

Variable Set-Out Pilot Plan



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DEFINITIONS

Radio Frequency Identification (RFID)

RFID tags can be embedded in carts and scanned by hand readers or readers on trucks to track the location of carts and gain information on program usage by customers. RFID technology can be used to track how often residents put out their cart for collection and this information can be used for billing as a type of variable set-out program.

Pay-as-you-throw (PAYT)

Customers are charged based on how much waste they set out for collection. Waste is measured by weight or volume and units are identified using different types of bags, tags, containers or RFID.

Variable set-out

Customer bills reflect how often they put their cart out for collection. This may be a subscription-based service or set-out may be tracked using RFID technology.

1. Introduction

This document provides an overview of the variable set-out pilot proposed by Waste & Recycling Services (WRS). It outlines the preliminary approach, timeline, estimated cost and criteria to measure pilot success.

2. Variable Set-Out in Calgary

2.1 Pay-As-You-Throw Objectives

Pay-as-you-throw (PAYT) is a solid waste management approach that charges customers based on the amount of garbage they produce. The general objectives of PAYT programs are:

- Social – improve fairness by charging customers based on their use of a service.
- Environmental – incentivize customers to divert and reduce waste.
- Economic – reduce costs of delivering waste management programs.

PAYT programs may also require new investments and can create a more complex program for customers. These are important considerations when exploring which PAYT program is best for a community.

Variable set-out is a type of PAYT program that charges customers based on how often their cart is set out for collection. Variable set-out can be managed by using Radio Frequency Identification (RFID) technology to track how often customers set out their carts on scheduled garbage collection days.

2.2 Technology Requirements for RFID-Based Variable Set-Out

Variable set-out using RFID technology is only possible when specific technologies and associated systems are in place. These are:

1. RFID tags on carts.
2. A system that captures data during collection.
3. A database that stores collection data and links it to billing addresses.
4. A billing system that facilitates customer billing based on collection data.

The first two technology requirements provide additional benefits to residential collection operations. RFID tags are in place on all black carts and are used to track the location and maintenance of carts. A system to capture collection data using RFID readers on trucks is part of a current project to equip collection vehicles with technology to improve collection efficiency and customer support. The scope of the project is currently under development and this technology is anticipated to be in place by mid-2021.

The other two technologies listed above are required specifically to bill customers based on how often they set out their cart for collection (Figure 1).

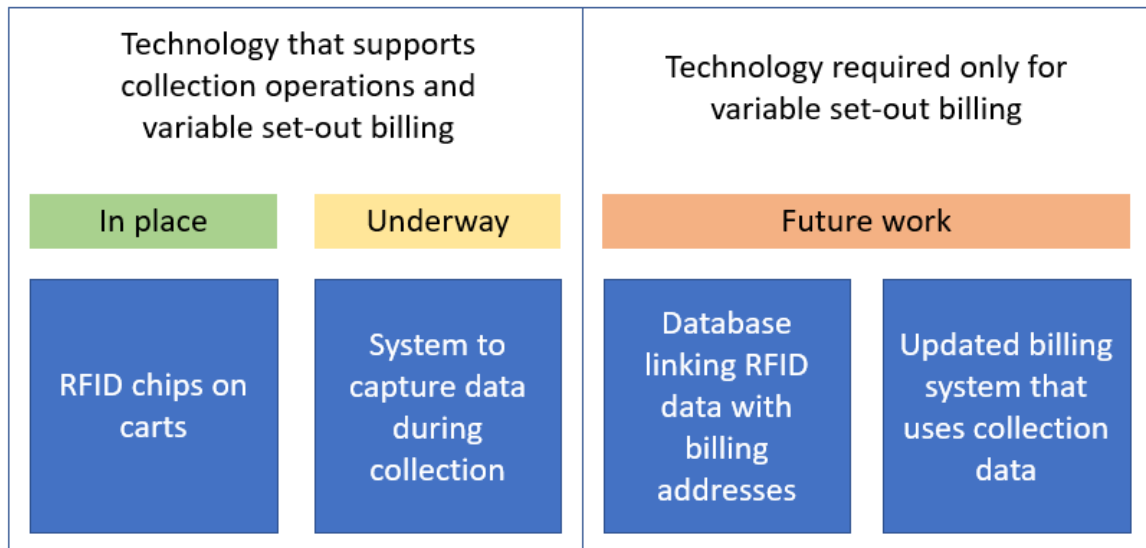


Figure 1: Technology requirements for RFID-based variable set-out and their status

Systems required exclusively to bill customers based on how often they set out their carts will be implemented and tested as part of this pilot. This includes the creation of a database that links RFID data with billing addresses, and associated updates to the ENMAX billing system. These new systems have significant costs attached, which are highlighted in section 3 of this report.

