchmarking surveys were conducted in the second iteration. These are summarized in Section 6 and highlights one of the benefits, the access to a network and information access the country, included as part of the solid waste benchmarking membership.

Section 7 tabulates the programs and facilities that are available in each of the member communities. Although this was briefly discussed at the summary workshop, we anticipate that this information will be very useful to the benchmarking members.





# Table of Contents



<b>1</b>	Introduction .....	6
<b>2</b>	Background .....	8
<b>3</b>	Nation-Wide Solid Waste Practices .....	10
<b>4</b>	Goals + Performance Measures .....	22
<b>5</b>	Community Profiles .....	44
<b>6</b>	Surveys and Studies .....	94
<b>7</b>	Facilities Summary Details.....	96
<b>8</b>	Online Resources .....	116
<b>9</b>	Participant Directory .....	118
<b>10</b>	Future Iterations .....	120
<b>11</b>	Glossary .....	122

# 1 Introduction

This report represents the results for the year 2010 and 2011. A total of 11 communities from across the country partnered and participated in 2010. There were 12 participating communities in 2011.

Solid waste systems and their respective programs vary from municipality to municipality and from province to province. Every community provides different services, delivers these services differently and funds programs using mechanisms that are unique to each community. Compound this with the changes that have occurred in the solid waste management industry over the past two decades and it becomes difficult to undertake “apples to apples” comparisons of solid waste management programs.

The National Solid Waste Benchmarking Initiative (NSWBI) was developed to assist communities understand the differences in solid waste management systems across Canada and facilitate an apples-to-apples comparison. The NSWBI not only examines system approaches, it also examines how the approach evolved, effectiveness of service delivery and opportunities for improving solid waste management services. The NSWBI is not intended to be used to rank performance – it is intended to create a knowledge bank that benefits its participants and enables sound decision making. The success of the program relies on member participation, sharing of knowledge and experiences, and collection of usable data and information.

## 1.1 What is Benchmarking?

Benchmarking serves as a best practice and management tool. “Benchmark” means reference point or standard, here referred to as Key Performance Indicator. “To benchmark” means to evaluate something, in our case solid waste management systems and specific performance indicators, against a reference point or standard. Benchmarking is a means to accurately assess performance against key goals, indicators and criteria. Benchmarking is used to compare solid waste management programs, to identify potential areas for improvement and to assess innovations within other programs.

The NSWBI focuses on detailed process benchmarking which serves as a baseline for solid waste services. Once a community understands “where they are in the process”, they can identify Best Practices and answer the “Four Vital Questions in Benchmarking” (see below).

## Four Vital Questions in Benchmarking





## 1.2 Intended use of Benchmarking data

Any aspect of a business can be benchmarked including organizational structures, management processes, service standards, work practices, program delivery approaches, technical standards, process performance and costs. These aspects can generally be categorized into 3 levels for the evaluation and application of benchmarking:

1. Managerial Level
2. Intermediate Level
3. Functional Level

The need for and focus of benchmarking differs at each of these levels, as do the key performance indicators and the management tools required by the individuals at each of those levels. A comprehensive benchmarking process requires that the Management Level be addressed first and foremost. This is also defined as “Metrics Benchmarking”. Once metrics are in place, process benchmarking can be utilized (among other tools) to assist with continuous improvement.

## 1.3 Gaining Consensus and Continuous Improvements

The NSWBI is a process that supports the needs of its member participants. Decisions with respect to process benchmarking, data gathering, performance measures, definitions and presentation of the data/results are determined by the participants. A consensus approach is applied to ensure the process is in keeping with what the majority of the participants want to do.

As the data becomes more refined and better approaches are revealed, the benchmarking process will be improved to support the needs of the participant. Much like the Water and Wastewater Benchmarking Initiative which has been occurring for nearly 15 years, definitions and processes are continuously being refined and updated to suit the members’ needs.

The National Solid Waste Benchmarking Initiative aims to:

- Use a proven benchmarking methodology to collect and compile data and information that allows “apples to apples” comparisons between solid waste management systems of different sizes, characteristics and geographic locations/demographics.
- Develop peer-to-peer relationships and foster open communication.
- Establish common goals amongst participants.
- Identify opportunities to improve performance that include identification and documentation of “Best Practices”. Participants are able to assess the performance of their programs and evaluate areas for improvement.
- Collect and compile relevant data. The data collection will be completed by a dedicated and experienced team visiting each participant’s jurisdiction and assisting in gathering the correct data.
- Allow opportunities for participants to implement tangible process improvement actions by assessing the “gaps” from program to program and the standards developed within the overall program. Specific continuous improvement strategies are refined through the analysis of the benchmarked measures.
- Provide a valuable tool for communicating to Councils and other stakeholders program performance as compared to other programs across Canada.
- Facilitate workshops and discussions to identify management and functional level process improvements that increase efficiency and effectiveness, and the potential for more cost-effective program delivery.
- Provide quality leadership – AECOM provides a broad breath of International and Canadian experience in addition to unequalled experience in the field of public utility benchmarking.

# 2 Background

## 2.1 History of Benchmarking

AECOM and the National Water and Wastewater Benchmarking Initiative participants have been successfully benchmarking municipal water, wastewater and stormwater utility operations since 1997. This partnership has grown to include more than 50 of Canada's most progressive municipal and regional utilities from coast to coast. By following a time tested and proven benchmarking methodology, a robust information database is developed for key performance measurements.

In response to an increasing number of requests for solid waste management benchmarking, AECOM launched the NSWBI in 2011. The first year focused on the aspects of the solid waste management system that most local governments have control over (i.e. single family residential homes). The first year also resulted in a report structure that is informative, easy to read and visually appealing.

This report is the result of the second year of national solid waste benchmarking initiative. It builds on the success of the first report, clarifies several uncertainties, has better definitions and has enhanced tables and graphs. Data for 2010 and 2011 are incorporated into this report.

## 2.2 Purpose of Solid Waste Benchmarking

A common misconception of Solid Waste Benchmarking is that it is a report card process that highlights the best communities and identifies deficiencies that make up the worst. Solid waste benchmarking was created as a tool that enables municipalities and regional governments to spot program differences, assess common performance indicators and develop language and definitions consistent for all programs.

Solid waste programs across the country have evolved to various stages of the solid waste hierarchy. Each community's programs and service levels are determined based on what elected officials feel their residents want or should have. Much like purchasing an automobile, the choice of vehicle is typically based on customer priorities which could range from price, fuel economy, looks, environmental values and/or reliability. Understanding these differences and being able to show how these differences perform in other jurisdictions will help solid waste managers guide their elected officials in making the best decision for their community.

The "Vision" for solid waste benchmarking is to take the common elements in solid waste systems and track how garbage and divertible materials are dealt with from the generation point to the disposal or end market point. The results of benchmarking can be used to better understand the many different approaches to managing solid waste and to develop solid waste programs that are socially, environmentally and financially responsible. The results may be used by managers to provide feedback to stakeholders on program performance, to continuously identify areas for improvement and to induce change within organizations.

### 2.3 How will Solid Waste Benchmarking Evolve?



The methodologies and protocols for benchmarking were built upon the concept of “Utility Management Framework”, where all participating utilities achieve consensus on a set of performance indicators. This consensus process has been the basis for the NSWBI and is one of the most important steps in the benchmarking project as it determines the level of importance for benchmarking each indicator.

The first year of solid waste benchmarking (2011) focused on establishing a baseline for understanding the elements of each solid waste system, how system elements were selected and the costs of implementing / sustaining specific system elements. The NSWBI first iteration focused on solid waste from single-family households.

In the second year (2012) we refined the parameter definitions and eliminated “single-family” from the NSWBI dictionary. Instead focus was given to “curbside customers” as this includes all customers provided an individual service. Based on the refined definitions it was determined that the data set from the first iteration would be adjusted to the new definitions, resubmitted and included in this second iteration report.

In addition, key performance indicators for the various aspects of solid waste infrastructure was developed. Operational data for collection and different solid waste facilities was collected along with high level budget information data. In the third iteration, the performance measures and data collection process will be further expanded and refined. To enhance this process, AECOM will develop process flow diagrams and system methodologies of the various solid waste management activities to ensure the NSWBI members have the same baseline understanding of the various processes. Establishing these methodologies will help build the solid waste management structure or framework for each community. This structure is considered the “Utility Management Framework” which should lead to development of a roadmap that will help existing and future participants identify the various key features or processes of their solid waste management system, highlight strengths and weaknesses and identify areas where action is required to change, improve or maintain solid waste management systems and programs.

**Table 2.1** National Solid Waste Benchmarking Iterations

<b>First Year</b>
Understand how solid waste programs can be benchmarked
Establish a baseline for benchmarking solid waste management systems
Identify priorities which include system costs and performance measures
Prepare a layout that summarizes the complexities of solid waste systems

<b>Second Year</b>
Refine solid waste management definitions
Benchmark results using first and second year data
Provide more detail regarding the Performance Measures presented
Enhance summary report layout
Incorporate solid waste system financial information

<b>Third Year</b>
Expand the focus for solid waste benchmarking
Develop process flow diagrams and methodologies for various aspects of solid waste management
Refine Performance Measures and summary report
Identify Key Performance Measures (KPI)
Develop trend analysis of the results to highlight best practices
Examine components for developing a solid waste management “Roadmap”

# 3 Nation-wide Solid Waste Practices

## 3.1 Statistics Canada - Solid Waste Management

Statistics Canada collects solid waste management data every two years. According to their reports, residential waste is defined as solid waste from residential sources including primary and seasonal dwellings which include all single-family, multi-family, high rise and low rise residences. Therefore, non-residential waste includes municipal solid non-hazardous waste generated by industrial, commercial and institutional (ICI) sources as well as waste generated by construction and demolition (C&D) activities.

Many waste studies include diversion rates or volumes. Diversion is, by Statistics Canada, defined as the quantity of materials diverted from disposal facilities and represents the sum of materials processed for recycling or composting facilities.

The following sections are a synopsis of the volume of waste generated, recycled and composted, throughout Canada.

### 3.1.1 Total Waste Generated - Canada

According to Statistics Canada, Canadians generated more than one tonne of waste per person per year in 2008. Generally, three-quarters of the waste stream was disposed and the remaining quarter diverted.

- Over 34 million tonnes of waste was handled by the waste management industry in 2008. Solid waste management in Canada can be summarized in the following manner:
- 26 million tonnes of waste was disposed in a landfill or by incineration
- 8 million tonnes of the waste stream was diverted or processed through material recovery facilities (MRF) or composting facilities
- Residential sources generated approximately 13 million tonnes of waste
- Non-residential sources generated approximately 21 million tonnes of waste

### Total Waste Disposal - all Sources

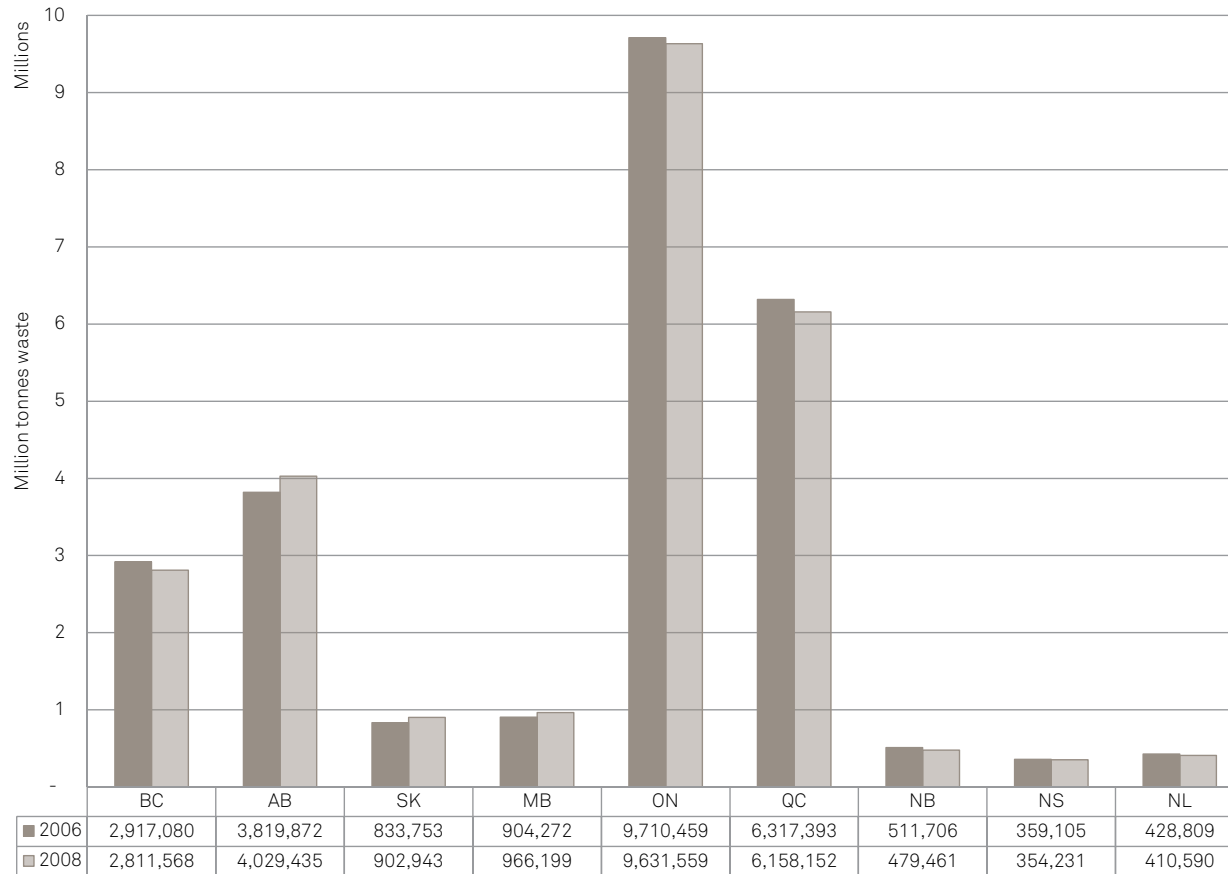


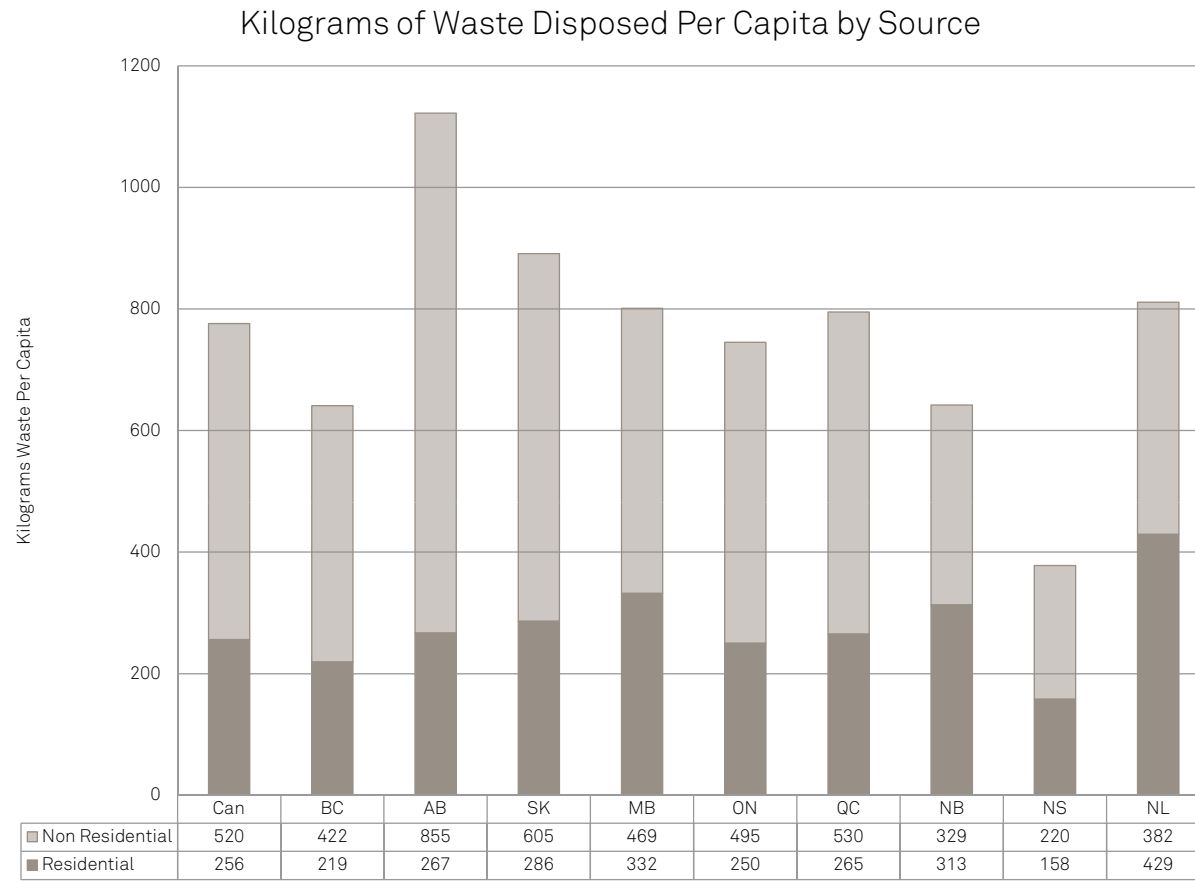
Figure 3.1 Summary of Total Waste Disposal by Province (Tonnes)

#### 3.1.2 Total Waste Disposed - by Province

Statistics Canada’s solid waste management data is broken down by province. Their study shows that the amount of waste disposed declined between 2006 and 2008 in most provinces, except for Manitoba, Saskatchewan and Alberta. Figure 3.1 provides a comparison of the total waste disposed by province in 2006 and 2008.

