

Analyzing and Addressing Solid Waste Affordability Concerns

1. Introduction

The City of Saskatoon (City) is recommending changes to the way in which it delivers and pays for solid waste collection and disposal. The need for reforms are critical as solid waste services are neither financially sustainable nor environmentally sustainable under the status quo. In order to address these two critical issues, the City is recommending the implementation of a Pay as you Throw (PAYT) Utility to deliver solid waste services.

Research shows that properly designed PAYT models or programs have the ability to elicit greater waste diversion in the communities where they have been implemented. Central to the PAYT model is a user-pay mechanism, which helps to incentivize behavioral changes in the way households (and others) dispose of waste from consuming consumer goods. Properly designed PAYT programs charge households a variable rate fee, based on cart size, to help incentivize better waste diversion practices. This, combined with a mandatory recycling and organics program have proven to be very successful in increasing waste diversion rates across North America. Despite the environmental (and financial) benefits of the PAYT approach, some cities are reluctant to move in this direction because of alleged “affordability” issues. In such cases, solid waste services are traditionally funded by the property tax base, where major subsidization of the service occurs and users do not pay the full costs. For example, non-residential property taxes pay for solid waste services, but non-residential properties receive very little, if any, of the service. In effect, they are subsidizing the costs—in Saskatoon’s case about 31%--to residential properties. This violates the principle of benefits “equity” in that those who pay for the service do not receive it.

In transitioning to a PAYT model, concerns are often raised around the concept of “ability to pay”. In the public finance discipline, ability to pay is a principle of equity or fairness about the tax system, not a user-pay system. It has two dimensions—vertical and horizontal—that attempt to be satisfied. Here, one objective is to re-distribute income through progressive taxation from those with greater ability to pay to those with lesser ability to pay. But using solid waste services, which have private good characteristics, to achieve this is the wrong approach.

Solid waste also generates a negative externality, known as pollution. Paying for waste through general taxation suggests that the societal cost of pollution is essentially \$0. However, because the deposit of waste in a landfill causes environmental harm the value of that harm should be included as part of the marginal cost of waste disposal. This means that putting a price on solid waste incentivizes users to reduce the societal costs.

Little research has been done on the affordability of waste services, while the full energy burden which often includes electricity, water and waste services, has been much

studied¹²³⁴. One study¹ reported that a household can afford to spend about 30% of income on shelter costs with the observation that about 20% of shelter costs are used for energy and utility bills; the affordable residential energy burden is thus 6% of income. This study also identified 11% percent as a high energy burden. A study² from Manitoba showed that more than 80% of households with a net energy/utility burden below 3% covered 100% or more of their annual bill. Less than 60% of households with a net energy/utility burden at or above 8% covered 100% of their annual bill.

The purpose of this document is to address perceived affordability concerns as they relate to solid waste services. The research finds that regardless of the model, solid waste services consume a negligible portion of after-tax household incomes.

2. Approach and Methodology

To analyze affordability issues relating to utilities we use the “conventional method” whereby we analyze existing and potential costs relative to median household incomes.

Our approach expands on the conventional method and measures affordability relative to inflation adjusted after-tax median household incomes. We use median after-tax household income as a proxy because this better represents the disposable income of households and government transfers to persons. Income data is adjusted to 2017 dollars. Moreover, we obtained median household income data by neighbourhood from the 2016 Census (2015 data).

Because solid waste services are largely funded by the property tax base, we compiled property assessment data for Saskatoon. Property assessment values are used to apply tax rates to determine annual or monthly property taxes. In this case, we use median assessed property values by neighbourhood for detached single family homes. The median assessed value for single family detached homes in Saskatoon is \$354,625 in 2018, while the after-tax median household income was \$70,742 in 2017 dollars.

In order to show a relationship between the two variables, we determine if there is a statistically significant correlation between median assessed values and median household incomes. As expected, the data reveals a statistically significant positive correlation between the two variables, as illustrated Chart 2.1.

