



---

# REVIEW OF RECYCLE BC PROGRAM PERFORMANCE

---

**Corresponding Author: Dr. Calvin Lkhan**

**Secondary Author(s):**

- **Elizabeth Cho McMillan**

**Prepared by: Waste Wiki@FES**

**Faculty of Environmental Studies, York University**

## Executive Summary

This study undertakes a review of recycling and economic performance of the Recycling BC (British Columbia) residential recycling program, between the periods of 2015 and 2018 (the years for which data is available).

The Recycle BC program is often touted as a “best practice” model of steward lead extended producer responsibility, and is seen as a potential model to be replicated in Ontario and other jurisdictions across the United States.

1) Program costs have increased by approximately 26%, while program performance (measured as % tonnes diverted) has increased by 1%

2) Despite a 7% increase in service coverage (measured as # households with access to curbside/depot collection), total collected recycled tonnes remains unchanged, while tonnes of material being sent to landfill disposal is increasing. Overall, tonnes being collected by Recycle BC (including recycling, recovery, energy from waste and disposal) is trending downwards

3) The most significant driver of increase in costs can be traced to increase in per tonne material management costs (which increased by 20.5% year over year between 2017 and 2018). While the specific cause for this increase is difficult to isolate, a potential explanation is that the proliferation of light weight and composite materials cannot be readily managed in existing recycling systems.

4) There is no evidence to indicate that a steward operated extended producer responsibility scheme will result in cost containment or increases in recycling performance. In fact, the rate of year over year cost increases is greater in British Columbia (steward lead) than it is in Ontario (municipally lead), when compared over the same time period

5) Increases in the cost of recycling end of life printed paper and packaging is ultimately born by the consumer. It is estimated that a 100% EPR program for printed paper and packaging results in a 5-7% increase in the cost of groceries and packaged products for the average household. These impacts are more acute among lower income households, who on average, consume more packaged good as a proportion of their overall consumption.

6) Of note, the overall carbon impact attributable to Recyclable BC has potentially decreased year over year, given the types of materials being recovered. A fall in the recovery of metals (a presumed mix of aluminum and steel), results in a lower overall carbon impact from recycling, despite the increased recovery of glass cullet, paper and plastics. This preliminary finding points to the fact that the total amount being recycled matters less than what is actually recycled

7) Despite increases in promotion and education expenditures (measured in both absolute and per capita terms), there is no statistically significant correlation between P&E and diversion rates (according to the correlation coefficient, we actually have a slightly negative relationship, which contravenes conventional wisdom)

8) By all available metrics, 2015 was actually the best performing year of the program - this is atypical, considering program development costs exceeded \$8 million dollars (compared to an average of \$218,000 since). Essentially, despite the growing pains of a new program - the year of inception has been the most successful (unless you measure it in terms of service coverage)

9) BC's performance is actually strikingly similar to Ontario. Most jurisdictions have an equilibrium point, which can best be characterized as the recycling rate a given area is likely to achieve independent of major programmatic change or policy intervention. In Ontario, it is roughly 60%, while in BC, it appears to be 75%. Anything above this equilibrium point is likely to require significant investments in both infrastructure and outreach, often coming at an extremely high marginal cost. In the case of BC, for every 1% increase in the recovery rate, program costs are expected to increase by \$5.4 million dollars

10) Based on the types of material RCBC is recovering, a significant % of year over year increases in diversion can be attributed to increased recovery of glass. Given the relatively poor value of glass cullet and the nominal environmental benefits associated with glass recycling, we have to ask ourselves the question: What materials do we need to target to ensure increases in diversion offer the best environmental and economic outcomes?

11) A claim made by supporters of the Recycle BC model is that stewards will be able to achieve cost efficiencies and simultaneously develop packaging that is compatible with a steward owned and operated waste management system. There is no evidence to date that shows a steward-led EPR program will lead to either increased recycling or cost containment.

12) Stewards have demonstrated an ability to develop more sustainable packaging (from a life cycle perspective), but not necessarily material that can be readily recycled or diverted within the existing system.

13) Other jurisdictions need to think very carefully before adopting a similar model. It is imperative that policy makers begin to dig deeper into the numbers, and demand greater transparency from Recycle BC, in order to truly determine whether it is a model worth following.