**Note:** Due to confidentiality requirements of the Statistics Act, data for Prince Edward Island, Yukon, Northwest Territories and Nunavut are not included in the disposal rates.

The increased disposal rate in some of the provinces is not indicative that each person in each of those provinces is disposing of more material. Population growth in those provinces could result in more waste being disposed.



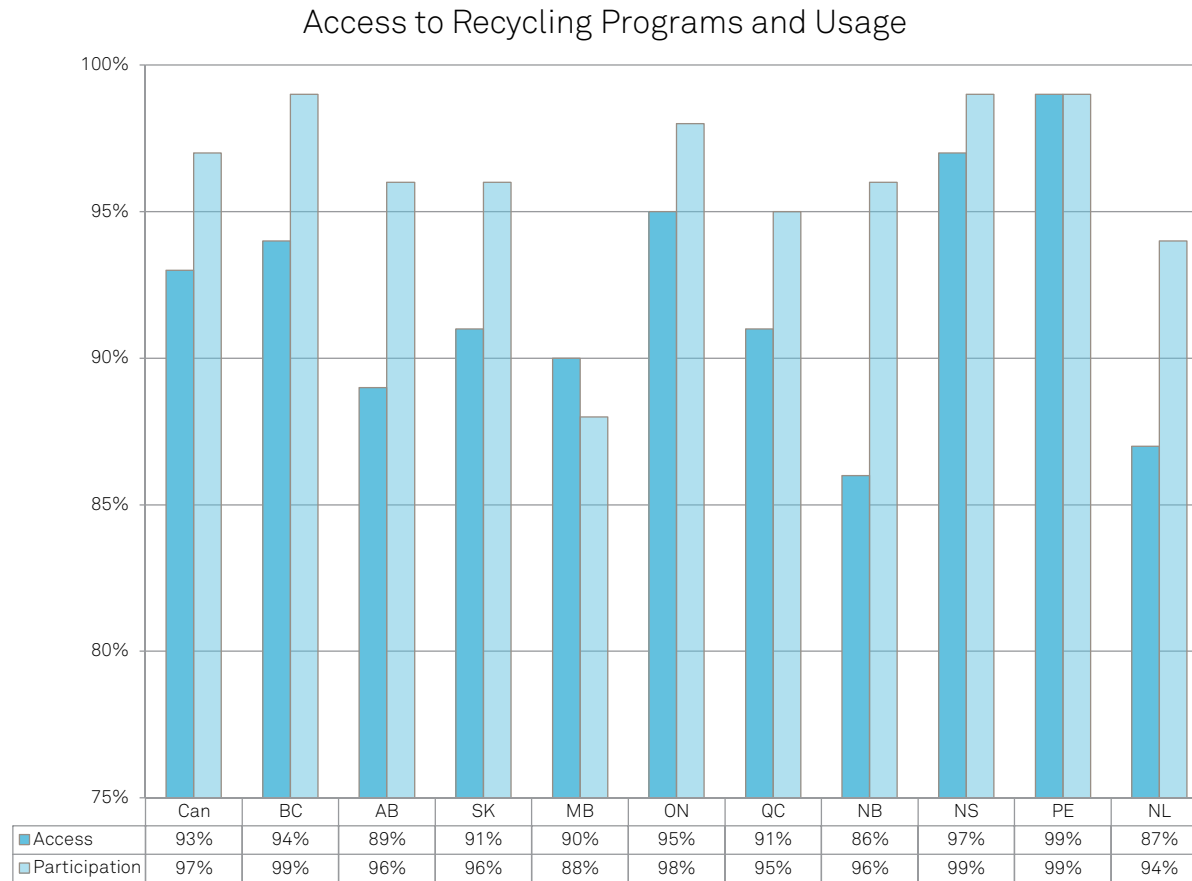
**Figure 3.2** Summary of Waste Disposal per Capita by Province (kg).

### 3.1.3 Waste Disposal per Capita - Provincial

One-third of the waste disposed in Canada in 2008 came from residential sources while the other two-thirds came from non-residential sources. These proportions were virtually unchanged when comparing statistics from 2006 and 2004. Of the 13 million tonnes of waste generated by the residential sources 8.5 million tonnes were disposed in 2008. Non-residential waste disposed rose by slightly less than 2% over the same period to 17.3 million tonnes in 2008. Figure 3.2 provides an overview of the quantity of waste disposed (in Kilograms) per capita from residential and non-residential sources for each province.

Based on the above figure, the following points can be made:

- The national average for per capita waste was 760 kilograms in 2008.
- Alberta has the highest quantity of waste disposal per capita at 1,122 kilograms.
- Newfoundland and Labrador, Quebec, Manitoba and Saskatchewan exceeded the national average for per capita waste disposal in 2008.
- Nova Scotia had the lowest per capita disposal at 378 kilograms, followed by British Columbia (641 kilograms) and New Brunswick (642 kilograms).
- Nationally, non-residential sources contributed 67% of the waste for disposal.
- Newfoundland and Labrador had the lowest proportion of non-residential waste.



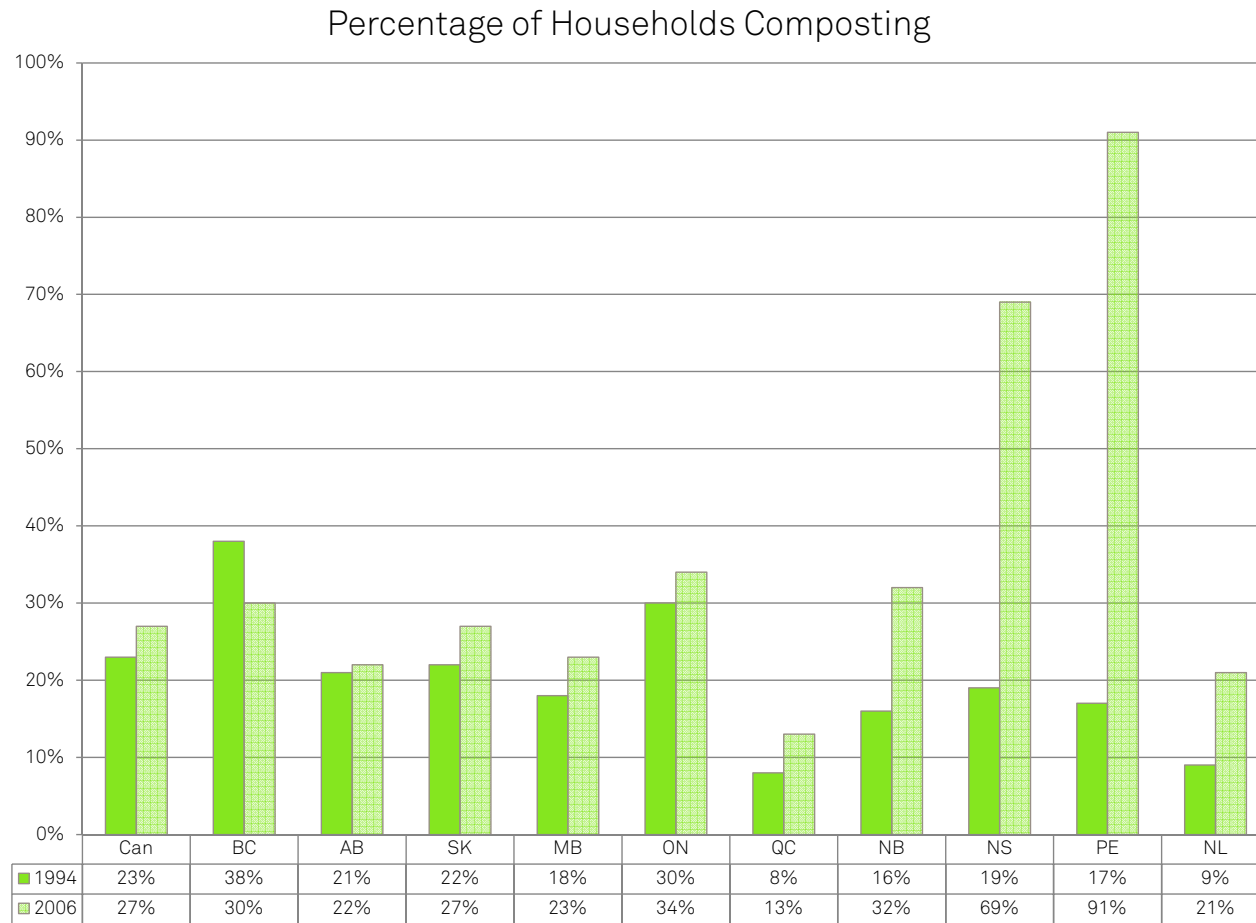
**Figure 3.3** Access to Recycling Programs and Usage.

### 3.1.4 Recycling

In 2006, 93% of all Canadian households had access to at least one form of recycling program and 97% of these households participated in using at least one of these programs. Data for 2008 is not available. Overall, across Canada, access to, and use of, a recycling program has increased since 1994. Figure 3.3 illustrates the percentage of Canadians with access to recycling programs and their participation in those programs.

In addition to the above, the following bullets summarize information on recycling programs in Canada:

- The share of households with access to a plastics recycling program increased from 63% in 1994 to 87% in 2006.
- In Prince Edward Island, access to and participation in, a program were both at 99%. This is a noticeable increase from the 1994 results when access to glass, paper, plastic and metal can recycling on average was 20%.
- Access to recycling programs improved in almost all regions of Canada between 1994 and 2006 with the largest increases reported in the Atlantic Provinces. The exception was New Brunswick, whose residents reported a slight decline in the level of access to recycling programs for bottles and metal cans.
- Saskatchewan reported a decrease in access to metal container recycling programs.



**Figure 3.4** Percentage of Households Composting (%).

### 3.1.5 Composting

Figure 3.4 illustrates the percentage of Canadian households composting in 1994 and 2006 as data for 2008 is not available. Composting programs, both backyard and curbside, have experienced a moderate increase of 4% in participation between 1994 and 2006. Almost 30% of the households that composted kitchen waste, and 38% of households that composted yard waste, had curbside collection service. The remaining households use backyard composters. High composting rates were reported by households in Prince Edward Island (91%) and Nova Scotia (69%) where regulations have banned the disposal of compostable materials in landfills.



### National Tipping Fee Survey (2011)

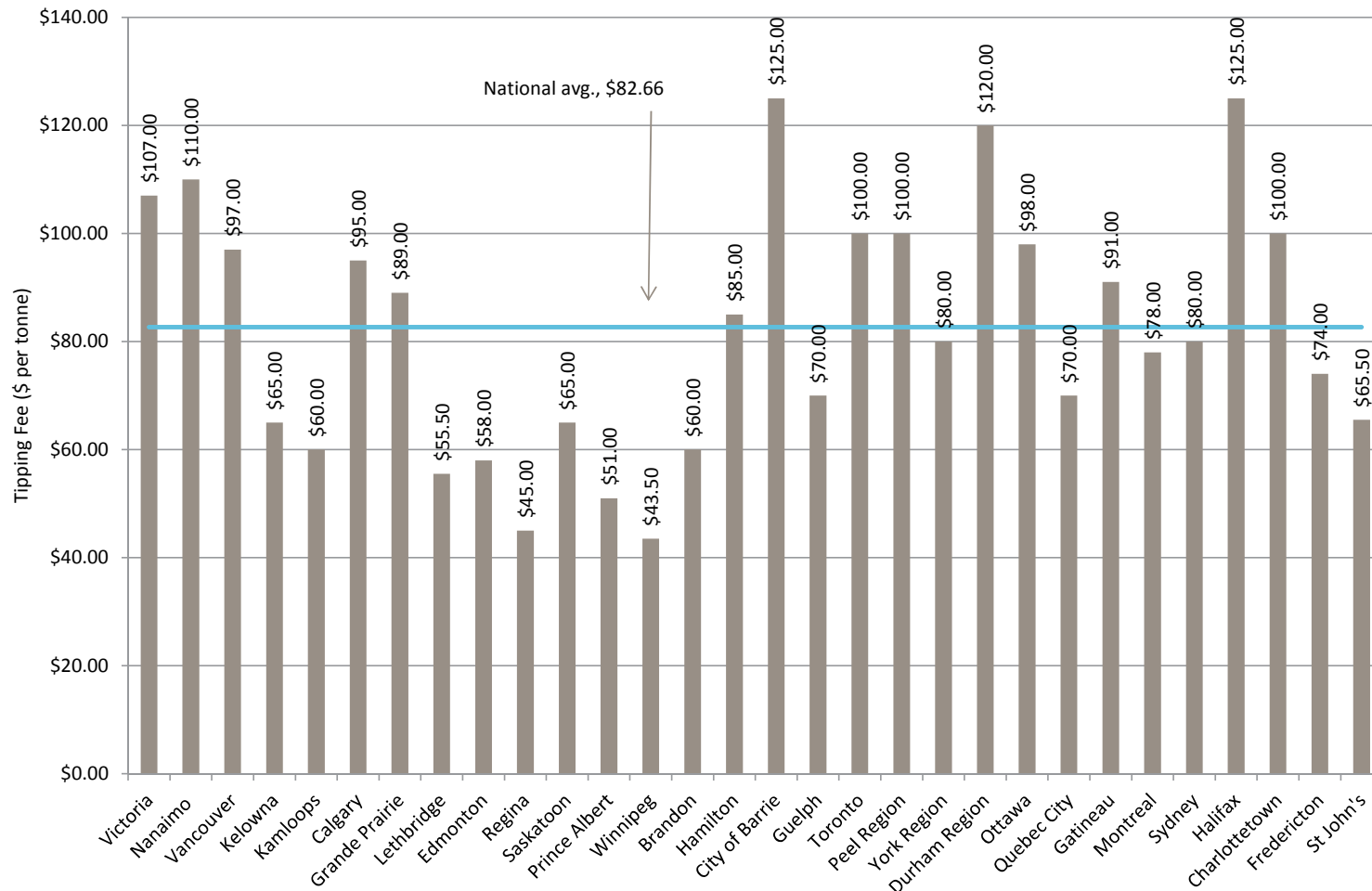


Figure 3.5 2011 MSW tipping fees at the scale across the country (west to east).

#### 3.1.6 Tipping Fee Survey

A summary of tipping fees across the country can be found in Figure 3.5.

Based on a tipping fee survey the average Canadian tipping fee for waste disposal was \$82.66 per tonne in 2011. City of Barrie and Halifax, reported the highest tipping fees in the country at \$125.00 per tonne and Winnipeg MB, reported the lowest at \$43.00 per tonne. Other funding sources vary from municipality to municipality and this impacts the tipping fee. These other funding sources may include general taxes, fee for service, industry, user pay, landfill fees and provincial grants.

### 3.2 Summary of Solid Waste Legislation

Solid waste management responsibilities are shared among the three levels of government (federal, provincial and municipal). The level of responsibility for the three levels of government can be summarized in the following manner:

Level of Government	Responsibility
Federal	Focuses on sustainable development, toxic substances, international movement, greenhouse gas emissions and operations on federal lands
Provincial	Focuses on granting approvals, licensing facilities, monitoring of operations and establishing EPR programs.
Municipal (municipalities and regional governments)	Focuses on solid waste collection, diversion (recycling and composting) and disposal.

The rules and regulations that municipal governments are required to follow vary from province to province. The table below summarizes the Acts, Regulations and Guidelines that pertain to solid waste management responsibilities.

