

# Waste Diversion Targets Update

20 November 2015

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## Executive Summary

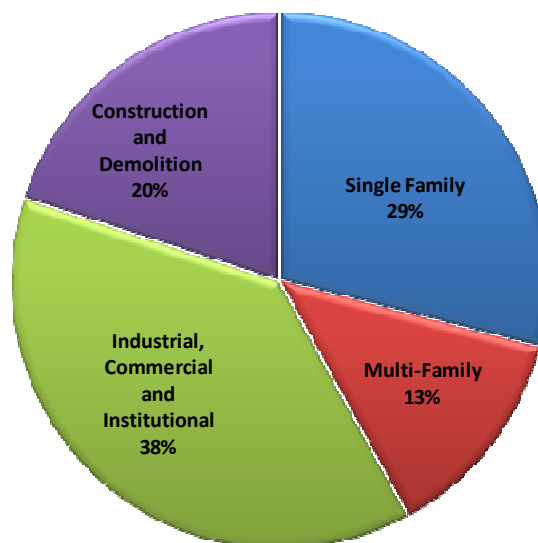
In 2007 The City of Calgary set an ambitious target of 80 per cent waste diversion by 2020. This report summarizes the progress made on waste diversion programs since 2007.

Waste & Recycling Services provided an update on the 80/20 by 2020 strategy to Council in 2015 April. A more measured program implementation plan has delayed the achievement of the 70 per cent diversion target by five years, which is now reflected in the new targets. The remaining 10 per cent (of the 80 per cent) was to be achieved through the implementation of waste-to-energy technology (WtE). Waste-to-energy represents a significant investment and a detailed strategy and implementation plan is required.

Recent bylaw amendments will advance diversion in both the multi-family and industrial, commercial and institutional sectors. The construction and demolition sector strategy will be updated to improve performance and increase diversion opportunities.

### 1.0 Introduction

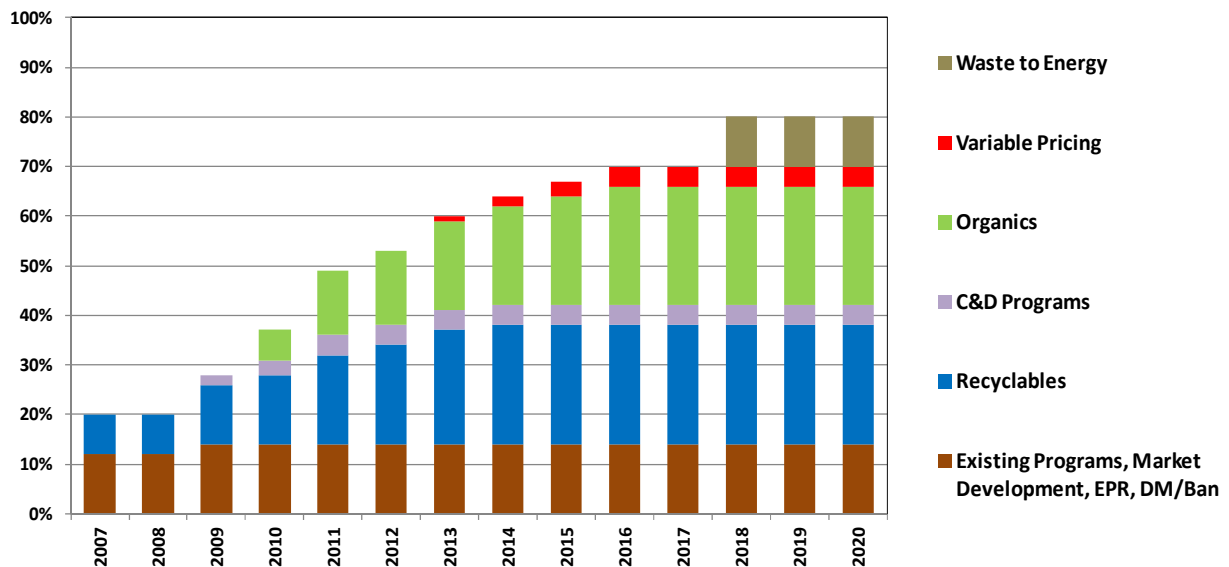
Waste in Calgary is generated by four sectors: Single Family residential (SF), Multi-Family residential (MF), Industrial, Commercial and Institutional (ICI), and Construction and Demolition (C&D). In 2014, the ICI sector generated 38 per cent of the waste received at the City's landfills, followed by 29 per cent from SF residences, 13 per cent from MF, and 20 per cent C&D waste (Figure 1).