## Introduction

This study undertakes a review of recycling and economic performance of the Recycling BC (British Columbia) residential recycling program, between the periods of 2015 and 2018 (the years for which data is available).

Recycle BC is a not for profit organization responsible for residential printed paper and packaging throughout British Columbia, servicing over 1.8 million households (which represent more than 98% of all homes in the province).

Recycle BC provides recycling services either directly to communities, or works in collaboration with local governments, first nations and private companies to provide recycling services to BC residents.

A common refrain used by supporters of the Recycle BC model is that the program offers superior economic and environmental outcomes relative to other jurisdictions, and that the 100% steward run extended producer responsibility model is a model that should be seen as an industry best.

While it is often difficult to compare recycling performance across jurisdictions, largely due to infrastructural, demographic and behavioral differences, there is utility in examining whether a program is achieving its stated objectives, namely, increased access, recycling performance and cost containment.

This study uses publicly available data from the Recycle BC Annual reports to examine and evaluate the historical recycling trends for the residential PP&P program in British Columbia. This data has not been manipulated in any way – the only calculated figures are the correlation coefficients that attempt to determine the statistical relationship between two or more variables.

This report is broken down as follows:

- A review of historical recycling performance (tonnes collected, recovery rate, recovery rate per capita etc.)
- Service Coverage and Cost (Including an examination of revenue, fee revenue, investment income and material management costs by activity type)
- The relationship between recovery rates, and P&E, gross expenditure, service rate etc.
- An examination of what is being recovered (material mix)
- A discussion surrounding the implications and inferences that can be gleaned from this review

## Historical Recycling Performance

	<b>2018</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>
Tonnes Reported by Stewards	235,655.00T	234,847.00T	238,062.00T	243,941.00T
Gross Tonnes Collected	206,778.00T	181,514.00T	185,477.00T	186,509.00T
Net Tonnes Collected	183,983.00T	174,942.00T	170,711.00T	178,583.00T
Recovery Rates Per Capita	40.00kg per person	38.30kg per person	40.70kg per person	43.60kg per person
Recovery Rate	78.10%	75%	78%	77%

Recovery rate performance has remained largely flat since program inception, with overall tonnages being reported by stewards trending downwards. This is not principally inconsistent with what is being observed in other jurisdictions – package light weighting is a phenomenon that is occurring across all jurisdictions, resulting in either stagnant or declining recovery rates. As a result, weight based key performance indicators may no longer be appropriate, particularly in light of the proliferation of lighter, more volumous materials.

Of note, recovery rate per capita was highest in 2015, decreasing by approximately 8% in subsequent years.

### Service Coverage

<b>Access to depots</b>	98.30%	98%	98%	97%
<b>Benefitting in Curbside/Multi Res</b>	169	156	154	151
	<b>2018</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>
Households Serviced (Including Curbside, MF and Depot)	1,850,000	1,846,097	1,844,000	1,715,000
	0	7	0	0
	1,881,960	1,881,960	1,881,960	1,881,960
Total Estimated Households in BC (Per Census)	9	9	9	9
Service Rate (based on Households)	98.301%	98.094%	97.982%	91.128%
	4,577,881	3,475,000	3,177,500	3,137,500
Population Served (Includes Curbside, MF, and Depot)	1	0	0	0

Total service coverage for the province has increased significantly since 2015, rising from 91.12% of the overall population in 2015 to 98.3% of the population in 2018. The greatest year over year increase in service coverage occurred between 2015 and 2016, with overall service coverage increasing by approximately 7%.

The overwhelming majority of households in British Columbia have access to either curbside or depot service, with the province having the highest service coverage (expressed as % of total households with access to recycling services) of any province in Canada.