### List of Solid Waste Management Legislation in Canada

British Columbia	
Legislation	
Acts	<ul style="list-style-type: none"> <li>• Environmental Management Act</li> <li>• Clean Energy Act</li> </ul>
Regulations	<ul style="list-style-type: none"> <li>• Recycling Regulation</li> <li>• Organic Matter Recycling Regulation</li> <li>• Landfill Gas Management Regulation</li> <li>• Clean or Renewable Resource Regulation</li> </ul>
Guidelines/Codes of Practice	
Solid Waste Management Plans	<ul style="list-style-type: none"> <li>• Guide to the Preparation of Regional Solid Waste Management Plans by Regional Districts</li> </ul>
Landfill Design Criteria	<ul style="list-style-type: none"> <li>• Landfill Criteria For Municipal Solid Waste</li> </ul>
Landfill Monitoring	<ul style="list-style-type: none"> <li>• Environmental Monitoring at Municipal Solid Waste Landfills</li> </ul>
Landfill Gas	<ul style="list-style-type: none"> <li>• Landfill Gas Generation Assessment Procedure Guidance Report</li> <li>• Landfill Gas Generation Estimation tool for annual reporting</li> <li>• Landfill Gas Generation Estimation Tool</li> <li>• Landfill Gas Management Facilities Design Guidelines</li> </ul>
Composting	<ul style="list-style-type: none"> <li>• Compost Facility Requirements Guideline</li> <li>• Land Application Guidelines for the Organic Matter Recycling Regulation and the Soil Amendment Code of Practice</li> </ul>
Transfer Stations	<ul style="list-style-type: none"> <li>• Establishing Transfer Stations for Municipal Solid Waste</li> </ul>
Waste to Energy	<ul style="list-style-type: none"> <li>• Waste to Energy: A Technical Review of Municipal Solid Waste Thermal Treatment Practices REVISED March 2011</li> </ul>

Alberta	
Legislation	
Acts	<ul style="list-style-type: none"> <li>• Environmental Protection and Enhancement Act</li> <li>• Climate Change and Emissions Management Act</li> </ul>
Regulations	<ul style="list-style-type: none"> <li>• Waste Control Regulation</li> <li>• Designated Material Recycling and Management Regulation</li> <li>• Specified Gas Emitters Regulation</li> </ul>
Guidelines/Codes of Practice	
Solid Waste Management Plans	<ul style="list-style-type: none"> <li>• Too Good To Waste Strategy</li> </ul>
Landfill Design Criteria	<ul style="list-style-type: none"> <li>• Code of Practice for Landfills</li> <li>• Code of Practice for Small Incinerators</li> <li>• Standards for Landfills in Alberta</li> </ul>
Landfill Monitoring	<ul style="list-style-type: none"> <li>• Alberta User Guide for Waste Managers</li> </ul>
Landfill Gas	<ul style="list-style-type: none"> <li>• Quantification Protocol for Landfill Gas Capture and Combustion</li> <li>• Technical Guidance for the Quantification of Specified Gas Emissions from Landfills</li> <li>• Worksheets: Landfills with Gas Collection, Landfills with Partial Gas Collection, Landfills with No Gas Collection</li> <li>• Technical Guidance for Completing Specified Gas Baseline Emission Intensity Applications</li> </ul>
Composting	<ul style="list-style-type: none"> <li>• Code of Practice for Compost Facilities</li> <li>• Mid Scale Composting Manual</li> <li>• Standards for Composting in Alberta</li> </ul>
Transfer Stations	<ul style="list-style-type: none"> <li>• Alberta Transfer Station Technical Guidance Manual</li> <li>• Alberta's User Guide for Waste Managers</li> </ul>
Waste to Energy	<ul style="list-style-type: none"> <li>• Code of Practice for Energy Recovery</li> </ul>

Saskatchewan	
Legislation	
Acts	<ul style="list-style-type: none"> <li>• Environmental Management and Protection Act</li> <li>• Clean Air Act</li> </ul>
Regulations	<ul style="list-style-type: none"> <li>• Municipal Refuse Management Regulations</li> <li>• Clean Air Regulations</li> </ul>
Guidelines/Codes of Practice	
Solid Waste Management Plans	<ul style="list-style-type: none"> <li>• Starting a Regional Waste Management System in Saskatchewan</li> </ul>
Landfill Design Criteria	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Landfill Monitoring	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Landfill Gas	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Composting	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Transfer Stations	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Waste to Energy	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>

Manitoba	
Legislation	
Acts	<ul style="list-style-type: none"> <li>• Environment Act</li> <li>• Waste Reduction and Prevention Act</li> </ul>
Regulations	<ul style="list-style-type: none"> <li>• Waste Disposal Grounds Regulation</li> <li>• Incinerators Regulation</li> </ul>
Guidelines/Codes of Practice	
Solid Waste Management Plans	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Landfill Design Criteria	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Landfill Monitoring	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Landfill Gas	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Composting	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Transfer Stations	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Waste to Energy	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>

Ontario	
Legislation	
Acts	<ul style="list-style-type: none"> <li>• Environmental Protection Act</li> <li>• Environmental Assessment Act</li> <li>• Waste Diversion Act</li> <li>• Water Resources Act</li> </ul>
Regulations	<ul style="list-style-type: none"> <li>• General Waste Management Regulation 347</li> <li>• Landfilling Sites Regulation 232</li> <li>• Liquid Fuels Regulation 217</li> <li>• Recycling and Composting of Municipal Waste Regulation 101</li> <li>• Waste Audits and Waste Reduction Work Plans Regulation</li> <li>• Industrial, Commercial and Institutional Source Separation Programs Regulation</li> <li>• Packaging Audits and Packaging Reduction Work Plans Regulation</li> </ul>
Guidelines/Codes of Practice	
Solid Waste Management Plans	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Landfill Design Criteria	<ul style="list-style-type: none"> <li>• Landfill Standards: A Guideline on the Regulator and Approval Requirements for New or Expanding Landfilling Sites</li> </ul>
Landfill Monitoring	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Landfill Gas	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Composting	<ul style="list-style-type: none"> <li>• Ontario Compost Quality Standards (Standards)</li> <li>• Guideline for the Production of Compost in Ontario</li> </ul>
Transfer Stations	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Waste to Energy	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>

Quebec	
Legislation	
Acts	<ul style="list-style-type: none"> <li>• E-13.1_A An Act respecting the establishment and enlargement of certain waste elimination sites</li> <li>• Environment Quality Act</li> </ul>
Regulations	<ul style="list-style-type: none"> <li>• Regulation respecting solid waste</li> <li>• Regulation respecting pulp and paper mills</li> <li>• Regulation respecting the application of the Environment Quality Act</li> </ul>
Guidelines/Codes of Practice	
Solid Waste Management Plans	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Landfill Design Criteria	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Landfill Monitoring	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Landfill Gas	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Composting	<ul style="list-style-type: none"> <li>• Guidelines on Approval Procedures and Siting and Operations Criteria for Organic Composting or Inorganic Recovery Facilities (preliminary, July 1999)</li> </ul>
Transfer Stations	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Waste to Energy	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>

New Brunswick	
Legislation	
Acts	<ul style="list-style-type: none"> <li>• Clean Environment Act</li> <li>• Clean Air Act</li> <li>• Clean Water Act</li> </ul>
Regulations	<ul style="list-style-type: none"> <li>• Regional Solid Waste Commissions Regulation</li> <li>• Designated Materials Regulation</li> <li>• Air Quality Regulation</li> </ul>
Guidelines/Codes of Practice	
Solid Waste Management Plans	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Landfill Design Criteria	<ul style="list-style-type: none"> <li>• Guidelines for the Siting and Operation of a Construction and Demolition Debris Disposal Site</li> </ul>
Landfill Monitoring	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Landfill Gas	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Composting	<ul style="list-style-type: none"> <li>• Guidelines for the Site Selection, Operation and Approval of Composting Facilities in New Brunswick</li> </ul>
Transfer Stations	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Waste to Energy	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>

Nova Scotia	
Legislation	
Acts	<ul style="list-style-type: none"> <li>• Environment Act</li> <li>• Environmental Goals and Sustainable Prosperity Act</li> </ul>
Regulations	<ul style="list-style-type: none"> <li>• Solid Waste-Resource Management Regulation</li> <li>• Material Banned from Disposal Sites Regulation</li> </ul>
Guidelines/Codes of Practice	
Solid Waste Management Plans	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Landfill Design Criteria	<ul style="list-style-type: none"> <li>• Municipal Solid Waste Landfill Guidelines</li> <li>• Guidelines for Industrial Landfills</li> <li>• Construction and Demolition Debris Disposal Site Guidelines</li> </ul>
Landfill Monitoring	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Landfill Gas	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>
Composting	<ul style="list-style-type: none"> <li>• Composting Facility Guidelines</li> </ul>
Transfer Stations	<ul style="list-style-type: none"> <li>• Siting and Operation of Waste Transfer Stations Guidelines</li> </ul>
Waste to Energy	<ul style="list-style-type: none"> <li>• No Regulations</li> </ul>

Prince Edward Island	
Legislation	
Acts	• Environmental Protection Act
Regulations	• Waste Resource Management Regulations • Materials Recycling Regulations
Guidelines/Codes of Practice	
Solid Waste Management Plans	• No Regulations
Landfill Design Criteria	• No Regulations
Landfill Monitoring	• No Regulations
Landfill Gas	• No Regulations
Composting	• No Regulations
Transfer Stations	• No Regulations
Waste to Energy	• No Regulations

Newfoundland & Labrador	
Legislation	
Acts	• Environmental Protection Act
Regulations	• Waste Management Regulations
Guidelines/Codes of Practice	
Solid Waste Management Plans	• No Regulations
Landfill Design Criteria	• Environmental Standards for Municipal Solid Waste Landfill Sites
Landfill Monitoring	• No Regulations
Landfill Gas	• No Regulations
Composting	• Environmental Standards for Municipal Solid Waste Compost Facilities
Transfer Stations	• Environmental Standards for Municipal Solid Waste Transfer Stations / Local Waste Management Facilities
Waste to Energy	• No Regulations

### 3.3 Extended Producer Responsibility (EPR)

Extended Producer Responsibility (EPR) programs were established to lessen the financial burden on tax payers and municipalities for the cost of disposal or management of many common products that were historically discarded in a municipal solid waste management program.

EPR programs are established at a provincial level through regulations and stewardship boards. Several provinces began establishing EPR programs in the 1990s. The number and types of programs vary from province to province. The Canadian Council of Ministers of Environment (CCME) prepared a Canada-Wide Action Plan for EPR programs in 2009 to create a harmonized approach to developing these programs. Below is a figure that summarizes the EPR programs that are in-place, conducted on a voluntary basis or in the process of being developed.

Summary of Provincial EPR Programs (as of August 2011)		British Columbia	Alberta	Saskatchewan	Manitoba	Ontario	Quebec	New Brunswick	Nova Scotia	Prince Edward Island	Newfoundland
<b>Number of EPR Programs</b>		17	7	5	7	10	7	3	10	17	4
Blue Box	Beverage Containers	In Place	In Place	In Place		In Place	In Place	In Place	In Place	In Place	In Place
	Milk Containers	Voluntary	In Place	Voluntary				Being Developed	Being Developed	In Place	Being Developed
	Printed Materials			Being Developed	In Place	In Place	In Place		In Place	In Place	
	Packaging & Printed Paper	Being Developed	Being Developed	Being Developed	In Place	In Place	In Place	Being Developed		In Place	
Electronic	Electronic Waste (E-Waste)	In Place	In Place	In Place	Being Developed	In Place	Being Developed		In Place	In Place	
	Batteries	In Place			Being Developed	In Place	Being Developed	Being Developed	In Place	In Place	
	Cell Phones	In Place	Voluntary	Voluntary	Voluntary	In Place	Being Developed	Being Developed	In Place	Voluntary	Voluntary
	Appliances (Small)	Being Developed				Being Developed				In Place	
Auto	Tires	In Place	In Place	In Place		In Place	In Place	In Place	In Place	In Place	In Place
	Batteries (Lead Acid)	In Place	In Place		Being Developed	In Place	Being Developed	Being Developed	In Place	In Place	In Place
	Anti-Freeze	In Place			Being Developed		Being Developed			In Place	
	Oil (Auto/Industrial)	In Place	In Place	In Place	In Place	In Place	In Place	Being Developed	In Place	In Place	In Place
	Autos - Retire Your Ride	In Place	Voluntary	Voluntary	Voluntary	Voluntary	Voluntary	Voluntary	Voluntary	In Place	Voluntary
HHW/Biomed	Used Paint	In Place	In Place	In Place	Being Developed	In Place	In Place	In Place	In Place	In Place	Being Developed
	Pesticides	In Place	Voluntary	Voluntary	In Place	Voluntary	In Place	Voluntary	Voluntary	Voluntary	Being Developed
	Mercury containing equip	In Place	Voluntary	Voluntary	Being Developed	Voluntary	Being Developed	Voluntary	Voluntary	Voluntary	Voluntary
	Needles/Sharps	In Place			In Place	Being Developed			In Place	In Place	
	Pharmaceuticals	In Place	Voluntary		In Place	Being Developed			Voluntary	Voluntary	
Bulky	Flourescents	In Place			Being Developed	Being Developed	Being Developed			In Place	
	Appliances (Large)	Being Developed				Being Developed				In Place	
	Outdoor Power Equip.	Being Developed								In Place	

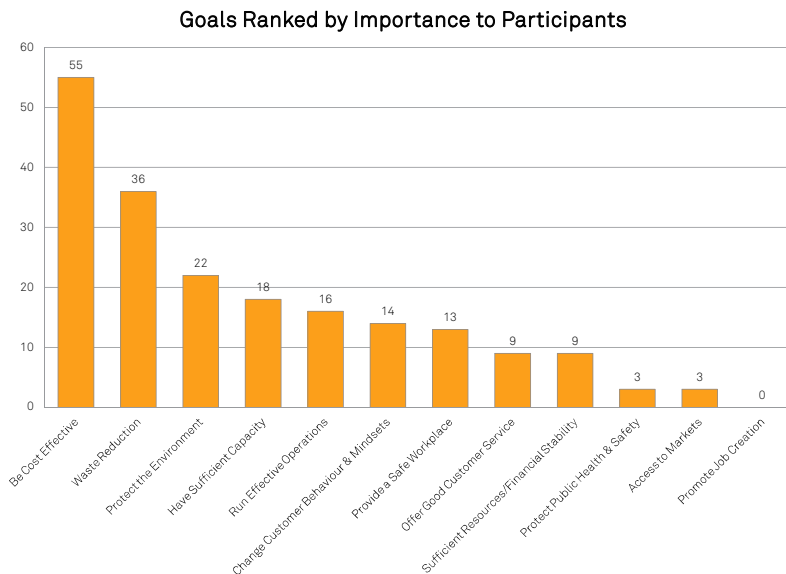
- In Place
- ▲ Voluntary
- ◆ Being Developed

Figure 3.6 Summary of in Place Voluntary and Upcoming EPR Programs Across Canada.

# 4 Goals + Performance Measures

The National Solid Waste Benchmarking Initiative is a membership of municipalities that are focused on understanding solid waste management systems across Canada. Although each member faces different issues and challenges, there was general agreement from participants on the goals for their solid waste management programs. During the kick-off workshop on March 9-10, 2011, the group ranked the following goals that are important for their communities to benchmark. The ranking is presented in Figure 4.1.

The top six goals were chosen based on priority from the surveyed performance measures. The Performance Measures that were identified in order of priority are listed in Table 4.1.



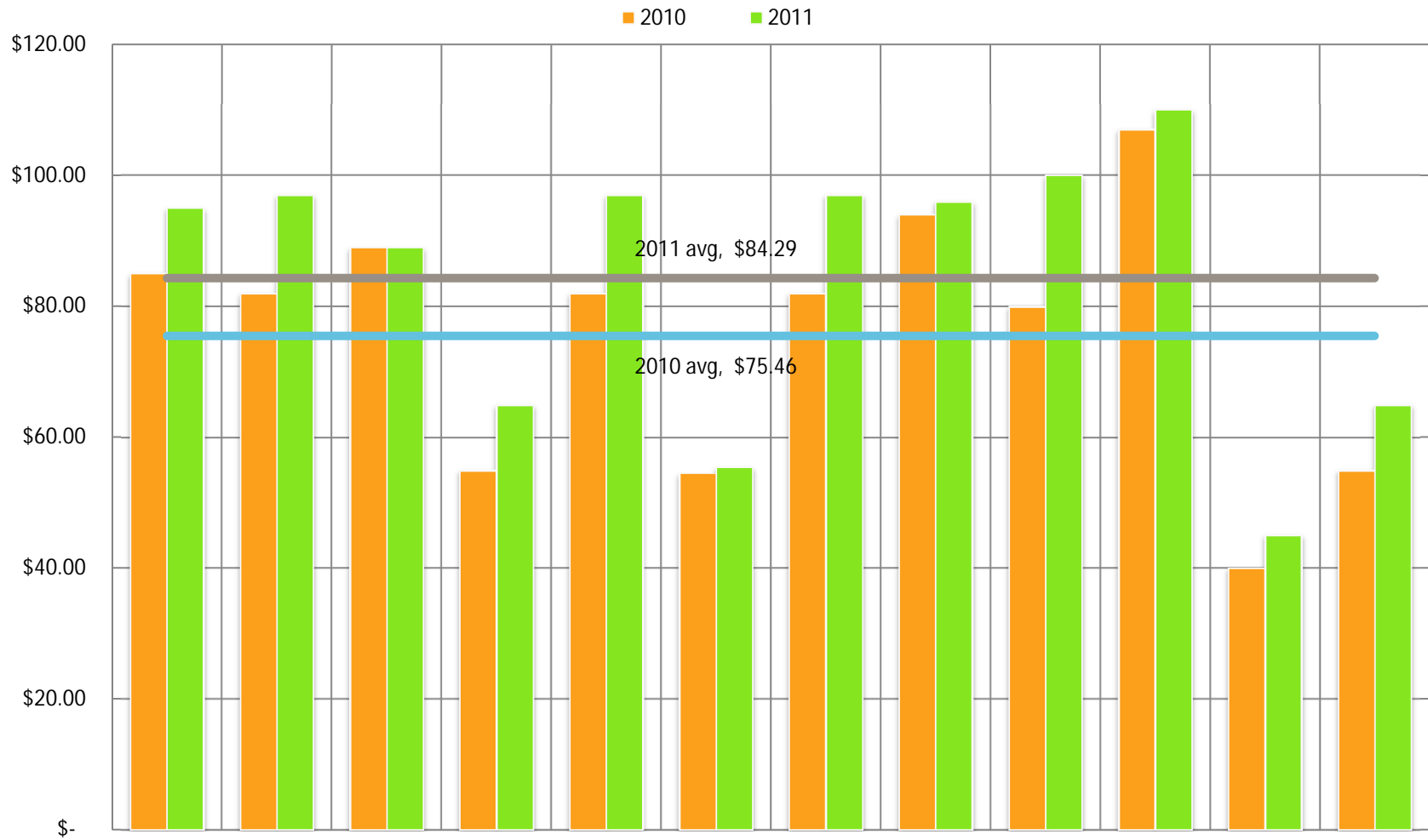
**Figure 4.1** Solid Waste Management Goals Ranked During the 2011 Kick-Off Workshop.