2.3 Pilot Objective

The objective of the variable set-out pilot is to **determine if variable set-out is a beneficial PAYT (pay-as-you-throw) program for Calgary**. To assess the program, this pilot will examine:

- Current cart set-out behaviours, and whether price incentives impact how frequently customers put their carts out for collection.
- Costs associated with accurately tracking cart collection, providing customer bills based on set-out frequency, and additional customer support.
- Extent of the benefits associated with the program, including improved collection efficiency, reduced cost of service delivery, and reduced waste to landfill.
- Impact to revenue, and what price incentive is most effective.
- Value that customers experience with a variable set-out billing program.

3. Proposed Approach, Timeline and Estimated Costs

There are two stages to the proposed pilot project: a pre-pilot stage to better understand customer behaviour; and a pilot of variable set-out billing in communities (Figure 2).

3.1 Pre-Pilot

Understanding and evaluating customer behaviour

WRS will explore how residents may respond to a variable set-out program through surveys and in-person customer interactions. Outcomes of this activity will inform details of the pilot design. It will investigate:

- Current household set-out behaviours.
- Reasons for setting out carts on collection day.
- Customer awareness of how set-out behaviours impact cost of service, driver safety, and the environment.
- Factors that could motivate customers to set out their carts less often.
- Anticipated changes to set-out behaviours based on price incentives.
- Level of support for a variable set-out program.

A report to Council in Q2 2021 will provide additional details for the variable set-out pilot, including feedback from customers, proposed pilot communities, rates that will be piloted and a more detailed cost estimate.

Truck technology development

WRS plans to modernize collection operations through the introduction of technology in collection vehicles. The technology will support improvements related to customer support, data tracking and management, service validation, asset tracking, and improved routing capabilities.

Before variable set-out can be piloted, technology must be in place in the trucks to track collection. It is expected that the technology required for the trucks will be in place mid-2021. Depending on the technology implemented in the trucks, there may be impacts on the scope of work and budget for the variable set-out pilot.

3.2 Variable Set-Out Pilot

It is anticipated that piloting variable set-out can begin in Q3 2021. Key elements of the pilot program include:

- Pilot community engagement
- Database and billing system development
- Billing pilot with customers

Pilot community engagement

Once the pilot communities have been determined, WRS will engage residents in those communities throughout the pilot. Feedback will be incorporated into the pilot to make it as customer-friendly as possible. There will be three stages of customer engagement during the pilot as follows:

- Stage 1 – Baseline measures of the following:
 - Awareness of and support for the variable set-out pilot

- Understanding of pilot objectives
 - Anticipated changes to set-out behaviours
 - Motivators and barriers to participation in the pilot
 - Attitudes regarding variable set-out
- Stage 2 – Measures from stage 1 will be tracked and used to assess any changes. Opportunities to improve communications and specific program elements will be identified.
- Stage 3 – Measures from the stage 1 and stage 2 engagement will be tracked and used to assess any changes.

Customer database and billing system development

The final systems that are required to bill households based on RFID data will be developed and tested. This includes a database for tracking specific household waste collection data and changes to the ENMAX billing system. The database will store information related to each household's waste collection and link it to customer addresses. Once the customer database is developed and tested to ensure accuracy, WRS will work with ENMAX to update the billing system to allow bills to reflect how many times a cart has been set-out for collection.

All systems will be field-tested to ensure data collected is accurate and reliable prior to launching the variable set-out billing. Customer database and billing system development and testing will take approximately 12 months.

Billing pilot with customers

Variable set-out billing will include a fixed amount to cover fixed costs (e.g. truck leases and customer support), and a variable portion that reflects how often customers set out their carts for collection. Reducing how often carts are set out will allow customers to save on how much they pay for garbage.

Customers in the pilot communities will have their garbage collection tracked and their bills will reflect how often their carts are tipped in a given month. During this pilot WRS will continually monitor impacts on diversion, waste reduction, safety and efficiency, cost and revenue. There will be ongoing education, communication and feedback with households in pilot communities.