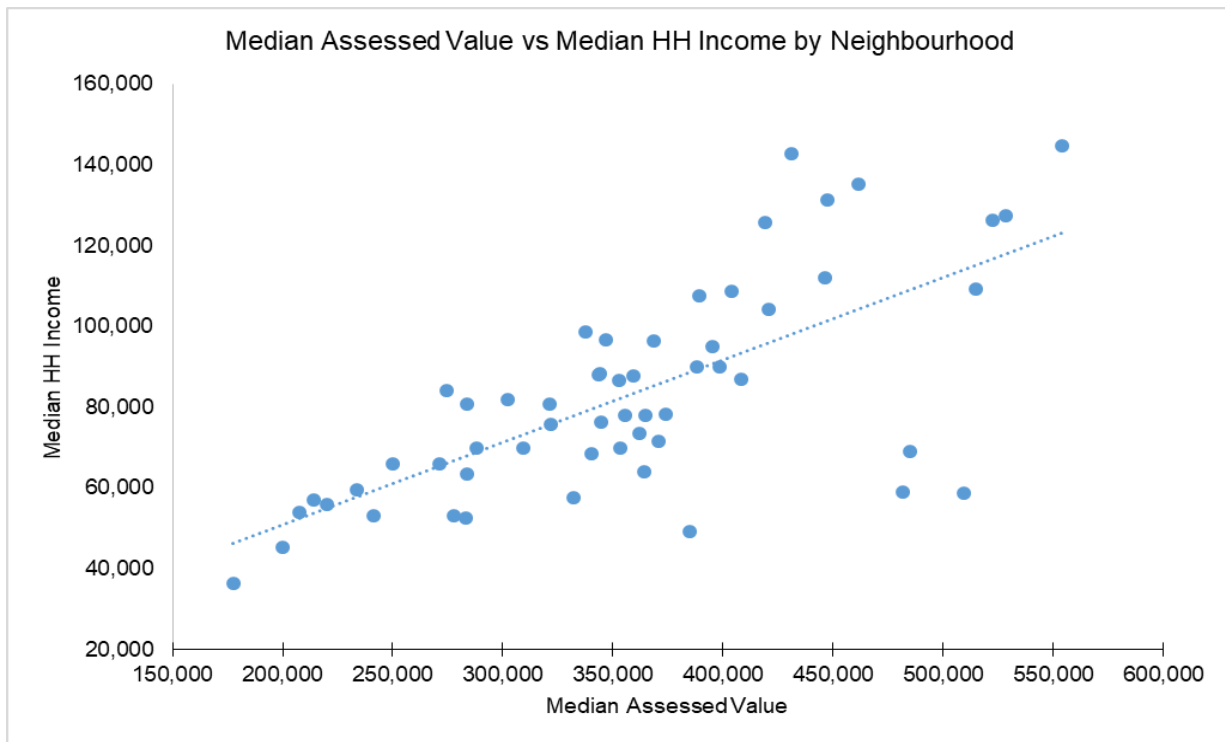
¹Ratepayer-Funded Low-Income Energy Programs: Performance and Possibilities.
<http://www.appraiseinc.org/reports/NLIEC%20Multi-Sponsor%20Study.pdf>

²Home Energy Affordability in Manitoba: A Low-income Affordability Program for Manitoba Hydro.
<http://www.fsconline.com/downloads/Papers/2010%2011%20Manitoba%20Hydro.pdf>

³<http://www.synapse-energy.com/sites/default/files/Low-Income-Assistance-Strategy-Review-14-111.pdf>

⁴<https://www.fraserinstitute.org/sites/default/files/energy-costs-and-canadian-households.pdf>

Chart 2.1



Subsequently, we applied existing 2018 residential property tax rates to the median assessed values to determine total residential property taxes by neighbourhood. This is done to establish a baseline for which to apply tax funded or utility funded waste services. The median residential property taxes for single family homes in 2018 are \$2,160. It should be noted that the Curbside Recycling Program, which is currently funded through a flat rate utility fee, is not included in the analysis.

Next, we analyze the City's tax-supported waste budget to determine the overall share of solid waste services. According to the 2018 Budget, solid waste services are about 3.4% of the total tax supported budget, or \$7.7 million. Single family residential properties represent 52% of the budget while non-residential properties represent 31% of the budget. The remainder are represented by multi-family residential and condominiums.