Goals	Performance Measures
<b>Be cost effective</b>	Disposal cost per tonne
	Disposal cost for household
	Disposal cost per capita
	Total cost per tonne
	Total cost per household
	Total cost per capita
	Processing cost (MRF)
	Processing cost (transfer station)
	Processing cost (compost)
Cost of environmental monitoring program	
Cost of airspace	
Overhead costs	
<b>Run effective operations</b>	Turnaround time at the scales
<b>Waste reduction</b>	Annual garbage tonnage per capita
	Annual organics tonnage per capita
	Annual recycling (+EPR) tonnage per capita
	Annual diversion rate
	Residue rate
Number of backyard composters sold per year	
<b>Protect the environment</b>	GHG emissions from landfills
	GHG emissions from composts
	GHG emissions from recycling
	GHG emissions form waste to energy facility
<b>Have sufficient capacity</b>	Collection infrastructure
	Organic management facilities
	MRF
	Landfill - total airspace availability
<b>Change costumer behaviour and mindset</b>	Education programs
	Household total output per capita

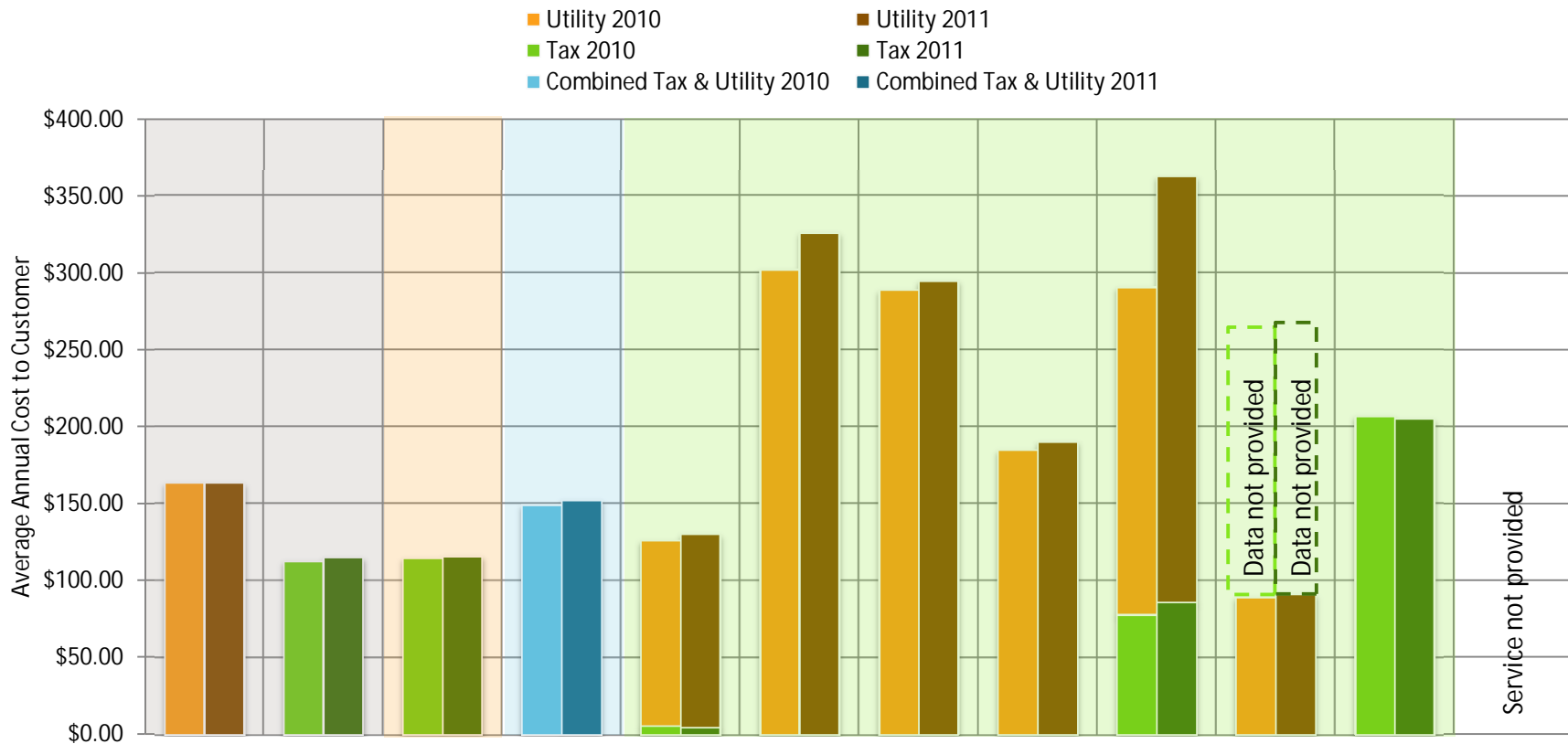
**Table 4.1** Solid Waste Management Program Goals and Related Benchmarking Performance Measures.



# Garbage disposal tipping fee per tonne



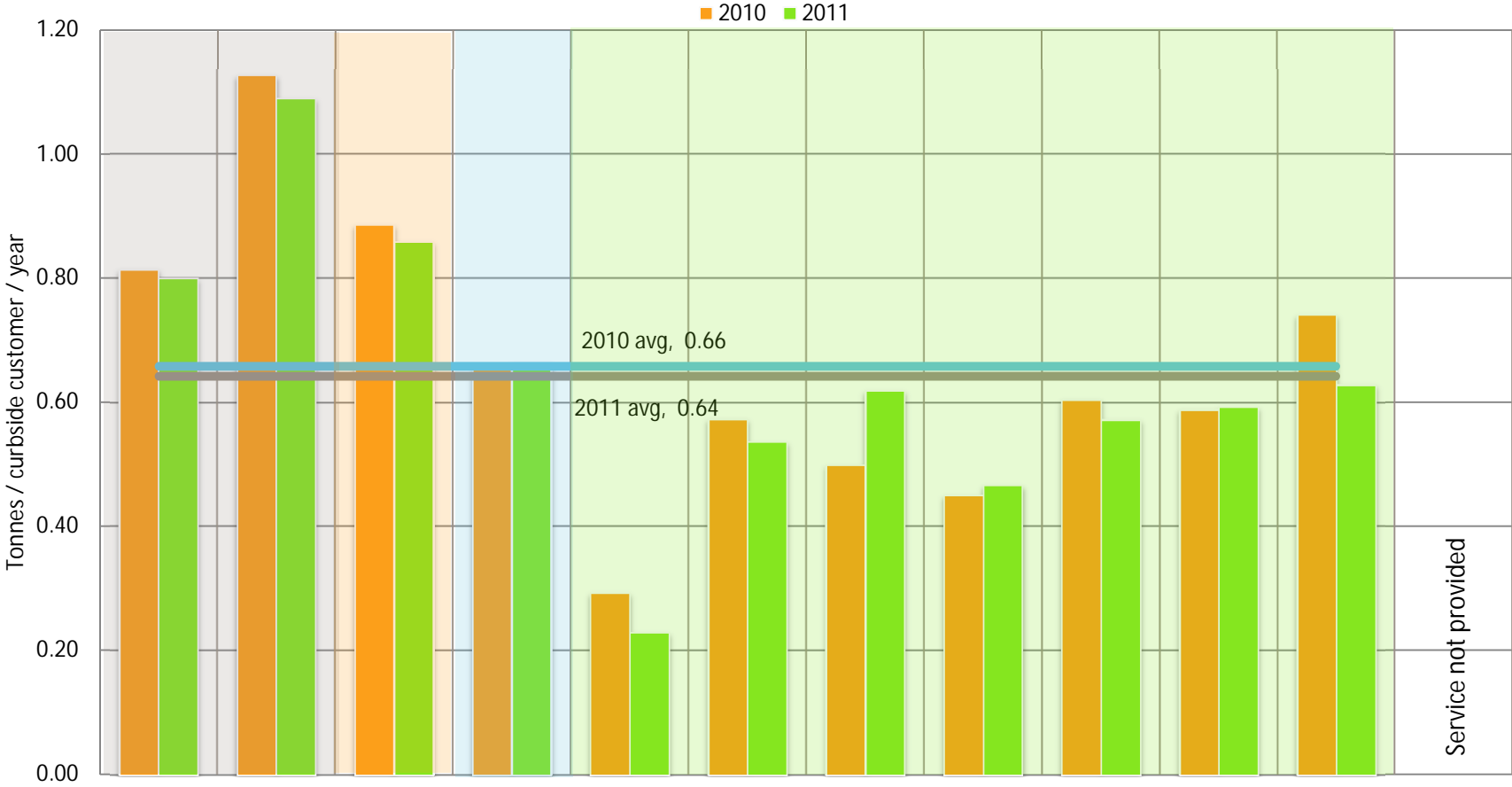
## Average Annual Cost to Customer for Solid Waste Management Service (including direct utility fees, property tax and other indirect taxes)



Grouped based on service provided:

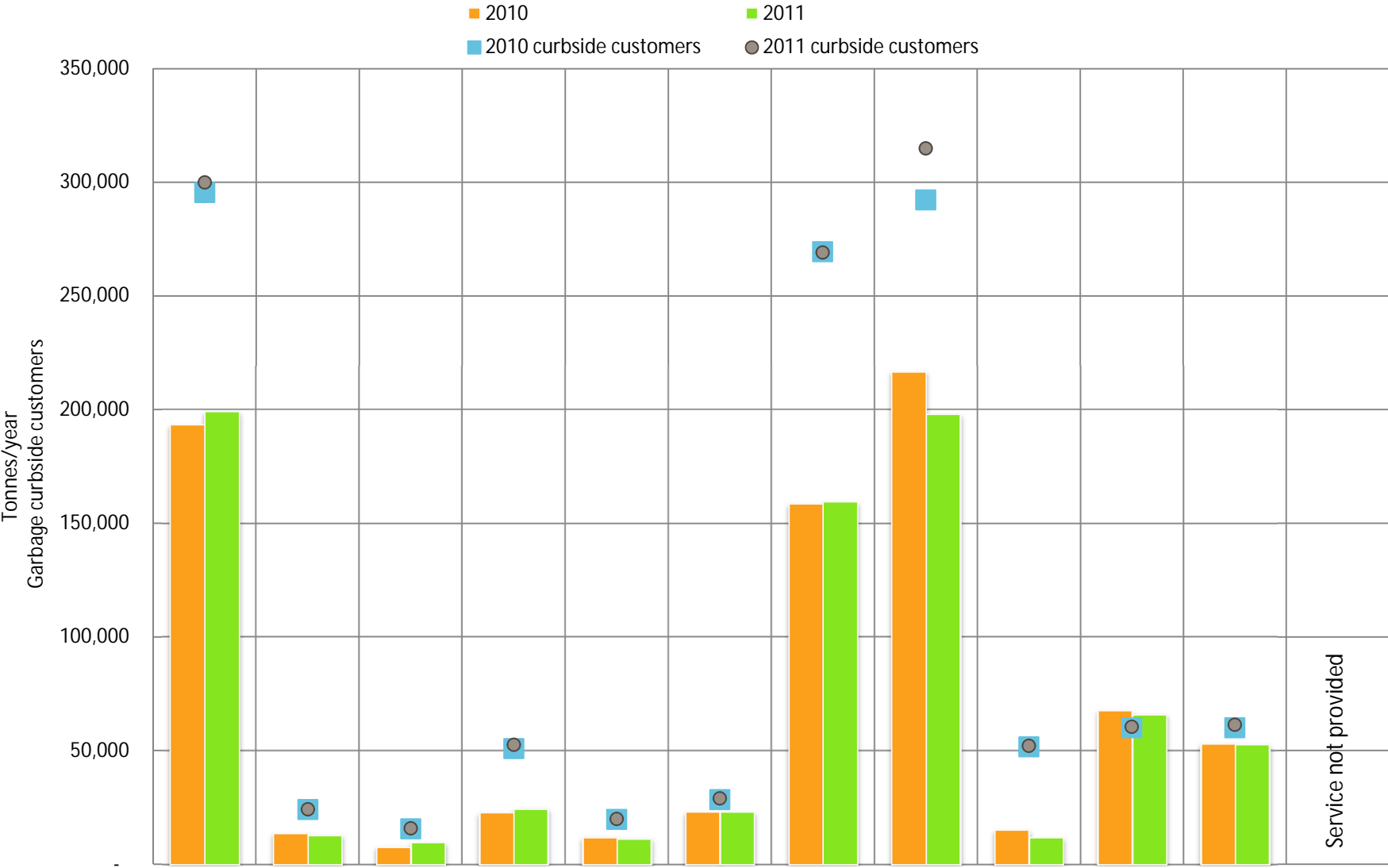
- Garbage curbside collection
- Garbage + seasonal organics curbside collection
- Garbage + recyclables curbside collection
- Garbage + recyclables + organics curbside collection

# Garbage collected at the curb per customer per year

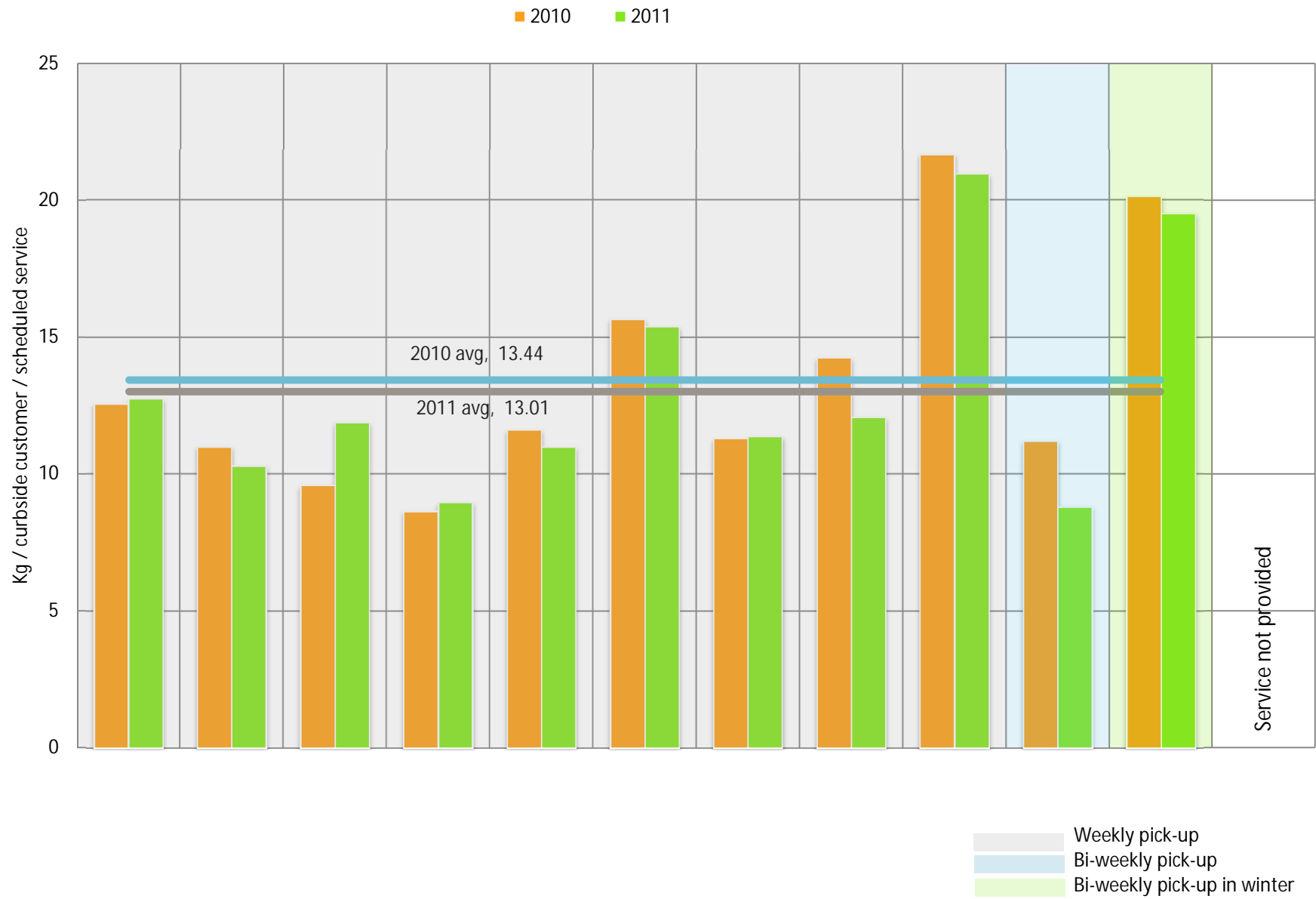


- Grouped based on service provided:
- Garbage curbside collection
  - Garbage + seasonal organics curbside collection
  - Garbage + recyclables curbside collection
  - Garbage + recyclables + organics curbside collection