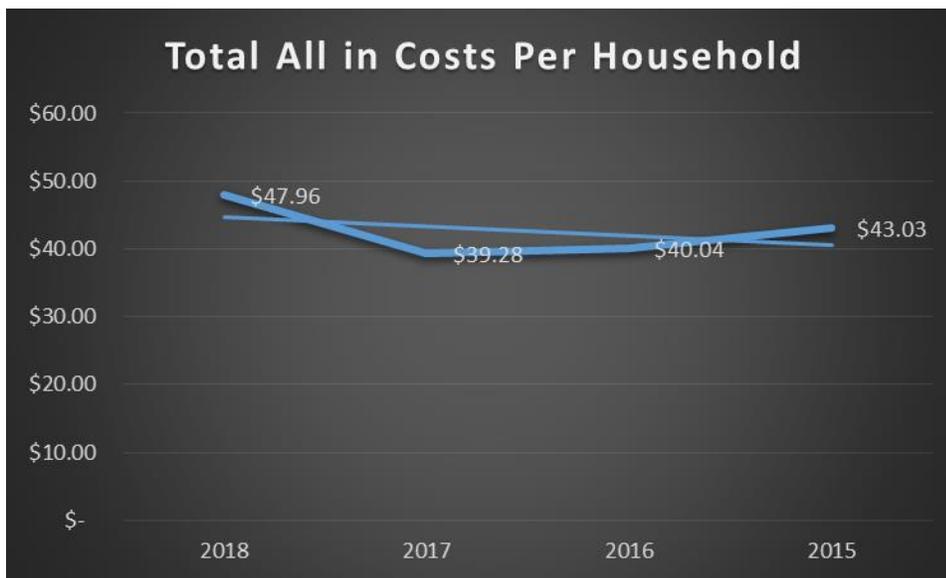
While Recycling BC should be applauded for ensuring that British Columbians are ensured access to a residential recycling program for packaging, system performance, expressed both with respect to material diverted and cost of material management, paints a slightly more muddied picture.

Figures 1 and 2 below show material management costs and total cost per household over the past 4 years (2015-2018).

**Fig 1. Material Management Costs Per Tonne (2015-2018)**



**Fig 2. Cost Per Household (2015-2018)**



As shown in Figure 1, material management costs have been trending upwards since program inception, with a marked increase between 2017 and 2018. Since 2015, material management costs per tonne have increased by 26.5%.

Of note, when compared to the same period in Ontario (Blue Box 2015 – 2018), Ontario’s material management costs increased by 18.25%. This is a particularly interesting point worth highlighting, in that British Columbia’s recycling program is often touted as being more efficient than Ontario’s, with supporters claiming that a steward run program is better equipped to contain costs.

While it would be premature to arrive at any particular conclusion regarding the efficacy of a steward run program (i.e. that a steward run program may be better or worse), the data contradicts the narrative put forward by advocates of the Recycle BC model.

Perhaps a more salient question is attempting to determine why costs have increased so quickly over such a short period of time. When looking at the historical data set, it is fairly evident that costs escalated most markedly between 2017 and 2018, which would largely coincide with the “Chinese National Sword” that saw China ban the import of recycled materials from other jurisdictions.

The corresponding decrease in revenue due to deteriorating end markets is likely the most probable cause for the precipitous increase in costs, however, looking at the data in greater detail, we do observe some interesting results. Table 3 below summarizes the breakdown of operational costs (by activity type), expressed on a per tonne basis:

**Table 3: Operational Costs Per Tonne By Activity Type**

	<b>2018</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>
Material Management Costs Per Tonne	\$	\$	\$	\$
*Recycling Tonnes Managed	430.73	337.97	369.12	359.18
Program Management Costs Per Tonne	\$	\$	\$	\$
*Recycling Tonnes Managed	48.55	50.54	53.53	5.30
Program and Education Costs Per Tonne	\$	\$	\$	\$
*Recycling Tonnes Managed	10.70	10.05	8.60	0.90
Research and Program Development	\$	\$	\$	\$
*Recycling Tonnes Managed	1.51	0.93	1.25	47.89
Total All in Cost (excluding fee revenue)	\$	\$	\$	\$
*Recycling Tonnes Managed	491.48	399.49	432.50	413.26

Excluding first year costs (as startup costs are likely to vary markedly when compared to subsequent years), program management costs, promotion and education costs, and research program and development costs have stayed either relatively constant, or are trending up slightly (due to the limited number of data years, it is difficult to establish a clear trend). The greatest contributor to overall cost increases is material management costs.