We then account for any proposed tax policy changes for 2019. The Administration is proposing an indicative total property tax rate increase of between 4 and 4.5% for 2019. We use the lower bound 4% for the analysis to show what potential tax increases would be if it included an expanded and fully funded waste program.

We then apply the expanded waste services program to a tax funded model and utility funded model. A tax funded model assumes a 48% subsidization rate (from non-residential and multi-unit tax payers) while a utility model assumes a 0% subsidization rate. In other words, under a utility model, single family households pay for the full cost of the service.

For the tax model, we assume a total City tax increase of 8.9% for 2019. This includes the 4.0% indicative tax rate and the 4.9% needed to deliver the recommended service level for solid waste, if property tax funded.

Under a utility model, we assume a 3.5% property tax reduction. This results in a net tax increase of 0.5% for 2019, when factoring in the indicative property tax rate increase and the indicative benchmark rate for a waste utility, which project full-cost-recovery at \$20/month.

As a result, the analysis models the potential affordability effects against the benchmark price of \$20 per month. The affordability analysis is limited by the fact that variable price ranges have not been established. Thus, they are excluded from the analysis. Once those ranges are established, a subsequent analysis can be conducted.

Analysis & Findings

3.1 Status Quo

If an organics program is not implemented and the current level of service for waste management continues, tax funded solid waste services costs would range from \$3.00 per month to \$9.50 per month as shown in Table 3.1.1. This includes subsidization from the non-residential sector.

The table also shows the range of costs for single family dwellings based on median assessed values by neighbourhood. With the current subsidization, median household costs for residential waste services are estimated to be \$3.15 per month, with lower and upper ranges of \$1.60 to \$4.90 per month.

Table 3.1.1: 2018 City taxes allocated to waste, by Median Assessed value

	City Taxes Paid Annually	Total Annual Waste portion	Total Monthly Waste Portion	Residential Waste Portion - annual subsidized	Residential Waste Portion - monthly subsidized
Median Cost	\$2,160.30	\$72.80	\$6.07	\$37.81	\$3.15
Lower Range	\$1,081.29	\$36.44	\$3.04	\$18.92	\$1.58
Upper Range	\$3,373.64	\$113.69	\$9.47	\$59.04	\$4.92

In terms of affordability, waste services are very small as a proportion of after-tax median household incomes. Table 3.1.2 shows the share of total city property taxes and solid waste services relative to after-tax median household incomes.

Table 3.1.2: 2018 Property taxes, including subsidized residential waste portion, Share of median after-tax household income by neighbourhood.

	2018 City Taxes (%)	Total Waste (%)	Residential Waste (%)
Median	3.05	0.10	0.05
Lower Range	2.17	0.07	0.04
Upper Range	5.60	0.19	0.10

As the table shows, total property taxes with waste included (except organics) consume about 3% of after tax median household incomes. By contrast, the residential portion of solid waste relative to after tax -median household income ranges from 0.04% to 0.10%. The negligible cost for single family residential households is a result of the subsidization from other property classes.

The status quo analysis is simply to provide a baseline for which to consider the potential implications for an enhanced solid waste program. Next, the analysis reviews the implications of funding an expanded solid waste program through a tax-funded model.

3.2 Tax Funded Model

The tax funded model assumes that the enhanced package of solid waste services will be funded through the existing property tax, which includes 48% subsidization rate to the single family residential sector (from non-residential and multi-unit residential). The analysis includes potential tax changes to the overall City budget and not simply the waste component. This provides a representation of the potential costs that households may face in 2019 from a property tax perspective.

As noted, this model assumes an 8.9% annual property tax rate increase in 2019. The effects of this potential tax change is shown in Table 3.2.1.

Table 3.2.1: 2019 City taxes allocated to waste for varying income levels paid by residents, by median household neighbourhood income

	2019 Annual Estimated Taxes	Change from 2018/month \$	Total Annual Waste (\$)	Total Monthly Waste (\$)	Residential Annual Waste Portion (\$)	2019 Monthly Residential Waste (\$)
Median Cost	\$2,352.57	\$16.02	\$175.03	\$14.59	\$91.04	\$7.59
Lower Range	\$1,177.53	\$8.02	\$87.61	\$7.30	\$45.57	\$3.80
Upper Range	\$3,673.89	\$25.02	\$273.34	\$22.78	\$142.18	\$11.85

Under the tax funded model, property taxes increase by a range of \$8 to \$25 per month, or by \$100 to \$300 per year. Tax-supported single family residential waste costs rise by a range of \$3.80 per month to \$11.85 per month.