# Garbage collected per year in relation to # of curbside customers

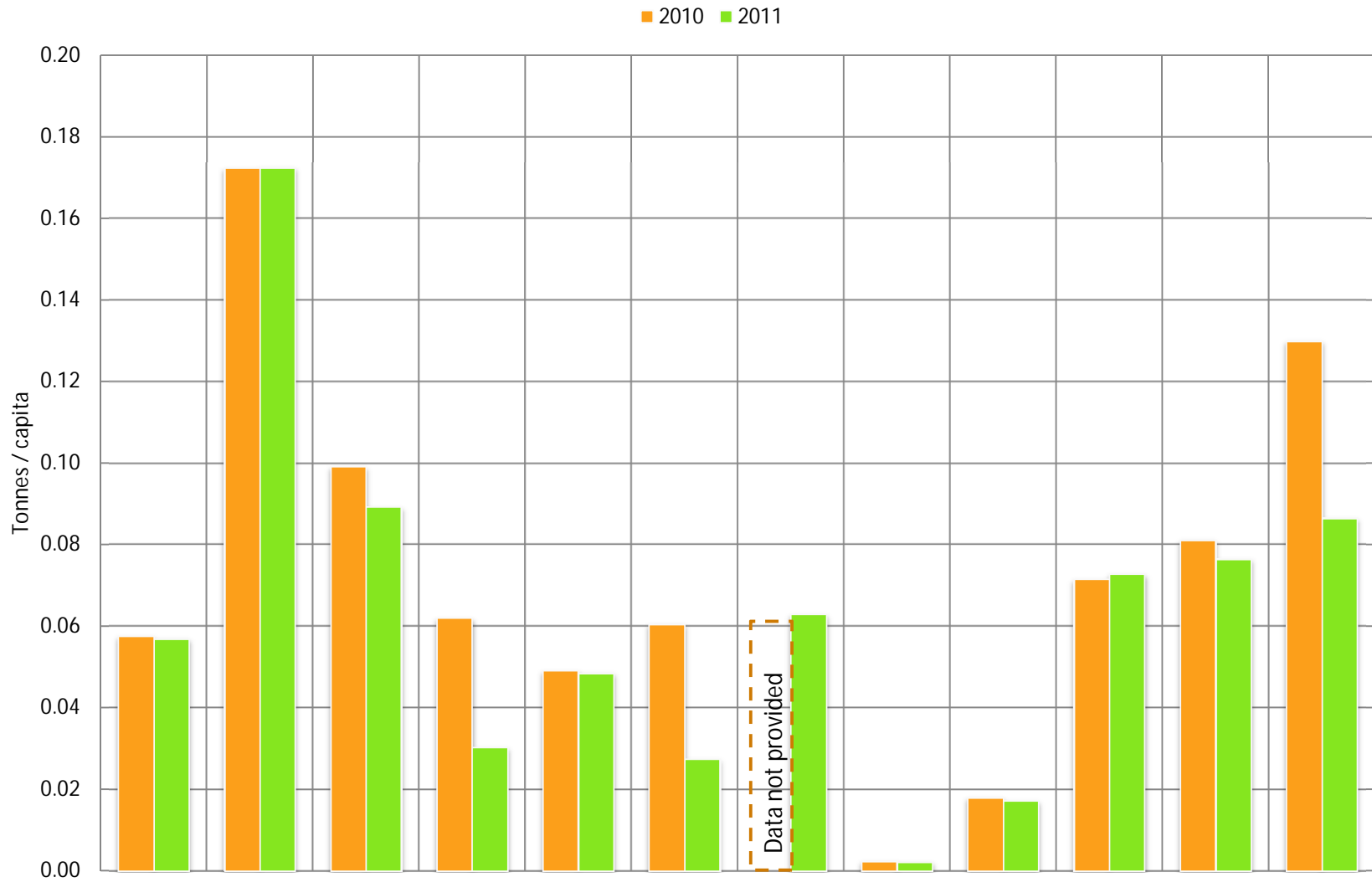


# Garbage collected at the curb per customer per scheduled service





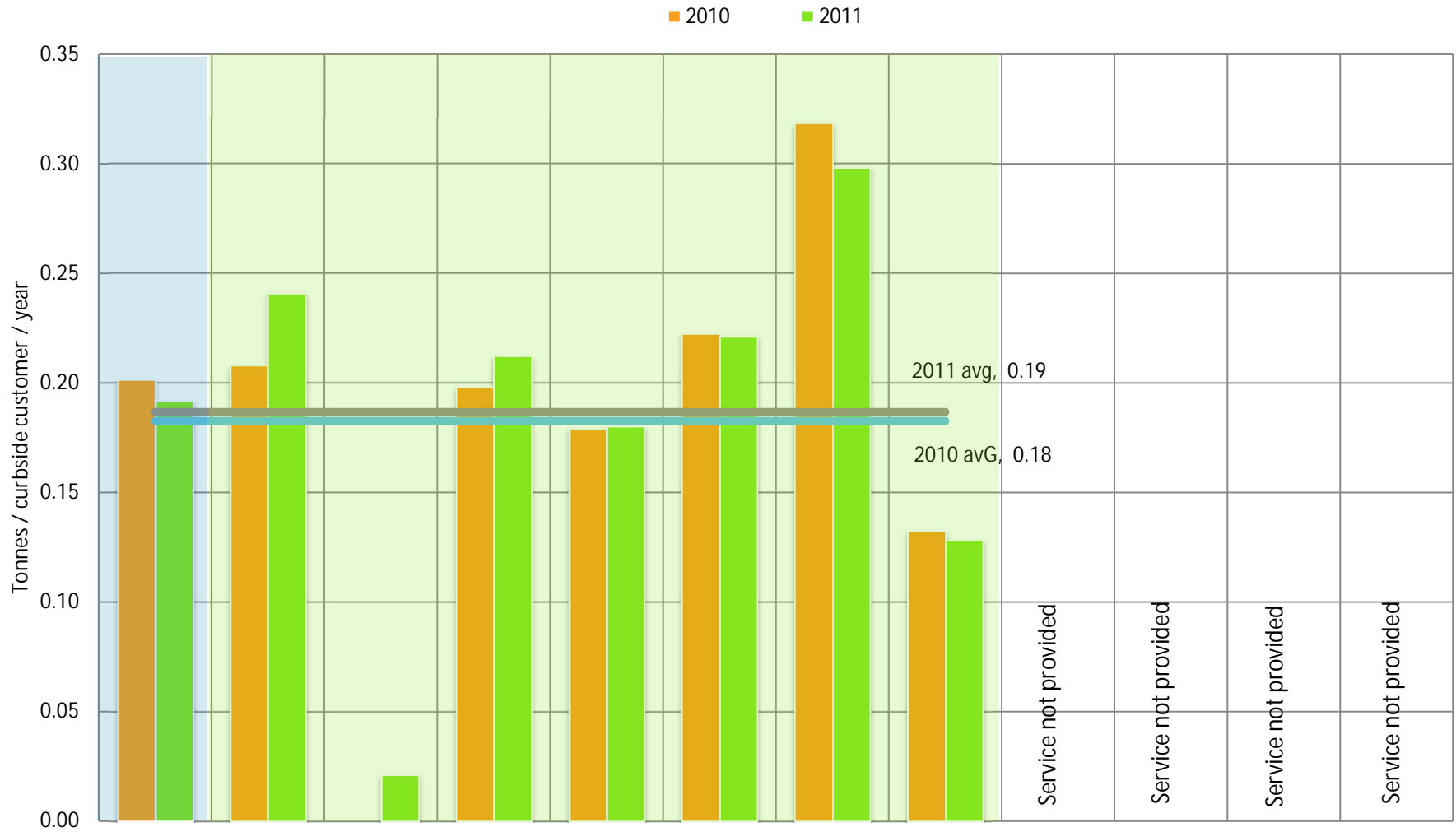
# Residential garbage selfhauled to landfill/transfer station







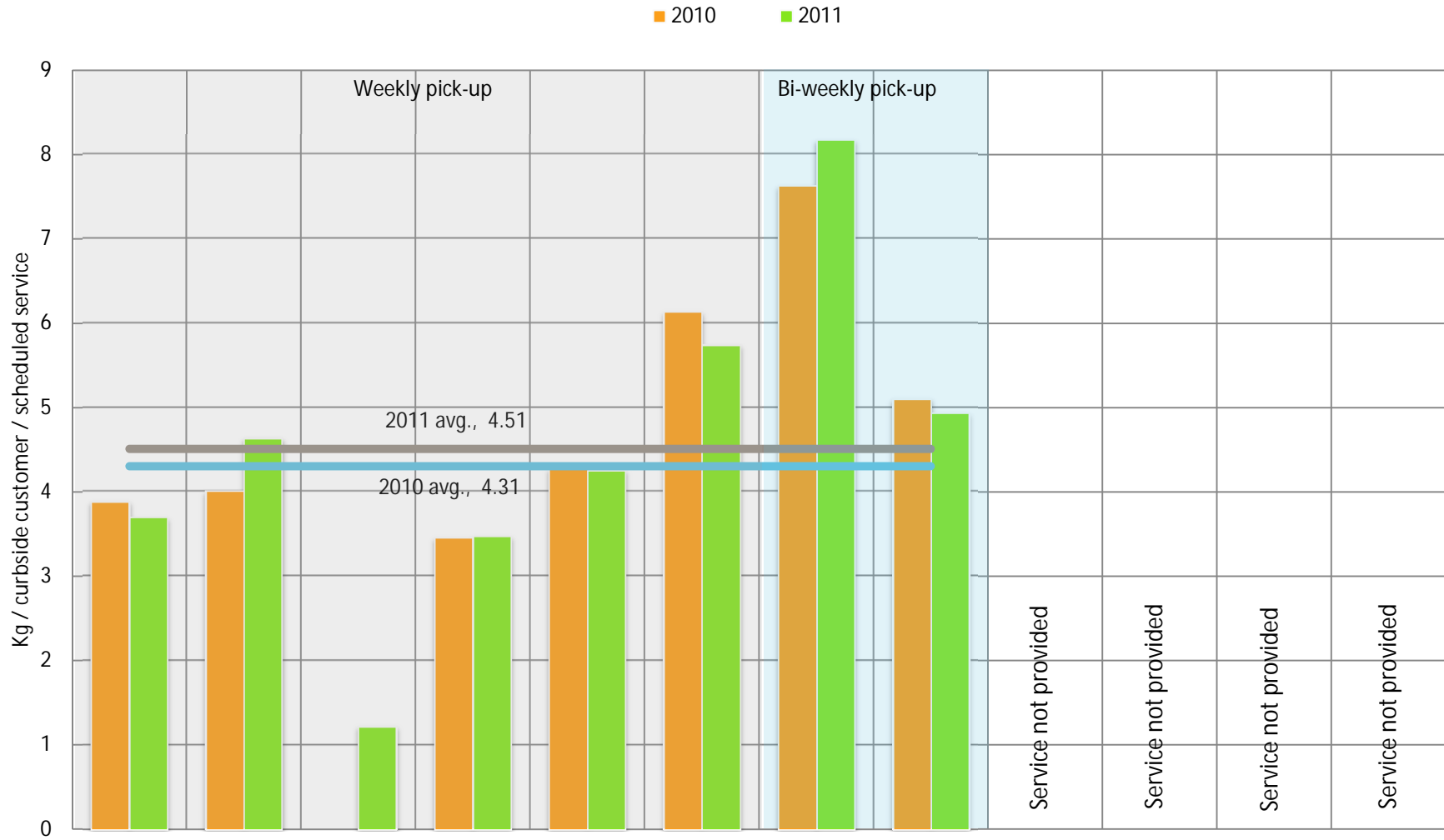
# Recyclables collected at the curb per customer per year



Grouped based on service provided:

- Garbage + recyclables curbside collection
- Garbage + recyclables + organics curbside collection

# Recyclables collected at the curb per customer per scheduled service



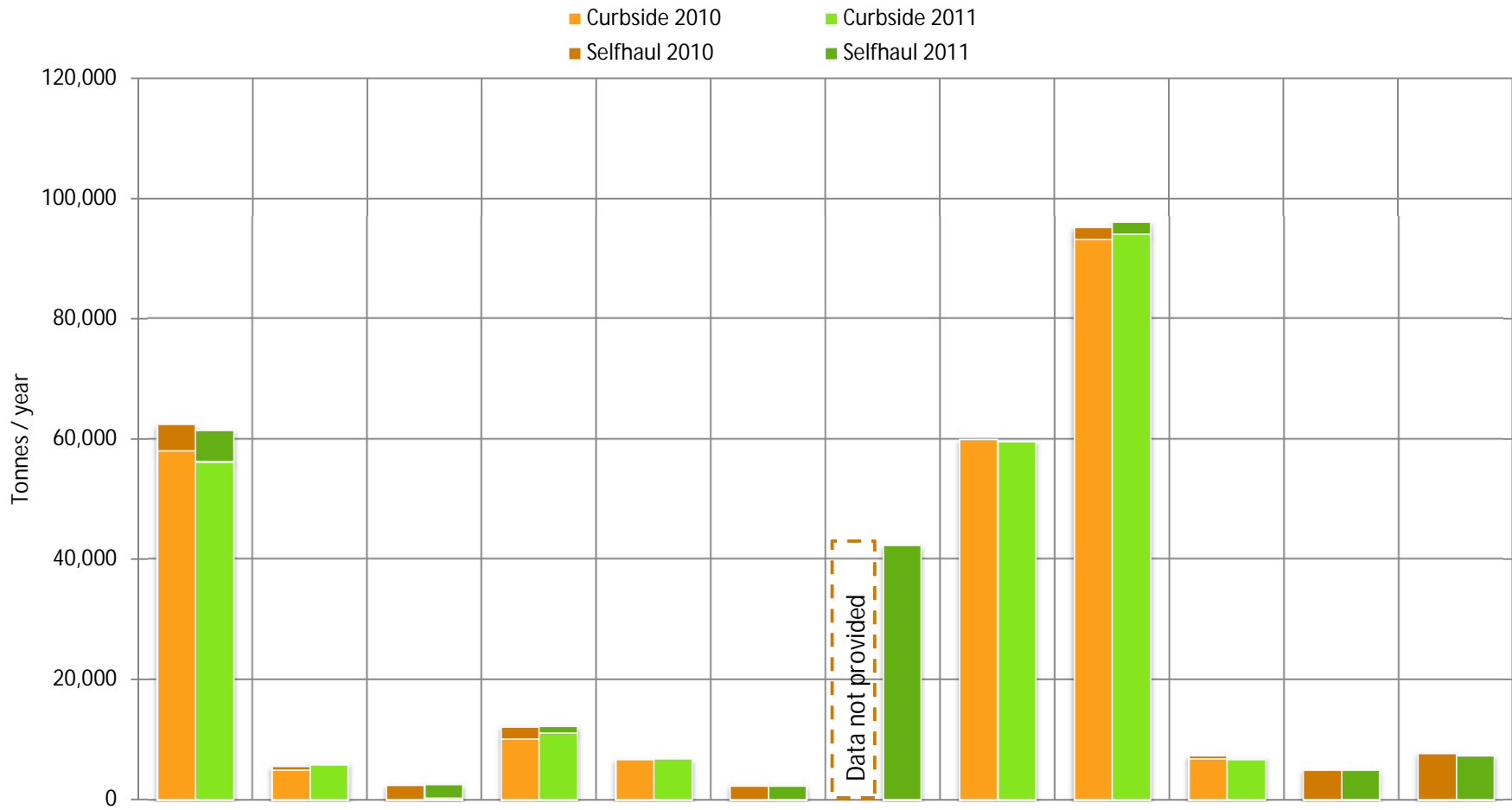
SELFHAUL - RESIDENTIAL  
CURBSIDE TYPE  
RECYCLABLES DIVERTED

	Community 1	Community 2	Community 3	Community 4	Community 5	Community 6	Community 7	Community 8	Community 9	Community 10	Community 11	Community 12
OCC	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Newsprint	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓
White/office paper	✓		✓	✓		✓	✓		✓	✓	✓	✓
Mixed paper	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓
Plastics #1	✓	✓	✓	✓		✓	✓		✓	✓		
Plastics #2	✓	✓	✓	✓		✓	✓		✓	✓		
Plastics #3	✓		✓	✓		✓			✓	✓		
Plastics #4	✓	✓	✓	✓		✓	✓		✓	✓		
Plastics #5	✓	✓	✓	✓		✓	✓		✓	✓		
Plastics #6	✓		✓	✓		✓			✓	✓		
Plastics #7	✓		✓	✓		✓			✓	✓		
Ferrous metal	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Non-ferrous metal	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Coloured glass	✓	✓	✓	✓			✓		✓	✓	✓	
Clear glass	✓	✓	✓	✓		✓	✓		✓	✓	✓	