**Figure 1: Breakdown of Waste Disposed in the City's Landfill in 2014 (by weight)**

The 80/20 by 2020 waste diversion target was approved in 2007 and the diversion target was to be achieved in part through a combination of resource recovery programs (such as recycling and composting), policy initiatives (banning material from landfills), education and provincial stewardship programs (such as the beverage container deposit/refund program, electronics recycling and paint and used oil programs) and education programs. The plan to achieve this target indicated that these activities had the potential to divert 70 per cent of waste at program

maturity (Figure 2). The remaining 10 per cent was to be addressed with emerging waste-to-energy (WtE) technologies.



**Figure 2: 2007 Strategy to achieve 80/20 by 2020**

The 2007 plan was aggressive in its implementation, proposing the introduction of the Blue Cart Program in 2009 and the Green Cart Program in 2010. Council adopted a more measured approach that led to the very successful launch, and current maturity, of the Blue Cart Recycling Program. The delay in implementing the Green Cart Program until 2017 allowed time to gain understanding from a pilot program, learn about residential organics programs in other municipalities and develop a plan that could mitigate the challenges experienced elsewhere.

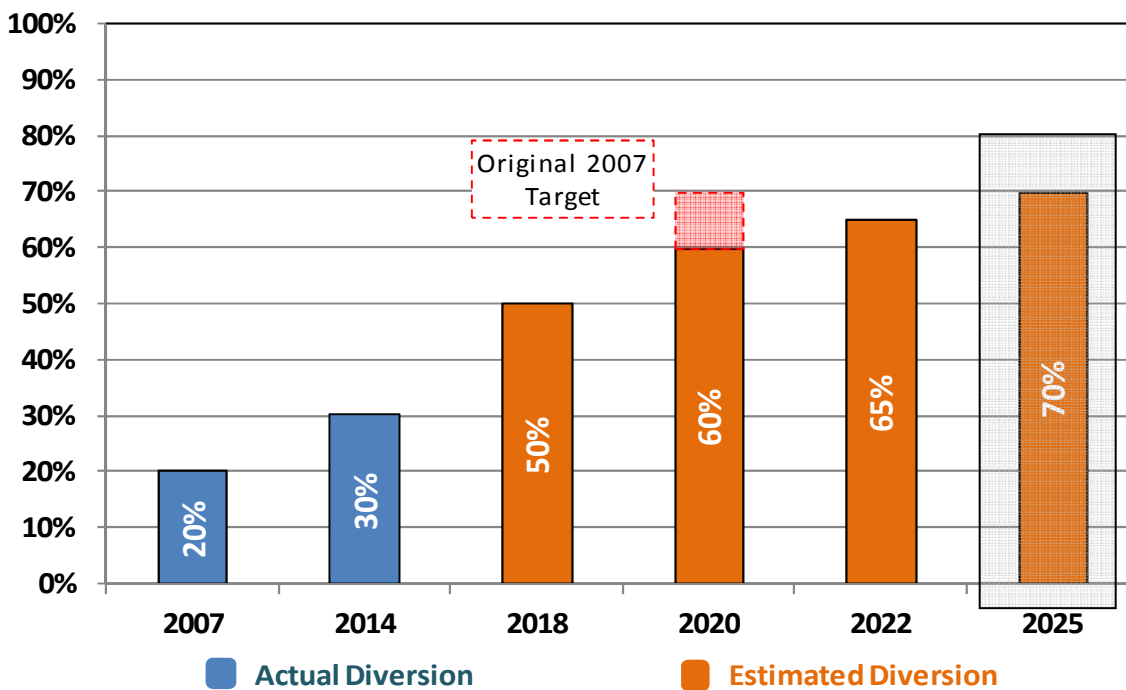
The initial focus of the 80/20 by 2020 strategy was the single family sector (SF). Waste & Recycling (WRS) exclusively provides both collection and processing services to this sector. Direct service provision simplifies program implementation and provides the opportunity for WRS to influence customer behaviours.