As shown in Table 4, revenue (expressed as the sum of fee revenue and investment income), has remained unchanged since program inception.

**Table 4: Revenue Received through Remitted Fees and Investment Income**

Financial	<b>2018</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>
	\$	\$	\$	\$
Revenue	<b>86,459,523.00</b>	<b>84,164,874.00</b>	<b>84,046,677.00</b>	<b>85,131,603.00</b>
	\$	\$	\$	\$
Fee Revenue	84,908,258.00	83,398,409.00	83,648,174.00	84,755,101.00
Investment	\$	\$	\$	\$
Income <sup>1</sup>	1,551,265.00	766,465.00	398,503.00	376,502.00

<sup>1</sup> Recycle BC does not specify what constitutes investment income.

What is unclear at this time is how revenue received from the sale of recycled material has changed. Unlike Ontario, Recycle British Columbia does not provide any data regarding revenue from the sale of marketed material in their annual reports.

As such, it is difficult to specifically isolate why material management costs have increased – is this an actual result of increases in the operational costs of managing material (collection, processing etc.)? Or is this increase simply attributable to a decrease in revenue?

In all likelihood, a combination of both factors is the most likely explanation. Using Ontario as a proxy, we observe that not only has revenue dropped significantly as a result of the Chinese National Sword, but the actual costs of attempting to collect and sort light weight material have also increased.

Existing recycling systems are not necessarily configured to efficiently and effectively capture light-weight materials, which can often result in escalating costs of material management. Despite claims made by supporters of the Recycle BC model, British Columbia is not immune to these cost increases, and as shown above, have actually seen an increase in material management costs that is greater than what was observed in Ontario (where net costs per tonne costs increased from \$304.77 to \$307.11 during the same period)

**Education, Accessibility and Outreach: How effective has it been?**

Another potential explanatory factor for increasing program costs is investments in improving accessibility (providing more households with access to recycling services) and promotion and education. As noted above, Recycle BC increased the total population serviced from 3,137,500 people in 2015 to more than 4,577,800 in 2018. In conjunction with the increase in overall service coverage, investments in recycling promotion and education per household increased from a relatively paltry \$0.09/hh in 2015, to \$1.04/hh in 2018. These investments, in part, explain the significant increase in per household costs, which increased from \$39/HH to \$48/HH year over year.

However, how effective have these investments been in increasing overall diversion performance? There is a general expectation that as accessibility increases, in conjunction with increases in public awareness through promotion and education initiatives, diversion performance should increase.

Referring to tables 5 and 6 below, there is almost no perceptible correlation between service rate and overall recovery rate, and a negative relationship between investments in per household P&E and recovery rates (for clarity, both tested correlations did not meet the threshold of statistical significance, implying that neither service rate or investments in P&E are correlated with recovery rate in any way).

**Table 5: Correlation Coefficient between Service Rate and Recovery Rate**

	<b>2018</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>
Recovery Rate	78.10%	75%	78%	77%
Service Rate (based on Households)	98.301%	98.094%	97.982%	91.128%
Correlation Coefficient	0.019089961			

**Table 6: Correlation Coefficient between per household investments in P&E and Recovery Rate**

	2018	2017	2016	2015
Promotion and Education Cost Per Household	\$ 1.04	\$ 0.99	\$ 0.80	\$ 0.09
Recovery Rate	78.10%	75%	78%	77%
Correlation Coefficient	-0.055787542			

The above findings are actually atypical when compared to other jurisdictions. Generally speaking, the findings from the broader literature suggest that both promotion and education, as well as service coverage, are highly correlated with recovery performance during a programs onset, gradually losing efficacy as a program reaches maturity. This phenomenon, which has been characterized as a “recycling steady state”, posits that most recycling programs in developed economies follow a very similar trajectory.

A newly launched program is likely to see rapid increases in diversion performance (and startup costs) during the first few years of operation as public awareness, accessibility and infrastructure matures. However, once access exceeds 90%, and participation in the recycling program becomes habitual for households (through regular service, a constant set of accepted materials, prescriptive guidance regarding what to put out and where (curb/depot) etc.), recycling performance will level off and reach a “steady state”.