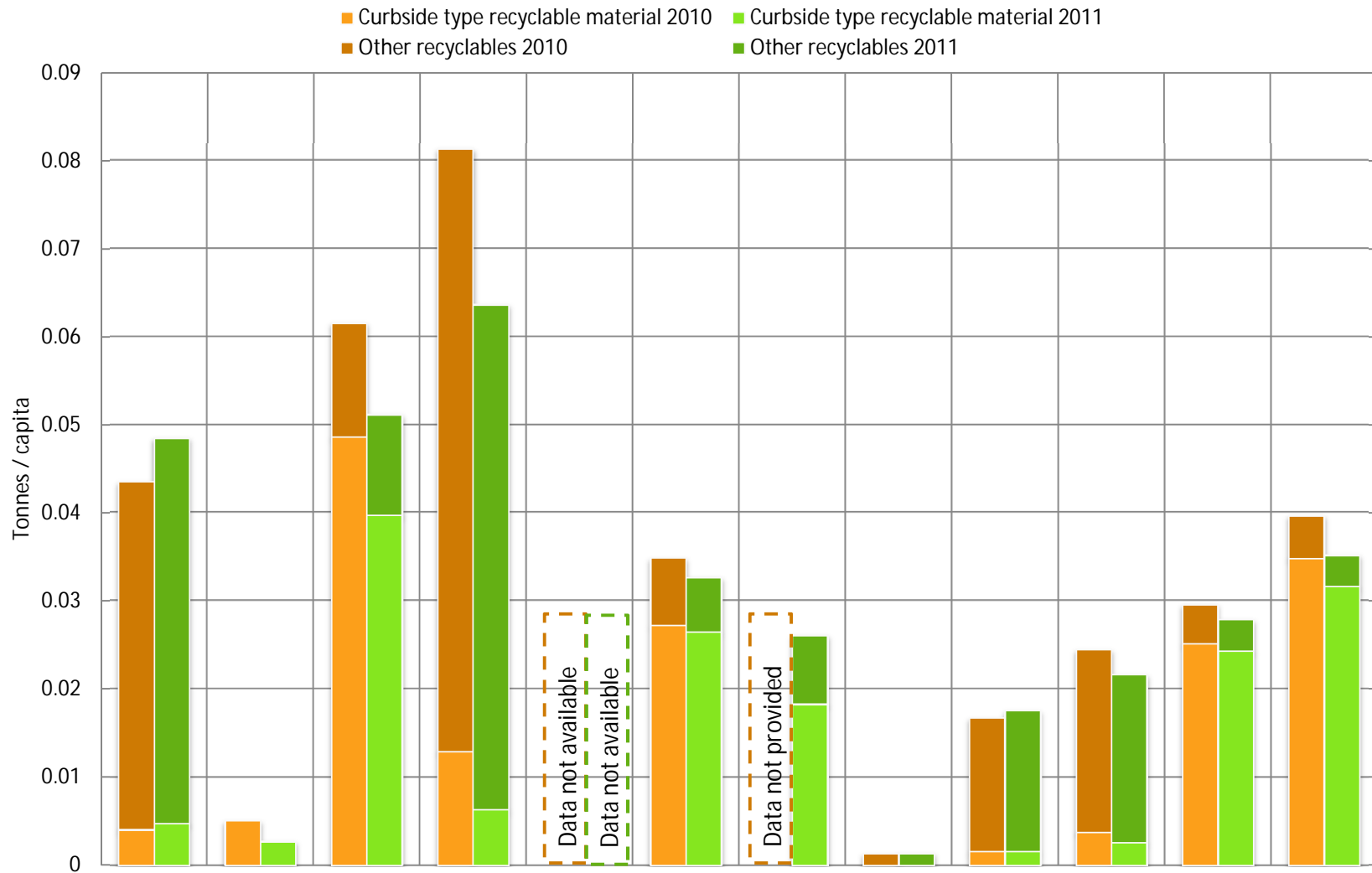
SELFHAUL - RESIDENTIAL  
OTHER RECYCLABLES  
DIVERTED

	Community 1	Community 2	Community 3	Community 4	Community 5	Community 6	Community 7	Community 8	Community 9	Community 10	Community 11	Community 12
Appliances/white goods	✓	✓	✓		✓	✓		✓	✓	✓	✓	
Batteries	✓	✓	✓			✓		✓	✓	✓	✓	
Beverage deposit containers	✓	✓				✓			✓			✓
Carpet								✓				
Drywall	✓	✓	✓		✓	✓		✓	✓			
Electronics	✓	✓			✓	✓		✓				
Fluorescent light bulbs		✓						✓				
HHW	✓	✓			✓	✓	✓	✓		✓	✓	
Mercury containing equipment	✓	✓						✓				
Milk containers	✓	✓						✓	✓			✓
Needles/sharps								✓				
Oil + oil filters	✓	✓			✓	✓		✓				✓
Pharmaceuticals								✓	✓			
Propane tanks	✓	✓	✓			✓		✓		✓	✓	
Re-usable goods		✓	✓			✓		✓				
Single-use retail bags	✓	✓						✓				
Scrap metal	✓	✓	✓			✓	✓	✓		✓	✓	
Shingles	✓	✓	✓					✓	✓	✓		
Tires	✓	✓	✓		✓	✓	✓	✓	✓			
Wood waste	✓	✓	✓			✓		✓		✓		
Used Paint	✓	✓						✓	✓			

# Curbside recyclables collected at the curb and curbside type recyclables selfhauled per year



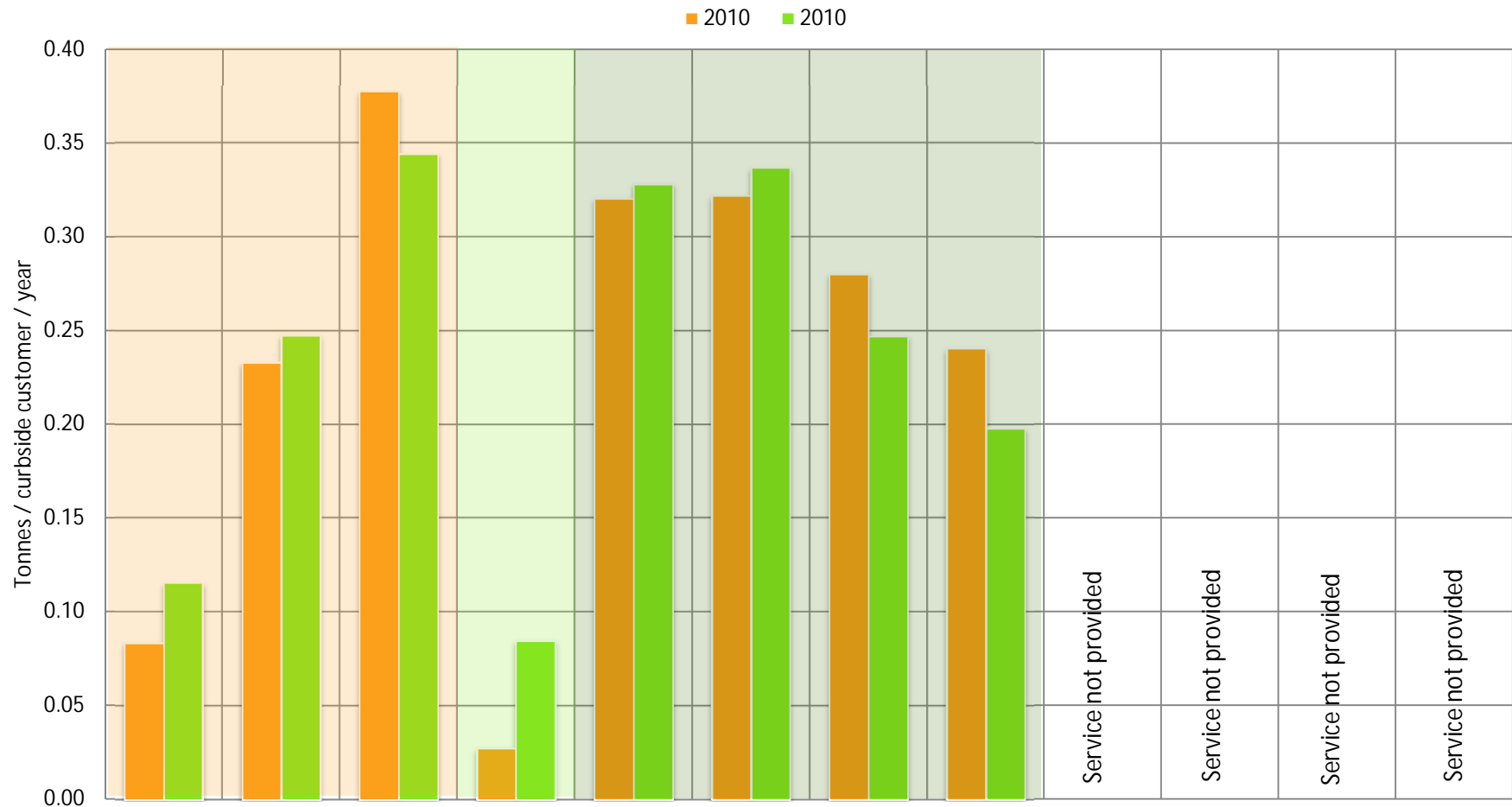
# Residential curbside type recyclables and other recyclables selfhauled



**CURBSIDE - RESIDENTIAL  
ORGANIC WASTE  
COLLECTED**

		Community 1	Community 2	Community 3	Community 4	Community 5	Community 6	Community 7	Community 8	Community 9	Community 10	Community 11	Community 12
Leaves		✓	✓	✓	✓			✓	✓				✓
Branches		✓	✓	✓	✓			✓	✓				
Grass clippings		✓	✓	✓	✓			✓	✓				✓
Sod			✓	✓				✓					
Other				✓				✓					
Meat & bones		✓			✓			✓	✓	✓			
Fish & shellfish		✓			✓			✓	✓	✓			
Grains, rice & pasta	Service not provided	✓			✓	Service not provided	Service not provided	✓	✓	✓	Service not provided		
Dairy products	Service not provided	✓			✓	Service not provided	Service not provided	✓	✓	✓	Service not provided		
Eggs & shells	Service not provided	✓			✓	Service not provided	Service not provided	✓	✓	✓	Service not provided		
Plates scrapings	Service not provided	✓			✓	Service not provided	Service not provided	✓	✓	✓	Service not provided		
Fruit & vegetables	Service not provided	✓			✓	Service not provided	Service not provided	✓	✓	✓	Service not provided		
Food-soil paper products		✓			✓			✓	✓	✓			
Coffee filters & grinds, tea bags		✓			✓			✓	✓	✓			
Nuts & shells		✓			✓			✓	✓	✓			
Houseplants & cut flowers		✓		✓	✓			✓	✓	✓			
Used paper cups & plates		✓			✓			✓	✓	✓			
Biodegradable/compostable plastics								✓	✓				
Diapers													
Sanitary products													
Cat litter							✓						

# Organics collected at the curb per customer per year

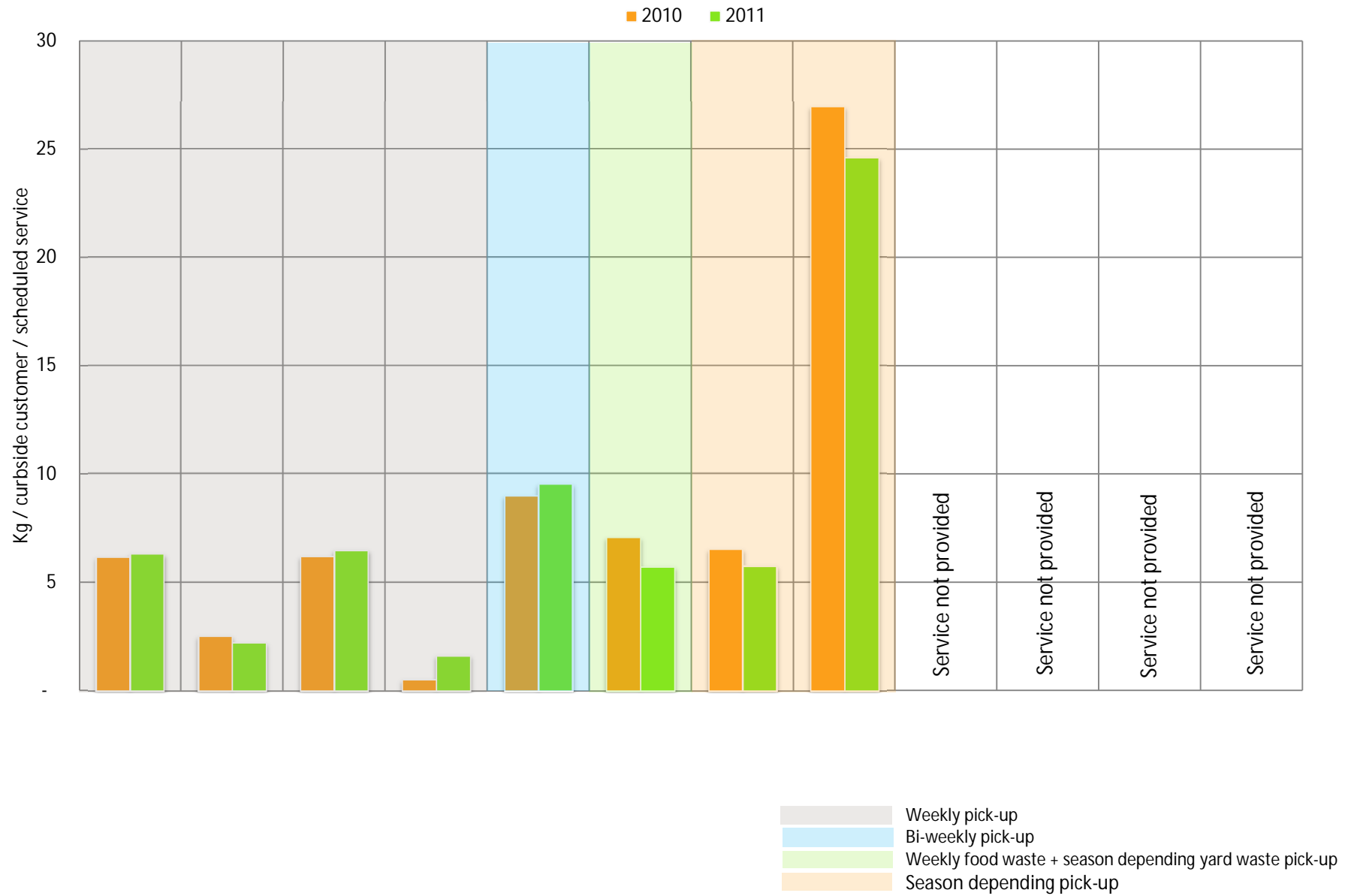


Grouped based on service provided:

- Yard waste
- Foodwaste
- Yardwaste + foodwaste



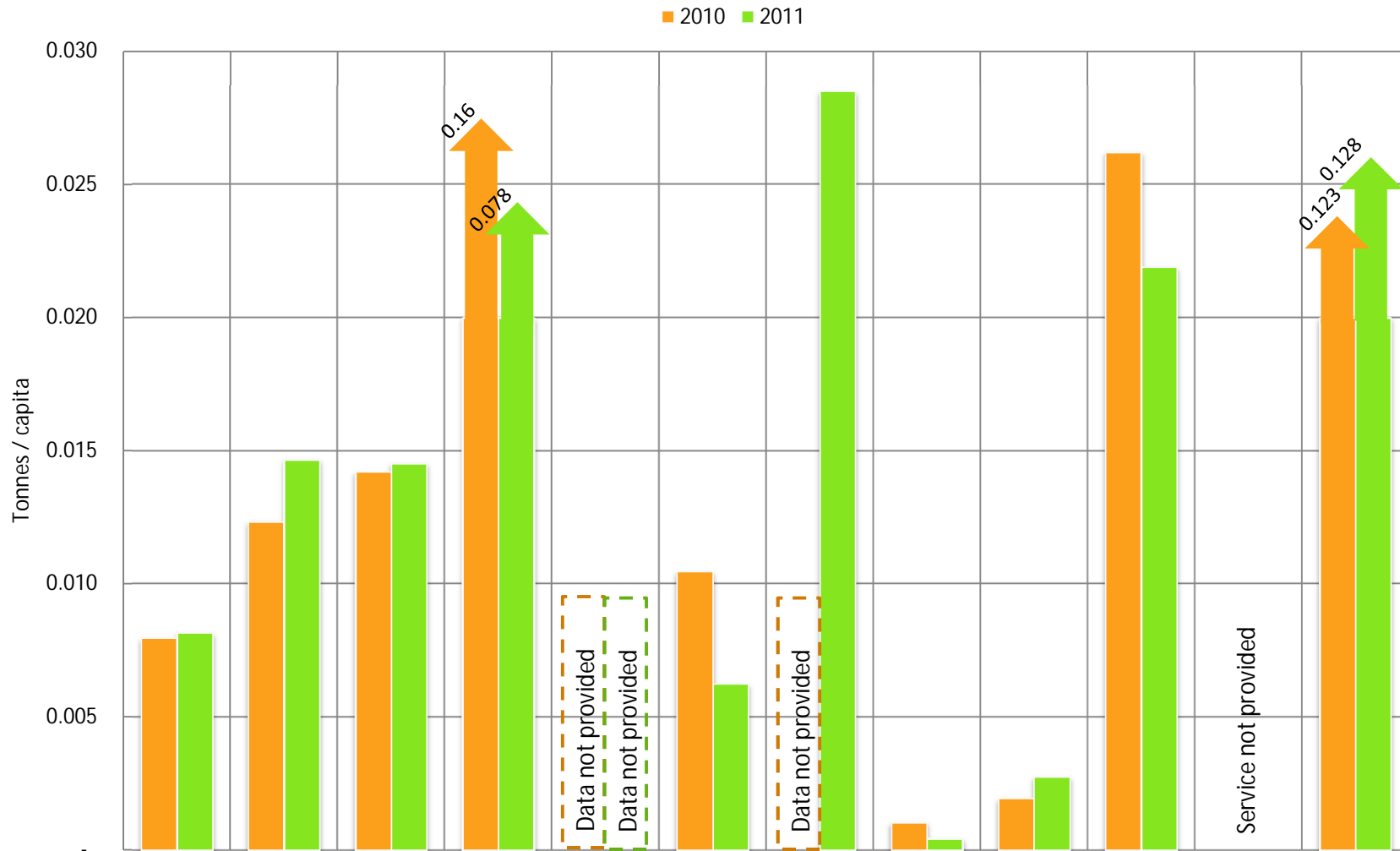
# Organics collected at the curb per customer per scheduled service