In addition to the SF programs, WRS has moved forward with programs for the other sectors. Diversion strategies and amendments to the Waste and Recycling Bylaw (20M2001) for MF and ICI sectors were approved in 2014. These programs were created to provide greater diversion opportunities in the sectors where WRS has less direct influence. The current timing for the introduction of new programs in each sector includes:

- Single Family Organics – 2017
- Multi-family and ICI Recycling – 2016
- Multi-family and ICI Organics – 2017

## 2.0 Waste Diversion Sector Targets

Based on current approved programs and data available to WRS, it is estimated that the waste diversion from all sectors will average 70 per cent by 2025 (Figure 3). This is proposed as the new waste diversion target for The City of Calgary.



**Figure 3: Waste diversion across all sectors**

The overall 70 per cent diversion target by 2025 will be achieved through these individual waste sector targets for 2025:

- Single family (SF) 70 per cent
- Institutional, commercial, industrial (ICI) 75 per cent
- Multi-family (MF) 65 per cent
- Construction and demolition (C&D) 40 per cent

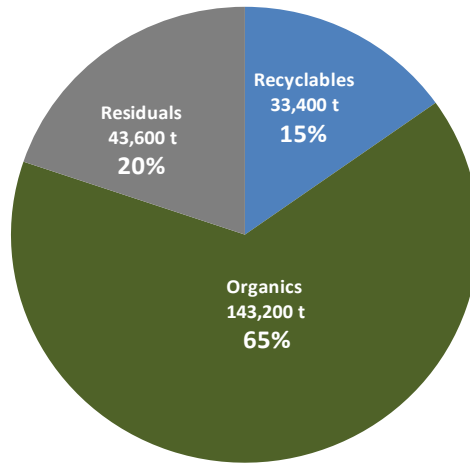
WRS has developed these sector targets based on historical and citizen behaviour data and sector target ranges from across North America. The target of 70 per cent diversion will be reached through a combination of new programs and the maturation of existing programs between 2015 and 2025. Ongoing communication, education and outreach initiatives will continue, and are expected to result in an incremental increase to the diversion rates in all sectors. Further details on each sector's waste diversion are described below.

## 2.1 Single Family Residential Sector

The SF residential sector in Calgary is currently made up of 316,000 residences (up to and including four-plexes). This sector contributed 220,000 tonnes of garbage (29 per cent of total) in 2014 to Calgary landfills.

The Blue Cart Recycling Program, introduced in 2009, increased Calgary's recycling rate by 38 per cent between 2008 and 2010 reaching a peak of 69,000 tonnes in 2012. Tonnages from the Blue Cart Program have decreased in recent years due to the changing composition of recyclables. The primary factor driving the decrease was the closing, consolidation and decreased circulation of Calgary newspapers.

WRS conducts a waste composition study each business cycle, which evaluates the composition of black cart materials. The SF waste composition is shown in Figure 4.

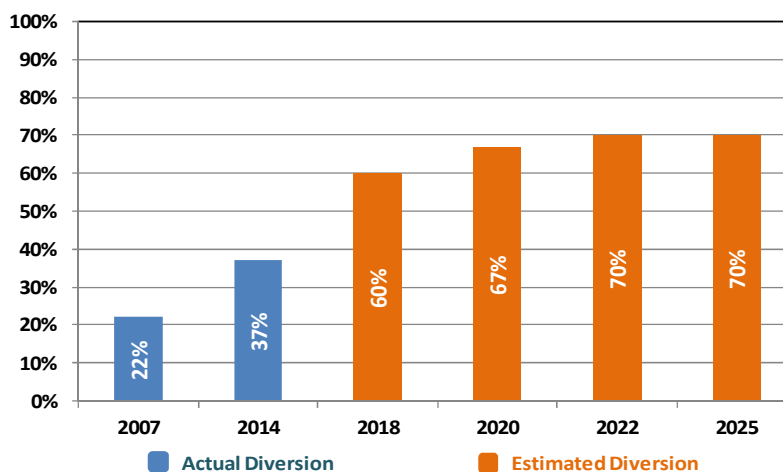


**Figure 4: 2014 Single Family Waste Composition**

Further development of waste diversion programs in the single family sector between 2015 and 2025 will include:

- A city-wide Green Cart Program. The total amount of organic material in the SF sector that could be captured in the Green Cart Program is 143,000 tonnes. Based on the pilot program and participation rates in similar programs in other municipalities, the implementation of the city-wide Green Cart Program in 2017 is expected to increase the sector diversion rate by an additional 34 per cent (85,000 tonnes) in 2020.
- A variable pricing strategy for garbage collection, which will increase awareness of the volume of waste generated by residents and encourage full participation in the Blue and Green Cart Programs. This strategy will be implemented in 2019 and is expected to achieve an additional 10 per cent diversion (25,000 tonnes) in this sector.
- Waste prevention initiatives, which will shift focus from dealing with waste once it has been discarded to avoiding its creation. These waste prevention initiatives are expected to reduce the amount of waste being generated, resulting in an additional 8 per cent increase in diversion rates (18,000 tonnes) by 2025.

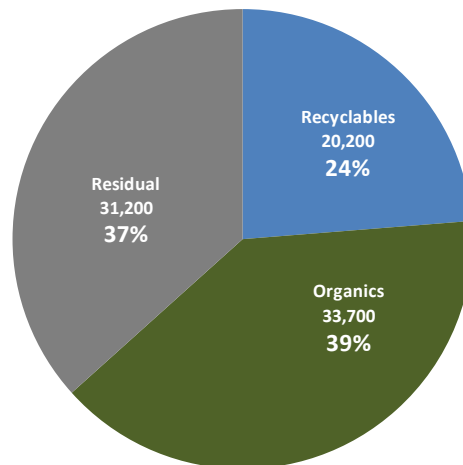
The projected impact of these programs on waste diversion in the SF sector is shown in Figure 5.



**Figure 5: Projected Impact of SF Diversion Programs**

## 2.2 Multi-Family Residential Sector

The multi-family residential (MF) sector is made up of 163,000 residences and is primarily serviced by the private sector for waste and recycling collection. This sector sent 35,000 tonnes of waste to landfill in 2014. WRS also continues to support this sector through the City's community recycling depot network. The composition of waste from the MF sector contains similar amounts of paper and cardboard but less organics than the SF sector (Figure 6).

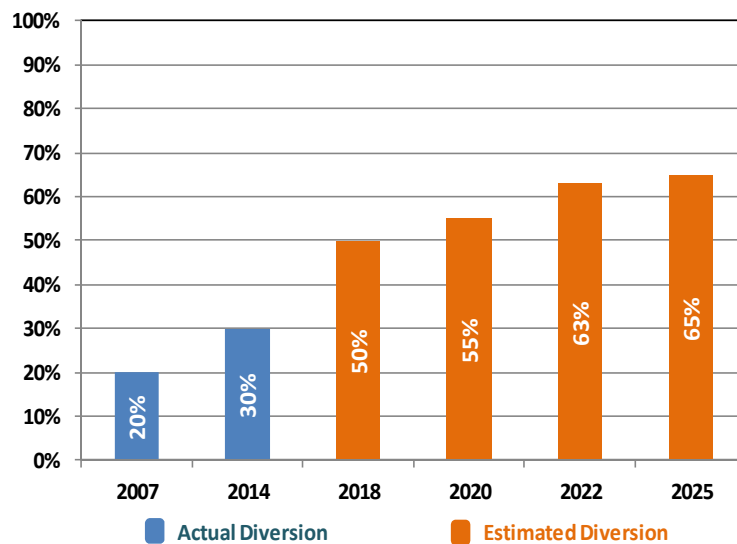


**Figure 6: 2014 MF Waste Composition**

The Waste and Recycling Bylaw was amended in 2014 to mandate recycling in MF residences. Similar bylaw amendments to provide MF residents access to food and yard waste diversion will be proposed late in 2016. Further development of waste diversion programs in the MF sector between 2015 and 2025 will include:

- The addition of paper and cardboard to the Designated Materials List (DML) in Q1 2016. This is expected to increase diversion in this sector by 8 per cent (approximately 8,000 tonnes).
- The addition of organics to the DML in Q4 2017. This will make it more expensive to dispose of organics at landfill and is expected to increase diversion of organic material in the MF sector by 11 per cent (10,000 tonnes).
- A ban and associated surcharge on paper and cardboard from disposal at landfill in Q3 2018 will contribute to a further 6 per cent increase to the diversion rate (5,000 tonnes).
- A ban and associated super-charge on organics disposal at landfill in Q4 2019 and food waste prevention will increase sector diversion performance by 16 per cent (16,000 tonnes).