This pilot is expected to run for at least a year. WRS will report back to Council with a recommendation regarding city-wide rollout once the pilot is complete.

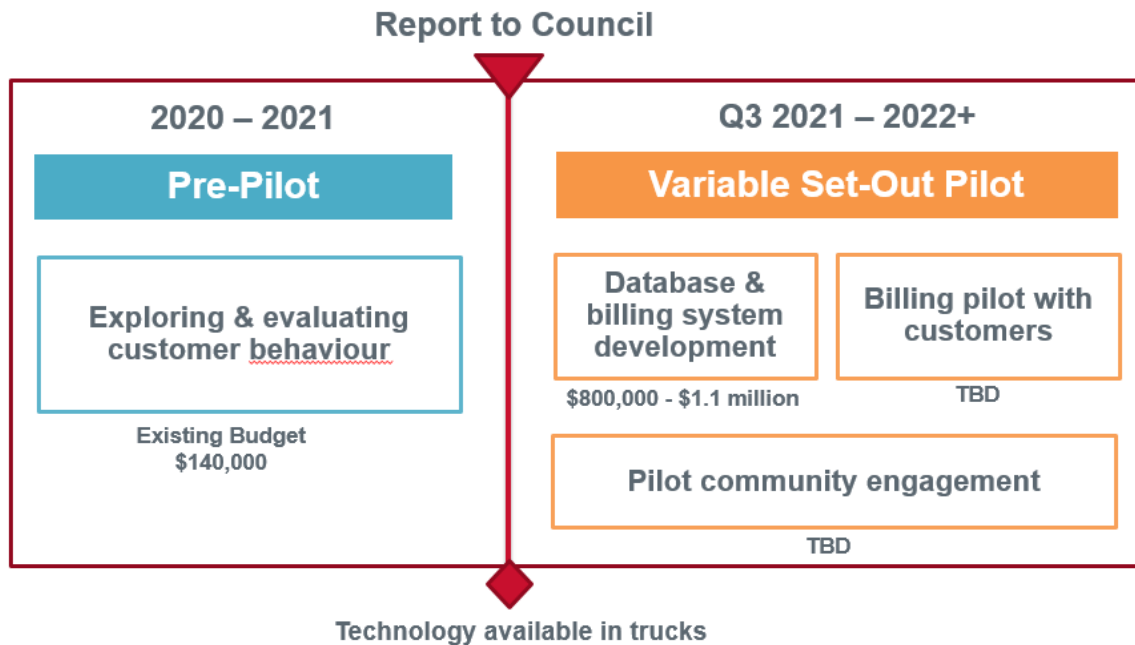


Figure 2: Variable set-out pilot activities, timeline, and costs

3.3 Pilot Costs

The estimated cost for the pre-pilot stage is \$140,000 and will be funded from the existing WRS operating budget. The estimated cost for customer database development and the billing system is \$800,000 to \$1.1million. Other costs related to the pilot will depend on the number of pilot communities selected and how long the pilot is carried out.

The cost of the technology required in the trucks to track collection for each household is not included in the pilot costs. A more detailed cost estimate and a plan for funding the pilot will be included in the report to Council in 2021.

3.4 Pilot Community Considerations

WRS will select pilot communities that represent a cross-section of residential households receiving cart-based services. As many as 10,000 households will be included in the pilot to ensure results are broadly representative of residential customers across the city.

Demographic factors that will be considered in selecting pilot communities include, socioeconomic status and cultural diversity. Operational considerations will include cart set-out type (street vs back alley), type of dwellings (detached, semi-detached, and secondary suites), historical set-out rates, and collection routes.

4. Pilot Evaluation

WRS will track and report on a set of performance measures that are aligned with PAYT objectives. Preliminary metrics that will be tracked and measured during the pilot are listed in the table below.

Waste diversion and reduction	Customer experience
<ul style="list-style-type: none"> • Tonnage of waste collected • Percent of waste diverted through Blue and Green Cart Programs • Blue and Green Cart contamination rates • Illegal dumping activities 	<ul style="list-style-type: none"> • Customer satisfaction • Customer perception of fairness • Billing accuracy • Number of 3-1-1 SRs
Efficiency and safety	Financial impact
<ul style="list-style-type: none"> • Average set-out frequency • Excess set-out • Average cart capacity utilization 	<ul style="list-style-type: none"> • Cost • Revenue