## SELFHAUL - RESIDENTIAL ORGANIC WASTE

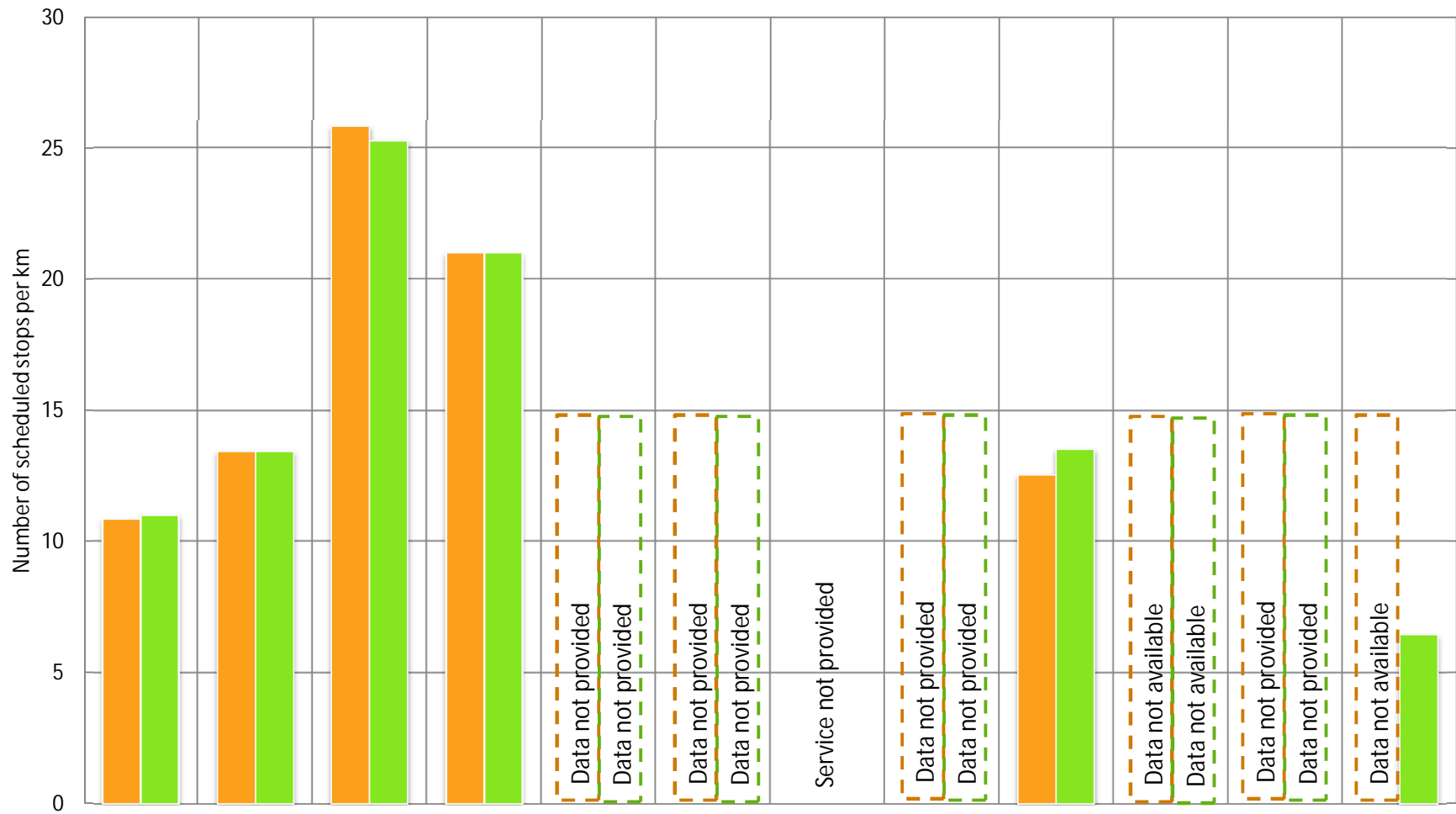
	Community 1	Community 2	Community 3	Community 4	Community 5	Community 6	Community 7	Community 8	Community 9	Community 10	Community 11	Community 12
Yard waste	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓
Christmas trees	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓
Larger trees and branches	✓	✓	✓	✓		✓		✓		✓		✓
Other			✓	✓		✓						

# Residential organics selfhauled to landfill/transfer station/depot

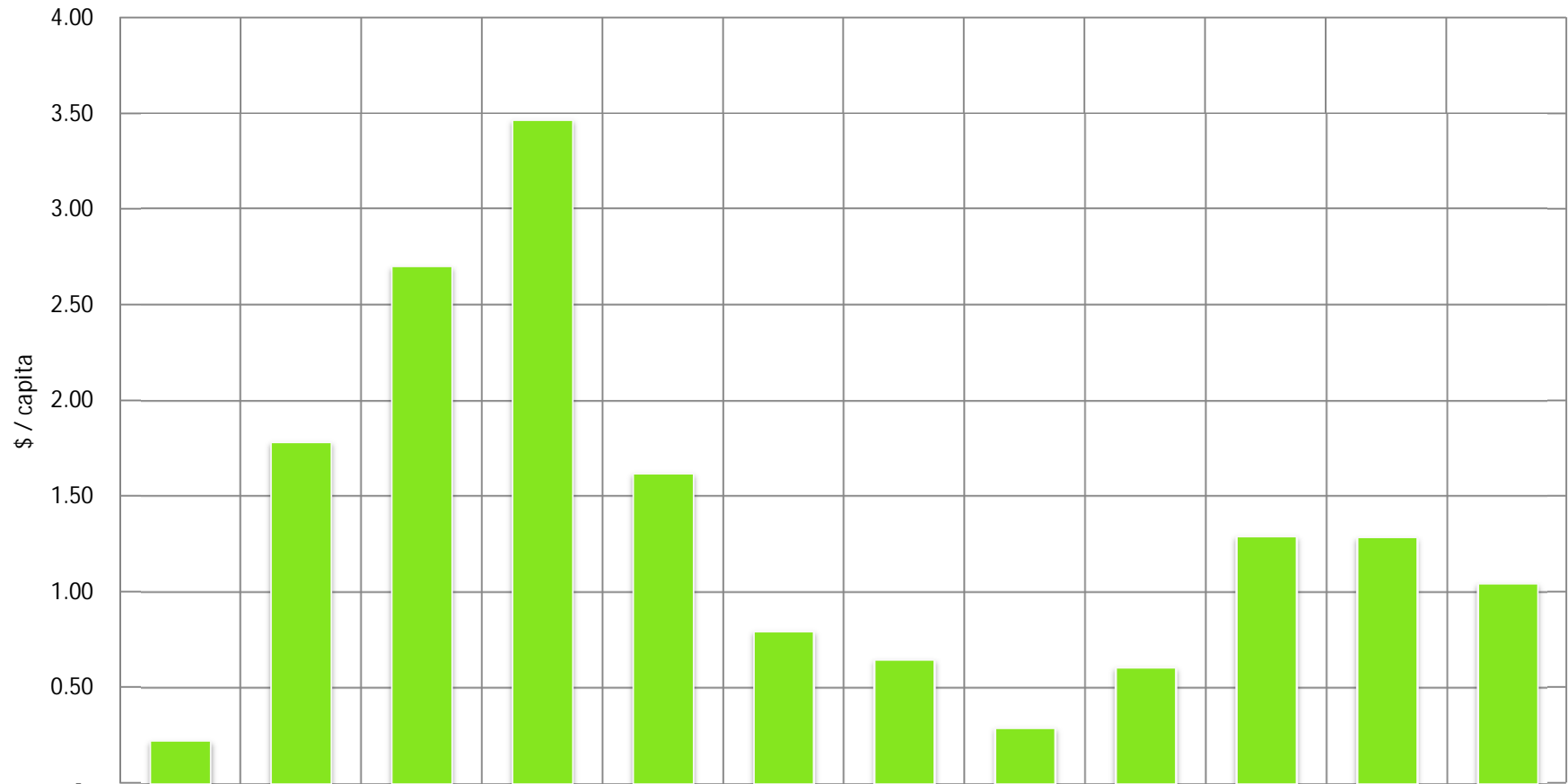


# Garbage collection - Number of scheduled stops per km

2010 2011



## Public education cost per capita (2011)



# 5 Community Profiles

## A user's guide

The following pages provide information about each participating community. This section was created to guide the reader through the profile layout and to explain the intent of each part of the community profile.

### 1 Community Data

Community data is summarized in this box. The data includes population, total households, community area, median age of residents and percent (%) ethnic diversity. There is also a map that illustrates where the community is located in Canada. This section aims to give the reader a brief overview of the community and its population.

### 2 Community Overview

The community overview provides information about geographic location, community qualities, its economy and demographics. This overview is intended to provide an understanding of the community's characteristics which may dictate the community's need or desire for change and the tools required to implement change.

### 3 Waste Services Summary (Garbage, Curbside Collection)

This section summarizes the community's solid waste curbside collection services for garbage, recycling and organic waste. Symbols indicate whether the service is provided by the city/municipality/region ☐, contractor © or private company ®.

### 4 Solid Waste Management Program Summary

Tables are used to summarize the waste services provided which includes garbage, recyclables and organics (yard waste and/or food waste). The information for this iteration focuses on curbside customers and residential selfhaul.

### 5 Solid Waste Facilities

Solid waste facilities in the community are summarized in a table and plotted on a map. It indicates whether the facilities belong to the public or private sector. The facilities identified include landfills, material recovery facilities (MRF), transfer stations, recycling depots, landfill gas recovery facilities and energy-from-waste (EFW) facilities.

### 6 Solid Waste System Summary

This section provides insight into the community's solid waste management system.

### 7 Waste Management System Diagram

A flow diagram illustrates the solid waste management system. Shading is used to identify the various aspects of the solid waste system that are controlled or managed by the subject community. It also identifies other parts of the solid waste management system that are controlled by the private sector or other public sector entities.

**City of Calgary**

**1** Overview facts: Population, Area, etc.

**2** The City of Calgary is located between the Canadian Rockies Mountains and the Canadian Prairies. It is the capital of the province of Alberta.

**3** City of Calgary is recognized as a Canadian leader in the solid and gas waste management sector. The City has achieved a number of awards for its performance in this area.

**4** The City of Calgary is a leader in the development of sustainable communities. The City has implemented a number of programs to reduce greenhouse gas emissions and improve the quality of life for its residents.

**6** Calgary's municipal street garbage collection services are provided by the City of Calgary. The City has a fleet of over 1000 trucks that collect waste from residential and commercial customers.

**7** The City of Calgary provides a range of waste management services to its residents. These include curbside collection, multi-family collection, industrial, commercial and institutional collection, construction and demolition collection, self-haul, municipal collection, private collection, and recycling.

**5** Challenges and Future Plans

**8** Challenges and Future Plans focuses on cause and action in each community.

**9** Financial Summary

**9** Financial Summary provides an overview of the solid waste budget components. The weight of the different cost components are analyzed along with different revenue sources funding the programs.

**9** Financial Summary

**9** Financial Summary provides an overview of the solid waste budget components. The weight of the different cost components are analyzed along with different revenue sources funding the programs.

Solid Waste Management Flow Chart Legend	
CSC	Curbside Customer
MF	Multi-family Customer
ICI	Industrial, Commercial and Institutional
C&D	Construction and Demolition
SH	Selfhaul
MC	Municipal Collection
PC	Private Collection
TS	Transfer Station (includes SH recycling depots)
LF	Landfill
PLF	Private Landfill
CF	Composting Facility
MRF	Materials Recovery Facility
WTE	Thermal Waste to Energy Facility
Ⓟ	Private
Ⓜ	City, Municipality or Region
Ⓢ	Contracted

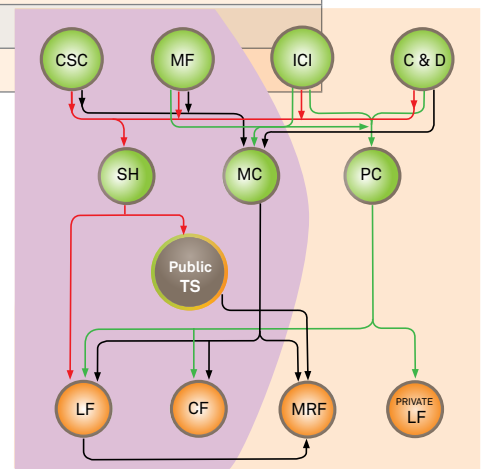
**8 Challenges and Future Plans**

Challenges and Future Plans focuses on cause and action in each community.

**9 Financial Summary**

This section provides an overview of the solid waste budget components. The weight of the different cost components are analyzed along with different revenue sources funding the programs. This section provides an overview of elements and amounts that make up the various program budgets. How the money is spent may tell a story about goals, programs and future plans.

**Waste Management System Diagram**



# 6 Surveys + Studies

Two surveys were conducted for NSWBI members in 2012, and are summarized below.

## Survey #1: Manual vs Automated Collection

The City of Coquitlam requested a survey for information regarding manual vs automated curbside collection of waste and recycling. The survey was conducted via an email distributed to members on August 2, 2012, and consisted of the following questions:

- If anyone has done a cost comparison or business case analysis of automated garbage & recycling collection vs. manual collection?
- If so, did you present the discussion in a report you could share with the City of Coquitlam?

Responses were received from the Regional District of Nanaimo, the City of Grande Prairie and the City of Calgary.

The Regional District of Nanaimo conducted a benefits/operational challenges comparison in 2008. The comparison noted that automated garbage collection seemed most suited to communities with larger garbage limits, and communities with similar topography, density and road standards. Based on the smaller size of their current bins and their physical setting, it was concluded that automated collection did not make much sense for the region. The Regional District of Nanaimo also provided a copy of their comparison table and notes in their survey response.

The City of Grande Prairie responded that they had switched from manual to automated collection in 2010. While they could not provide copies of the comparison or analysis completed, they provided a summary of the findings. During the RFP process to select a new collection contractor, it was noted that the automated collection bid was far cheaper than the manual collection bids. Benefits of the automated collection included higher workplace safety due to elimination of typical hazards associated with manual collection, easier access to the labour market as physical requirements were no longer a consideration, and more consistency in the workforce. They also noted that bins associated with automated collection were of higher quality.

The City of Calgary noted two reports generated that discussed automated collection. The first document was a Council Report on Collection Efficiency. This report documented previously achieved and planned efficiency improvements for collection services provided by Waste & Recycling Services (WRS). The second report documented the costs, implications and program outline for the Tag-a-bag program for residential waste collection and disposal. Web links to copies of both reports, including attachments, were provided by the City of Calgary in the response. The City of Calgary also stated they had developed a business case for automated collection, but could not share the actual document as it was not part of formal Council submissions. However, they noted that they would be willing to discuss the topic with the City of Coquitlam.



### Survey#2: Cart Washers

Cart washers typically consist of a structure similar to a large dishwasher. The cart is rolled up to and placed inside the structure. The structure is then closed and the cart washed using a combination of high pressure water and steam. Most systems wash one cart at a time.

The City of Regina requested this survey to help determine the benefits and obstacles associated with the use of their new individual roll-out carts. The survey was distributed to all members via the NSWBI August 2012 newsletter, and consisted of the following questions:

Do you have a cart washer? If yes:

- What type, brand or model do you use?
- Why did you decide for this type, brand or model?
- Would you recommend this type of washer to others such as Regina? Why/Why not?

