

The feasibility of deploying solar-powered smart-compacting garbage and recycling bins on a pilot basis

Date: April 18, 2024

To: Infrastructure and Environment Committee

From: General Manager, Solid Waste Management Services

Wards: All

SUMMARY

The purpose of this report is to provide Toronto City Council with feedback on the feasibility of piloting solar-powered smart-compacting garbage and recycling sidewalk litter bins in one or more Business Improvement Areas to study their effectiveness and possible future deployment throughout the city. This report provides background on previously conducted solar-powered-compacting litter bin pilots and estimated costs for these types of bins as well as information on the current litter bin contract.

A pilot involving solar-powered smart-compacting bins is not being recommended at this time due to concerns around ergonomics, costs, and scalability as well as unknowns related to public space recycling in light of the transition of the Blue Box Program to Extended Producer Responsibility.

Solid Waste Management Services is planning to conduct a bin sensor pilot on existing street litter bins starting in Q2 - Q3 of 2024. The sensors electronically detect the fullness of the bins and relay when the bins are at or near capacity. In addition to sensors, Solid Waste Management Services will be adding field support staff to inspect the street litter bins, gather data and report overflowing and maintenance issues for a period of six months in order to define trends and recommendations for optimal collection frequency for each litter bin in the city.

The City will continue to explore enhancements and incorporation of technology in litter bins to help inform the future state once more information is available regarding the impact of Extended Producer Responsibility on public space recycling.

RECOMMENDATIONS

The General Manager, Solid Waste Management Services recommends that the Infrastructure and Environment Committee receives this report for information.

FINANCIAL IMPACT

The financial impacts from this report are estimated at \$936,816.00. This amount represents an estimated cost of \$152,640.00, net of HST recoveries for the bin sensors, an estimated cost of \$774,000.00, inclusive of salary and benefits for the field support staff and an estimated cost of \$10,176.00 net of HST recoveries for supporting resources. Funding is available in Solid Waste Management Services operating accounts SW1060 for the bin sensors and SW0715 for the field support staff and supporting resources. Any future costs would be based on the outcome of the Pilot and future possible service requirements regarding the impact of Extended Producer Responsibility on public space recycling.

The Chief Financial Officer and Treasurer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

At its meeting on March 27, 2024, the Infrastructure and Environment Committee adopted Item IE12.1 - Post-Transition of the Blue Box Program to Extended Producer Responsibility and Results of District 2 Service Delivery Options Review. City Council requested the General Manager, Solid Waste Management Services to report back to the Infrastructure and Environment Committee, no later than the third quarter of 2025, on the results of the review and analysis of the potential service delivery options for the City's integrated litter program operations including:

- a. any timelines and recommendations to undertake a managed competition process or directly bring operations in-house for contracted litter vacuum operations; and
- b. any timelines and recommendations for changes to the City's on-street litter bin operations which are currently part of the City's coordinated Street Furniture Program.

The Infrastructure & Environment Committee Decision document can be viewed at: <https://secure.toronto.ca/council/agenda-item.do?item=2024.IE12.1>

At its meeting on February 7 and 8, 2023, City Council adopted Item IE1.13 - Feasibility Report on a Pilot Project to Demonstrate Solar Powered Smart Compacting Garbage and Recycling Bins. City Council requested the General Manager, Solid Waste Management Services, in consultation with Business Growth Services in the Economic Development and Culture Division, to report back to the Infrastructure and Environment Committee by the third quarter of 2023 on a feasibility study to deploy Solar Powered Smart Compacting Garbage and Recycling Bins in the field for one or more Business Improvement Areas on a pilot basis to study their effectiveness and possible future deployment throughout the City.

The City Council Decision document can be viewed at:

<https://secure.toronto.ca/council/agenda-item.do?item=2023.IE1.13>

On January 30, 2023, the Infrastructure and Environment Committee considered a Letter (January 20, 2023) from Councillor Mike Colle on Feasibility Report on a Pilot Project to Demonstrate Solar Powered Smart Compacting Garbage and Recycling Bins.

The letter can be viewed at:

<https://www.toronto.ca/legdocs/mmis/2023/ie/bgrd/backgroundfile-233992.pdf>

At its meeting on February 7 and 8, 2023, City Council adopted Item IE1.8 - Update on the Transition of Toronto's Blue Bin Recycling Program to Extended Producer Responsibility. City Council authorized the General Manager, Solid Waste Management Services, the General Manager, Transportation Services, and the General Manager, Fleet Services, or their designates, until December 31, 2028, to negotiate and enter into agreements, or amendments of existing agreements, including non-competitive procurement agreements under Municipal Code Chapter 195, Purchasing, for pilot projects necessary for Solid Waste Management Services, Transportation Services, and Fleet Services to accelerate and enhance innovative service delivery initiatives for:

- a. public sidewalk waste bin design;
- b. remote and field-based operational data capture including sensors for waste bins; and/or
- c. vehicle design, operations, and associated equipment configuration;

on terms and conditions satisfactory to the General Manager, Solid Waste Management Services, the General Manager, Transportation Services or the General Manager, Fleet Services, and in a form satisfactory to the City Solicitor.