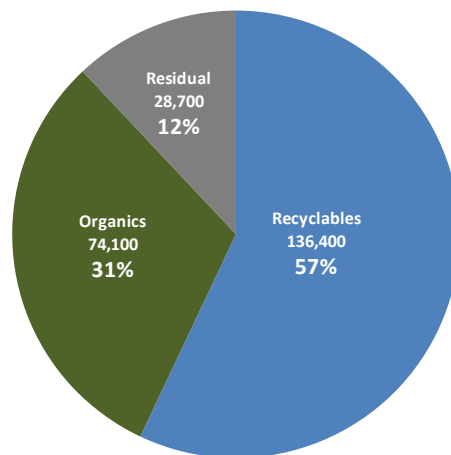
The projected impact on waste diversion in the MF sector as a result of these programs is shown in Figure 7.



**Figure 7: Projected Impact of MF Diversion Programs**

### 2.3 Industrial, Commercial and Institutional Sector

The Industrial, Commercial and Institutional (ICI) sector in Calgary is made up of 160,000 businesses, institutions and industries representing 780,000 workers. This sector sent 239,000 tonnes of garbage to Calgary landfills in 2014, 38 per cent of the waste received. The composition of waste from the ICI sector is characterized by significantly more paper and cardboard and less organics than the SF sector (Figure 8).



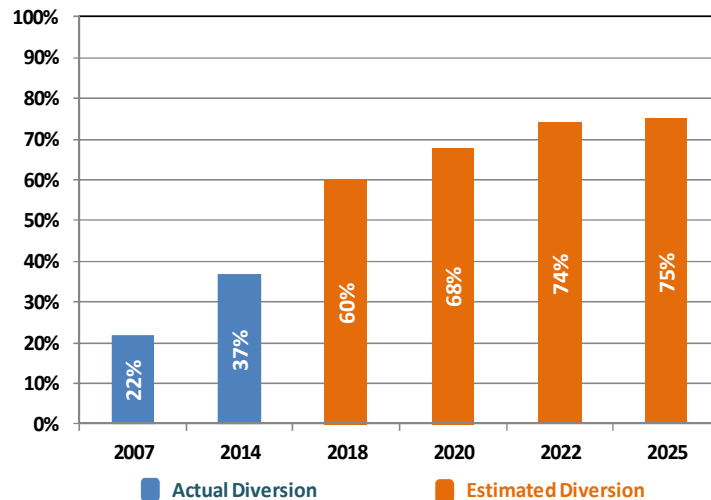
**Figure 8: 2014 ICI Waste Composition**

A strategy to reduce waste and increase diversion in the ICI sector was approved by Council in 2014. In 2015 Council approved amendments to the Waste and Recycling Bylaw to mandate recycling in the ICI sector.

Further development of waste diversion programs in the industrial, institutional and commercial sector between 2015 and 2025 will include:

- The addition of paper and cardboard to the Designated Materials List (DML) in Q1 2016 is expected to increase diversion in this sector by 14 per cent diversion (30,000 tonnes).
- A ban on paper and cardboard from landfills in Q3 2018, contributing a further 19 per cent diversion rate increase (50,000 tonnes).
- The addition of organics to the DML in Q4 2017, making it more expensive to dispose of organics at landfill. This is expected to increase the sector diversion rate by 8 per cent (22,000).
- A ban on organics disposal at landfill in Q4 2019 will increase sector diversion performance by an additional 13 per cent (40,000 tonnes).

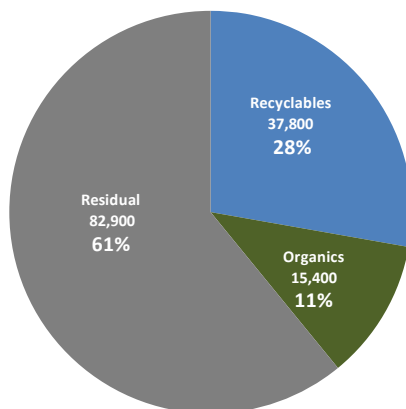
The projected impact on waste diversion in the ICI sector as a result of these programs is shown in Figure 9.