No responses were received as none of the members use cart washers. It was noted that residents are generally responsible for keeping their garbage/recycling/organics carts clean.

# 7 Facilities Summary Details

This section provides a summary of the facilities and solid waste services that are provided in the NSWBI member communities. The following tables are included in this report.

- Solid Waste System Overview (Table 7.1)
- Collection System (Table 7.2)
- Self-Haul Facilities (Table 7.3)
- Landfills (Table 7.4)
- Composting Facilities (Table 7.5)
- Material Recovery Facilities (MRF) (Table 7.6)
- Energy from Waste Facilities (Table 7.7)
- Closed Landfills (Table 7.8)
- Public Education Programs (Table 7.9)
- Transfer Stations (Table 7.10)

	Community 1	Community 2	Community 3	Community 4	Community 5	Community 6
<b>Population (2011)</b>	1,090,936	126,456	55,032	179,839	106,276	87,882
<b>Total Households</b>	422,920	45,346	22,979	74,942	40,159	37,320
<b>Curbside Customers</b>	300,008	24,139	15,803	52,498	34,846	29,387
<b>Collection Method</b>						
Garbage	Automated	Manual	Automated	Automated	Manual	Automated
Recycling	Automated	Manual	Manual	Automated	Manual	n/a
Organics	n/a	Manual	Manual	Automated	Manual	n/a
<b>Diversion System Type</b>						
Recycling	Single stream	Source separated	Single stream	Single stream	Source separated	n/a
Organics	n/a	Food/Yard waste	Yard waste	Yard waste	Food/Yard waste	n/a
<b>Service Provider</b>						
Garbage	Municipal	Contracted	Contracted	Contracted	Contracted	Municipal
Recycling	Municipal & Contracted	Contracted	Contracted	Contracted	Contracted	n/a
Organics	n/a	Contracted	Contracted	Contracted	Contracted	n/a
<b>Collection Frequency</b>						
Garbage	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly
Recycling	Weekly	Weekly	Weekly	Bi-weekly	Weekly	n/a
Organics	n/a	Weekly	Weekly	Bi-weekly	Weekly	n/a
<b>Container Limits (Garbage)</b>						
# of cans/bags/carts	None	2	1	1	2	1
L per can/bag/cart	240	120	246	120	80	360
kg per can/bag/cart	60	20			20	
<b>Fleet Information</b>						
<b>Garbage</b>						
Number of truck	n/a	10	3	12	n/a	8
FTE - collection crew	n/a	20	4.5	12	n/a	10
Travel distance	1,416,998	94,995	31,200	n/a	n/a	21,400
Fuel consumed (L)	n/a	87,461	55,090	350,741	n/a	15,000
<b>Recycling</b>						
Number of truck	n/a	8	2	6	n/a	n/a
FTE - collection crew	n/a	8	2.5	6	n/a	n/a
Travel distance (Km)	n/a	73,332	6,400	n/a	n/a	n/a
Fuel consumed (L)	n/a	67,517	8,000	175,370	n/a	n/a
<b>Organics</b>						
Number of truck	n/a	10	1	6	n/a	n/a
FTE - collection crew	n/a	20	1	6	n/a	n/a
Travel distance	n/a	94,995	9,922	n/a	n/a	n/a
Fuel consumed (L)	n/a	87,461	8,293	175,370	n/a	n/a

	Community 7	Community 8	Community 9	Community 10	Community 11
<b>Population (2011)</b>	145,625	927,120	1,296,814	202,350	234,200
<b>Total Households</b>	70,350	382,870	402,939	83,100	98,531
<b>Curbside Customers</b>	52,050	269,150	315,000	60,500	61,343
<b>Collection Method</b>					
Garbage	Manual	Manual	Manual	Automated	Automated
Recycling	Manual	Manual	Manual	n/a	n/a
Organics	Manual	Semi-automated	Manual	n/a	Automated
<b>Diversion System Type</b>					
Recycling	Single stream	Dual stream	Single stream	n/a	n/a
Organics	Food and soiled paper	Food/Yard waste	Food/Yard waste	n/a	Yard waste
<b>Service Provider</b>					
Garbage	Municipal & Contracted	Municipal & Contracted	Contracted	Municipal	Municipal
Recycling	Contracted	Municipal & Contracted	Contracted	n/a	n/a
Organics	Municipal & Contracted	Municipal & Contracted	Contracted	n/a	Municipal
<b>Collection Frequency</b>					
Garbage	Bi-weekly	Weekly	Weekly	Weekly	Weekly
Recycling	Bi-weekly	Weekly	Weekly	n/a	n/a
Organics	Weekly	Bi-weekly	Weekly	n/a	Bi-weekly
<b>Container Limits (Garbage)</b>					
# of cans/bags/carts	1	3	2	1	1
L per can/bag/cart	77-100			360	378
kg per can/bag/cart	23	15	20	92	
<b>Fleet Information</b>					
<b>Garbage</b>					
Number of truck	15	n/a	56-57	13	23
FTE - collection crew	18	n/a	125	28	32
Travel distance	n/a	n/a	1,211,319	n/a	419,100
Fuel consumed (L)	n/a	n/a	1,406,000	299,933	314,900
<b>Recycling</b>					
Number of truck	11	n/a	77-78	n/a	n/a
FTE - collection crew	12	n/a	166	n/a	n/a
Travel distance (Km)	n/a	n/a	1,296,628	n/a	n/a
Fuel consumed (L)	n/a	n/a	1,810,000	n/a	n/a
<b>Organics</b>					
Number of truck	15	n/a	34	n/a	n/a
FTE - collection crew	16	n/a	55	n/a	n/a
Travel distance	n/a	n/a	464,241	n/a	n/a
Fuel consumed (L)	n/a	n/a	416,000	n/a	n/a



# 8 Online Resources



## Participants

City of Calgary [www.calgary.ca](http://www.calgary.ca)

City of Coquitlam [www.coquitlam.ca](http://www.coquitlam.ca)

City of Grande Prairie + Aquatera  
[www.cityofgp.com](http://www.cityofgp.com), [www.aquatera.ca](http://www.aquatera.ca)

City of Kelowna [www.kelowna.ca](http://www.kelowna.ca)

City of Lethbridge [www.lethbridge.ca](http://www.lethbridge.ca)

City of Ottawa [www.ottawa.ca](http://www.ottawa.ca)

City of Regina [www.regina.ca](http://www.regina.ca)

City of Saskatoon [www.saskatoon.ca](http://www.saskatoon.ca)

Metro Vancouver [www.metrovancouver.org](http://www.metrovancouver.org)

Region of Peel [www.peelregion.ca](http://www.peelregion.ca)

Regional District of Nanaimo [www.rdn.bc.ca](http://www.rdn.bc.ca)

Township of Langley [www.tol.ca](http://www.tol.ca)

## Benchmarking Programs

OMBI – Ontario Municipal CAO's Benchmarking Initiative  
[www.ombi.ca](http://www.ombi.ca)

NWWBI – National Water and Wastewater Benchmarking Initiative  
[www.nationalbenchmarking.ca](http://www.nationalbenchmarking.ca)

## Stats Canada – Solid Waste Management Statistics

[www.statcan.gc.ca](http://www.statcan.gc.ca) (search: catalogue # 16F0023X)

## Stewardship and Recycling Programs

Canadian Council of Ministry of Environment  
[www.CCME.ca/ourwork/waste.html](http://www.CCME.ca/ourwork/waste.html)

Electronics Product Stewardship Canada  
[www.epsc.ca](http://www.epsc.ca)

Product Care  
[www.productcare.org](http://www.productcare.org)

## Alberta

[www.albertarecycling.ca](http://www.albertarecycling.ca)  
[www.bcmb.ab.ca](http://www.bcmb.ab.ca)

## British Columbia

[www.return-it.ca](http://www.return-it.ca)  
[www.bcstewards.ca](http://www.bcstewards.ca)  
[www.rcbc.bc.ca](http://www.rcbc.bc.ca)

## Saskatchewan

[www.saskwastereduction.ca](http://www.saskwastereduction.ca)  
[www.sweepit.ca](http://www.sweepit.ca)  
[www.recyclesaskatchewan.ca](http://www.recyclesaskatchewan.ca)

## Ontario

[www.stewardshipontario.ca](http://www.stewardshipontario.ca) (blue box and HHW)  
[www.ontarioelectronicstewardship.ca](http://www.ontarioelectronicstewardship.ca) (electronics)  
[www.ontariots.ca](http://www.ontariots.ca) (tires)



# 10 Future Iterations

## 10.1 2013 – What is next?

The first two years of solid waste benchmarking produced a document that summarizes solid waste management systems and helps solid waste managers understand the differences in solid waste programs across Canada. So far, the benchmarking initiative has been focussed on solid waste services for curbside customers. In a comprehensive solid waste management system, waste from curbside customers typically makes up 25-35% of the waste generated by the community. The members will need to determine which sectors or aspects of the solid waste management system should be benchmarked next.

## 10.2 Potential Future Topics

Potential future topics to include and focus on include the following:

- Management of waste from multi-family or multi-customer sources and the service level provided to these customers. These customers include apartment buildings, condominiums and row houses.
- Management of waste from institutional, commercial and industrial (ICI) sources.
- Management of waste from construction and demolition activities.
- Solid waste liabilities – management responsibilities and costs for closed or abandoned landfills .

Much like for curbside customers, important considerations include:

- Where does the waste come from;
- How much is generated on a unit basis (per capita or per unit) ;
- What are the waste characteristics;
- How is the waste stored and collected,
- What is the collection frequency;
- Who collects the waste;
- Where is the waste taken to;
- How much does it cost to process or dispose of the waste;
- How much does it cost to provide the services identified ;
- How well does this system perform relative to other jurisdictions;
- Are there waste diversion requirements; and
- Are there policies or bylaws that govern this waste stream.





# 11 Glossary

Definition	
Curbside Recyclables	Recyclable materials collected as part of Curbside Collection that commonly include newsprint, cardboard, white paper, mixed paper, and containers (ferrous and non ferrous metal, plastic #1-7, container glass). Included material categories may vary from jurisdiction to jurisdiction. HHW may be included if the waste is diverted from disposal. HHW to disposal should be included in curbside collection of garbage.
Curbside customer	Individual customer that is provided a waste (garbage, recyclables and organics) pick-up service. For services that are tied to an individual customer, the customer is considered a curbside customer. This excludes shared services (i.e. more than one household per cart or bin) and front-end load "dumpster style" collection services.
Multi-family customer	Residential non-curbside collection customer whose waste (garbage, recyclables and organics) is collected in shared bins/containers by private or municipal services.
Curbside collection	An individual service for collection of solid waste material(s) (garbage, recyclables and organics) from a curbside customer. Waste collected through curbside collection is temporarily stored in cans, carts or other mobile storage units between scheduled collection dates.
Garbage	Waste material that is discarded at a disposal facility (i.e. landfill or Energy from Waste (EFW) facility).
Organics	Organic materials that include yard and garden waste and food waste.
Yard waste	Waste generated through yard and gardening activities. Yard waste includes grass clippings, leaves, branches (typically not to exceed three inches in diameter), brush, bushes, weeds, sod and trees not to exceed three inches (may vary from jurisdiction to jurisdiction) in diameter and/or three feet in length. Includes Christmas trees and materials put into backyard composters. Grasscycling is not included. Included material categories may vary from jurisdiction to jurisdiction.
Food waste	Any food, food scraps or compostable food-soiled substance (raw or cooked) which are discarded, or intended or required to be discarded. Food waste may include diverted and treated cat litter, sanitary products etc. Food waste diverted through garburators are not included in this waste category because it is handled and funded by a non-solid waste service. Included material categories may vary from jurisdiction to jurisdiction.

HHW	Discarded household products that contain corrosive, toxic, ignitable, or reactive ingredients are considered to be household hazardous waste (HHW). May include paints, cleaners, oils, batteries, and pesticides. Included material categories vary from jurisdiction to jurisdiction.
Bulky Waste	Discarded waste items that are too large to be picked up at the curb by the regular curbside collection vehicles. Bulky waste may include furniture, plumbing fixtures and large appliances. Included material categories may vary from jurisdiction to jurisdiction.
Co-mingled organic waste	Food waste and Yard waste collected at the curb as one waste stream.
Population/capita	Population estimate based on the best municipal estimate. For instances where best municipal estimates are not available, use Statistics Canada or provincial statistic figures.
Household	Total number of dwelling units in a community. Includes curbside and multi-family customers.
Residential self-haul	Waste delivered to a landfill, transfer station or depot by non-commercial vehicles with a load that is less than 1 tonne. Loads delivered by small businesses, home based businesses, and trades may be included if load is under 1 tonne and the categories are not differentiated at scale. (Potential denominator: total capita)
Composting Facility	Facility where biodegradable waste, such as yard and/or food wastes, are processed through composting, an aerobic biological treatment process. The composting method used may vary from jurisdiction to jurisdiction.
Compost Depot	Location where residential and small scale ICI customers drop-off yard waste materials. The compost depot may for example be at the same location as composting facility or a separated area at a transfer station or landfill. The Depot may and may not be staffed.
Transfer station	A facility where solid waste is received from municipal or private collection vehicles as part of municipal collection programs, private collection programs and residential self-haul customers before it is transported to another facility such as a disposal facility, recycling facility or organics processing facility.
Active landfill	Landfill where waste is being received and disposed in an active cell.
Closed landfill	Landfill where waste no longer is disposed. A closed landfill may still receive waste and have a transfer station or other waste management facility.
Material Recovery Facility	Facility where dry recyclable materials are received, sorted and prepared for marketing to end-use manufacturers.
Recycling Depot/Centre	Location where residential and small scale ICI customers can bring recyclable materials that are then re-routed to processing facilities. Private facilities that only accept refundable beverage containers are not included in this category.
HHW Depot	Location where residential and small scale ICI customers bring hazardous household wastes that are then re-routed to processing and disposal facilities

Anaerobic Digestion facility(ies)	Facility where organics are processed/digested under anaerobic conditions. The methane gas generated through the process may or may not be utilized for energy recovery.
WTE/EFW - LFG	Facility where landfill gas is collection and used for generation of electrical and/or heat energy.
WTE/EFW - thermal treatment	Disposal facility where waste materials are converted to electrical and/or heat energy though thermal treatment. This includes conventional combustion (mass burn and controlled air), gasification and plasma technologies.
Reuse store(s)	Location or retail outlet where used material and/or goods (diverted from disposal) is sold or offered for free. Only include locations that are operated or supported by the municipal waste management system.
Solid waste service charge/fee	Direct cost or fee that is charged to service user if utility fees are used to fund solid waste services.
Residential waste	Waste generated by curbside customer, residential self-haul customer and multi-family customer. Includes garbage, curbside recyclables, organics and other recyclables.
Municipal Solid Waste (MSW)	Includes residential waste, ICI waste and C&D sources. Does not include biosolids.
Collection	Activity that directly and indirectly collects and transports waste to one or several disposal and/or processing facilities. Collection includes curbside collection and residential self-haul locations/depots.
Disposal facility	Facility where garbage (non-recyclable and non-compostable material) is disposed or treated. Includes landfills, solid waste incinerators and waste-to-energy facilities. Does not include transfer station.
Curbside recyclable type materials	Material types that in the jurisdiction also is collected at the curb and/or falls under the same material type category. Included material categories may vary from jurisdiction to jurisdiction.
Other Recyclables	All material that is diverted from disposal and is not considered curbside recyclables or organics; such as materials included in EPR programs.
Organics processing facility	Facility where organics are processed. Processing options includes aerobic composting, anaerobic digestion (biofuel generation) and fermentation (waste-to-ethanol).
Solid Waste	Any material, product, or by-product for which the generator has no further use and which is processed or discarded for management at recycling, organics and/or waste disposal facilities.
Construction & Demolition (C&D) waste	Some communities refer to C&D as DLC (demolition, land-clearing and construction) or CRD (construction, renovation and demolition waste). C&D represents waste generated by construction and demolition activities. It generally includes, but is not limited to, materials such as concrete, asphalt, brick, treated wood, untreated wood, drywall, metal, cardboard, doors, windows, wiring, asphalt shingles, vinyl siding etc. It excludes materials from land clearing in areas not previously developed. C&D waste can come from residential sources such as home renovations or from non-residential sources such as construction or demolition of commercial/office buildings.





Property #  
City of Regina | REGINA  
Saskatchewan



## **AECOM**

4<sup>th</sup> Floor, 3292 Production Way  
Burnaby, BC, V5A 4R4  
Phone: 604.444.6400  
Fax: 604.294.8597

## **About AECOM**

AECOM is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water and government. With approximately 45,000 employees around the world, AECOM is a leader in all of the key markets that it serves. AECOM provides a blend of global reach, local knowledge, innovation and technical excellence in delivering

solutions that create, enhance and sustain the world's built, natural and social environments.

A Fortune 500 company, AECOM serves clients in more than 130 countries and had revenue of \$8.2 billion during the 12 months ended September 30, 2012. More information on AECOM and its services can be found at [www.aecom.com](http://www.aecom.com). Follow AECOM on Twitter at @AECOM.