In terms of affordability, waste services relative to after-tax median household incomes are still very small. Table 3.2.2 shows the total City property taxes and solid waste services as a share of after-tax median household incomes. Under this model, total property taxes would consume an estimated 3.3% of median after-tax household incomes. Conversely, the expanded service package of residential waste costs could potentially consume less than a quarter of one percent of annual median after-tax household incomes.

Table 3.2.2: 2019 Property taxes, including subsidized residential waste portion, Share of after-tax median household income by neighbourhood

	2019 City Taxes (%)	Total Waste (%)	Residential Waste (%)
Median Share	3.33	0.25	0.13
Lower Range	2.37	0.18	0.09
Upper Range	6.10	0.45	0.24

3.3 Utility Funded Model

The utility funded model is much different than the tax funded model. The concept is simple: those who receive the service pay for it. Unlike the tax funded model, where different property classes pay for the cost to deliver the service but do not receive the service, the property tax subsidy to residential properties is eliminated. That is, single family residential properties pay for the full cost of the service. Because of this, impacts to residential households will be higher in the short run.

Nonetheless, under this model most of the tax supported solid waste costs are to be transferred to the utility. As a result, there is an estimated property tax rate reduction of

3.5%. However, because the City is proposing a 4% overall tax increase, the net effect under this model would result in a 0.5% property tax increase in 2019.

Table 3.3.1 shows the cost per month for single family residential households by neighbourhood, it includes both the 0.5% increase in property taxes, as well as the proposed benchmark utility fee of \$20 per month.

Table 3.3.1: 2019 Property Tax Increase plus Benchmark Utility Fee per month, per household

	65 gl Bin
Median Cost	\$20.90
Lower Range	\$20.45
Upper Range	\$21.41

Table 3.3.2 compares the potential monthly cost increases per household between the tax-funded model and the utility model. The analysis includes both the 0.5% tax increase for 2019 and the proposed benchmark utility rate. As noted earlier, the analysis does not include recycling which is the same in both scenarios.

Table 3.3.2: Comparison between Tax Funded Model and Utility-Funded Model (Benchmark Price) per household, per month.

	Benchmark - 65 gl bin
Median Cost	\$13.31
Lower Range	\$9.56
Upper Range	\$16.65

Relative to the tax model, median single family residential waste costs would increase by an estimated \$13.00 per month. The increase is because subsidization from the non-residential and multi-family residential property classes are zero.

With respect to affordability, we again apply the same metrics relative to median after-tax household incomes. More specifically, the estimated share of property taxes and the waste utility as a share of income in 2019. Table 3.3.4 shows the effects of this using only the benchmark price for a mid-size bin.

Table 3.3.4: 2019 Property Taxes and Waste Utility Costs as Share of Household Income (Benchmark Price)

	2019 Taxes Share of Income (%)	Waste Utility as Share of Income (%)
Median Share	3.07	0.34
Lower Range	2.19	0.20
Upper Range	5.63	0.66

As illustrated in the table, in 2019 property taxes are estimated to consume between 2.2% and 5.6% of after-tax median household incomes. Under the proposed benchmark price, by contrast, potential solid waste costs as a share of after-tax median household incomes range from less than 0.34% to a high of 0.66%. Stated another way, 2019 estimated median property taxes per household consume about nine times greater share of income than a potential solid waste utility would.

The preceding analysis suggests that waste services are very affordable under a utility model. This does not downplay the impacts on very specific households or circumstances as a result of the removal of the subsidy, but the general conclusion is that affordability is not a concern relative to after-tax median household incomes.

However, affordability could be enhanced by a variable rate pricing scheme. Variable rate pricing not only incentives behaviour change, but properly designed, it has the potential to reduce household waste costs. If the variable price reflects the marginal cost of pollution (e.g., airspace), then those who use smaller bin sizes would see a

monthly cost reduction for solid waste, relative to the benchmark. Unfortunately, the analysis on the full affordability effects of solid waste pricing is lacking by this limitation.