The City Council Decision document can be viewed at:

<https://secure.toronto.ca/council/agenda-item.do?item=2023.IE1.8>

COMMENTS

Background

In 2005, through a competitive process, the City secured an advertising-based 20-year public-private partnership agreement with Astral Media for the provision of a range of approximately 25,000 items of 'street furniture' including litter bins, transit shelters, poster boards and benches among other items. This street furniture agreement will conclude on August 27, 2027. Throughout the term of this agreement, Astral Media owns and is responsible for cleaning and repairing the litter bins (along with other street furniture).

The operationalization of this agreement takes a partnership approach with Transportation Services managing the agreement for the City including bin installations

and repairs and Solid Waste Management Services collecting the material from the bins. When this agreement concludes in 2027, all assets will be transferred to the City.

There are approximately 10,300 street litter bins installed across Toronto, the majority of which are collected at night for safety and efficiency reasons. The frequency of street litter bin collection varies based on the location and/or usage of each bin and seasonality. Bins located in Business Improvement Areas and the downtown core are collected daily with some bins in these areas receiving additional collection during the day as required, and where it is feasible to do so. Solid Waste Management Services addresses any service requests related to overflowing street litter bins within 24 hours. There are more than 51,000 collections of these bins scheduled per week and the average reliability rate for collecting these bins without a service request in 2023 was 99.97 per cent.

Transportation Services and Solid Waste Management Services, in collaboration with Astral Media, have made a number of enhancements to the bin design to allow for easier disposal of materials by residents and better functioning overall. These include larger openings so that items do not get stuck, two openings for litter and one for recycling, and various improvements to the door mechanisms to ensure that doors remain closed after collection. Approximately 1,000 bins are being deployed with these enhancements in various areas across the city in 2024.

As part of the on-going transition of the City's Blue Bin Program to Extended Producer Responsibility, producers are required as of January 1, 2026, to collect blue box materials from public spaces and provide a number of blue box receptacles. Public space can mean an outdoor area in a park, playground or sidewalk, public transit stations or stops under municipal or provincial jurisdiction. The number of receptacles is determined using a formula based on the population of the municipality. Based on this formula, the number of receptacles that producers will be required to provide in Toronto is estimated at 7,500 bins. This number is significantly smaller than the City's current public space bin infrastructure, as Solid Waste Management Services alone collects from a network of more than 15,000 public space recycling bins (includes 10,300 street litter bins with receptacles for garbage and dual compartment recycling and 5,700 dedicated recycling bins located in parks).

Solid Waste Management Services is continuously advocating to the Province to increase producer obligations in public space recycling to, at a minimum, match municipalities' current service level.

Currently, it is unknown what impact Extended Producer Responsibility will have on public space recycling or the current public space recycling bin infrastructure in Toronto. It is also unknown if the City will have any role in public space recycling collection as the Issuing Authority (Circular Materials as the System Administrator on behalf of all registered Producer Responsibility Organizations and Reverse Logistics Group) has yet to initiate a process for retaining this service.

Litter Bin Technology Pilots

In 2011, Transportation Services piloted two bins with solar compacting technology in the downtown core. The design and operation of the solar compacting bins were assessed from an ergonomic standpoint considering the experience of both the public and those who would be collecting the bins. The ergonomics review determined that the units tested did not meet the criteria for safe collection. Concerns included but are not limited to compaction causing bins to exceed collection weight limits (i.e., over 20 kg) and the worker's posture while collecting the material.

As part of Solid Waste Management Services' recent work to explore piloting solar-powered smart-compacting garbage and recycling sidewalk litter bins, the Division contacted one of the main suppliers of solar compacting bins in North America to discuss pilot requirements and request pricing. The company expressed that they were not interested in supplying or leasing a few bins for testing and required the City to purchase a minimum of eight bins at an approximate price of \$10,000 per bin, not including installation, maintenance and HST. Based on this, it is anticipated that the total cost to pilot just eight bins would exceed \$100,000. Based on this pricing, a pilot and any broader deployment of the bins would be cost-prohibitive.

Solid Waste Management Services is planning to conduct a bin sensor pilot on existing litter bins. This pilot would not require the purchase of new bins and would only require the purchase of 500 sensors and a data plan. The sensors electronically detect the fullness of the bins and relay when the bins are at or near capacity. In conjunction with Transportation Services and Technology Services, and the Office of the Chief Information Security Officer, Solid Waste Management Services has developed parameters for this proposed pilot with the intent to operationalize it in Q2 - Q3 of 2024.

In addition to sensors, Solid Waste Management Services will be adding temporary field support staff hired under Delegated Authority of the General Manager of Solid Waste Management Services to inspect the street litter bins, gather data and report overflowing and maintenance issues for a period of six months in order to define trends and recommendations for optimal collection frequency for each litter bin in the city. Each litter bin will be reviewed a minimum of once per week. Solid Waste Management Services will report back on the outcome of these initiatives in 2025.

If proven to be beneficial, bin sensor technology could be considered as part of any future contracts related to the supply and maintenance of litter bins once the existing Astral Media contract expires in 2027. Any future use of sensors will be considered in alignment with the Digital Infrastructure Strategic Framework, which applies to new digital infrastructure initiatives undertaken in the public realm.

Any future litter bin agreements will require street furniture program alignment, budget development, and need to take into account any potential Extended Producer Responsibility impacts to public space recycling and the City's litter bin infrastructure.

CONTACT

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SIGNATURE

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