**Figure 9: Projected Impact of ICI Diversion Programs**

## 2.4 Construction and Demolition Sector

The Construction and Demolition (C&D) sector includes all of the renovation, construction and demolition activities in Calgary. This sector sent 136,000 tonnes of garbage to Calgary landfills in 2014, 20 per cent of the waste received. Of this material, almost 30 per cent is recyclable including materials such as: drywall, shingles and dimensional lumber (Figure 10).



**Figure 10: 2014 C&D Waste Composition**

A series of actions to reduce waste and increase diversion in the C&D sector was approved by Council in 2007. The subsequent programs implemented at City landfills have resulted in significant diversion. The programs range from a designated materials list for loads containing C&D materials such as asphalt shingles, recyclable wood and drywall to reduced tipping fees for source separated recyclable C&D materials.

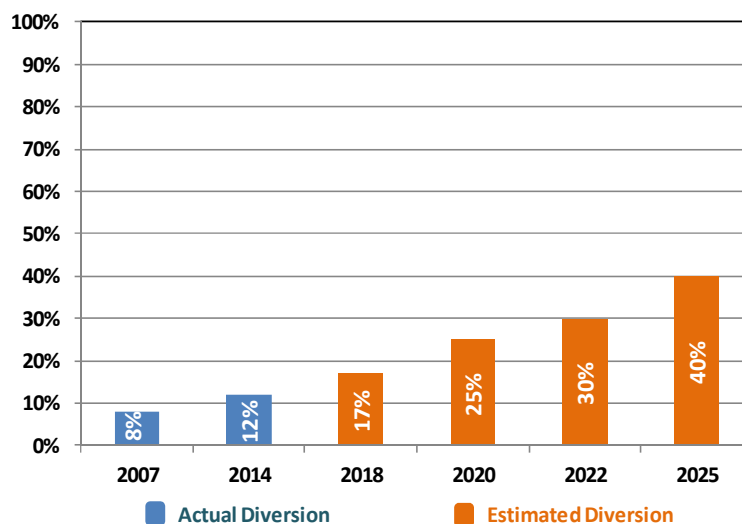
These programs have also lead to increased recycling in the private sector. However, as these are not received by City landfills, the diverted tonnages are not available for this report.

The net impact of the City and private sector diversion programs is that the current composition of C&D material received at City landfills is primarily residual material that is not recyclable.

Further development of waste diversion programs in the construction and demolition sector between 2015 and 2025 will include:

- WRS will revisit the current strategy and engage stakeholders to identify additional policy instruments and other programming for further waste diversion in this sector. WRS will return to Council in Q2 of 2016.
- In Q4 2017, organics will also be added to the DML in the C&D sector making it more expensive to dispose of organics at landfill. This is expected to increase the sector diversion rate by 3 per cent (5,000 tonnes).
- A ban on organics disposal at landfill in Q4 2019 will increase sector diversion performance by an additional 6 per cent (9,000 tonnes).

The projected impact on waste diversion in the C&D sector as a result of these programs is expected to result in 40 per cent of the available recyclable material being diverted from landfill (Figure 11).



**Figure 11: Projected Impact of C&D Diversion Programs**

### 3.0 Waste to Energy

The strategy developed in 2007 to achieve the 80/20 target envisioned that WtE would be needed for The City to achieve the 80 percent waste diversion target. At this time, it is estimated that the cost to implement a WtE facility would range between \$100-500 million in capital investment and a guaranteed volume of waste would be required. In order to narrow this investment range, identify an appropriate technology and appropriately size a facility, more certainty regarding the characterization of the approximate 30 per cent residual material remaining once all sector diversion programs reach maturity will be required.

In addition, recent experiences in other municipalities suggest the WtE technology is still evolving. Similar to the approach with the SF organics program development, The City is in an advantageous position to learn from other municipalities and provide clear cost effective direction with regard to future capital investment. As the lead time for planning and implementation of WtE facilities can be up to 10 years, WRS will report back in Q1 2018 on the potential application of waste-to-energy technology.