Future increases or decreases in diversion rates are unlikely to differ significantly from this equilibrium point, barring major programmatic changes or systemic disruption (i.e. Financial crisis of 2009/2010, Chinese sword etc.). As an example, Ontario’s “steady state” recycling rate for the Blue Box program is between 60% and 65%. By comparison, British Columbia’s “steady state”, appears to be between 75% and 80%.

While the conclusion one may draw from this is that British Columbia is doing a better job diverting residential printed paper and packaging (and broadly speaking, that is true), how much of that performance delta is specifically attributed to the steward lead Recycle BC model is subject to debate.

Supporters of this model are often quick to site BC’s superior recycling rate as evidence for the success of the program, but based on a historical analysis, households are going to recycle that much, irrespective of the system in place. In 2013, Encorp Pacific reported a recycling rate of 80.1% for British Columbia, exceeding the provinces 75% target. Despite the relative infancy of the Recycle BC program, residential recycling of PP&P has been happening in the province for the better part of two decades. The primary reason why increases in recycling P&E investments and service coverage did not result in a statistically significant increase in recovery rates, is largely because the recycling system in BC has reached maturity. In the absence of a major programmatic change or exogenous disruption to the recycling system, BC is likely to continue to achieve a similar level of recycling performance into the future (although package light weighting may ultimately result in a decrease in overall recycling rates over time).

**What is BC Recycling?**

While an examination of overall tonnages and costs is useful in providing an overview of how a program may be doing, it fails to tell the full picture. What a system is recovering is almost just as important as how much is being recycled, as both the costs and environmental impacts of materials vary significantly across categories.

It should be noted that the Recycle BC Annual reports do not provide a detailed breakdown of the types of materials generated or recovered, instead reporting on broader umbrella categories such as paper, plastic (flexible and rigid), metal and glass. Prior to 2017, the annual reports did not provide any information regarding material collected by material type, and as a result, this study can only examine the past two years for which data was publicly available (2018 and 2017).

Tables 7 and 8 below summarize total collected tonnes and supplied tonnes by material type for the Recycle BC program for the years 2017 and 2018.

**Table 7: Total Collected Tonnes by Material Type (2017 and 2018)**

<b>Collected Tonnes</b>	<b>2018</b>	<b>2017</b>
Paper	120,267.00T	121,829.00T
Plastic	26,627.00T	25,132.00T
Metal	8,837.00T	9,209.00T
Glass	15,162.00T	13,961.00T
<b>Total:</b>	<b>170,893.00T</b>	<b>170,131.00T</b>

**Table 8: Total Supplied Tonnes by Material Type (2017 and 2018)**

<b>Supplied Tonnes</b>	<b>2018</b>	<b>2017</b>
Paper	140,385.00T	139,910.00T
Plastic	62,708.00T	61,736.00T
Metal	13,169.00T	13,855.00T
Glass	19,391.00T	19,346.00T
<b>Total</b>	<b>235,653.00T</b>	<b>234,847.00T</b>

At first glance, looking at the above tables, we see that collected tonnes and supplied tonnes remain relatively unchanged, with a slight increase in overall recovery performance year over year. However, looking at the numbers more closely, we observe that almost the totality of the increase in recovery performance is made up of increased recovery of glass.

While there is insufficient information to explain whether this result is a statistical aberration or part of a larger trend, it is worth highlighting that compared to other jurisdictions, glass makes up a greater proportion of overall recovered tonnes relative to other material categories. Why this matters is that glass is generally seen as a low value material with minimal economic or environmental benefit from recycling (specifically the recycling of cullet, and not in reference to bottle to bottle reuse).

This point isn't being made to disparage glass recycling, but more so to illustrate that overall recovery rates paints an incomplete picture with respect to program performance. A higher recovery rate does not necessarily result in a superior environmental outcome – a system which prioritizes the recovery of materials such as metals (specifically aluminum) and plastics can achieve greater carbon reduction relative to one that focuses on paper and glass – even if it diverts less overall material.

Of note, the overall carbon impact attributable to Recyclable BC has potentially decreased year over year, given the types of materials being recovered. While readers are cautioned from drawing any definitive conclusions due to the paucity of relevant data points and the lack of detailed recovery figures for individual materials, a fall in the recovery of metals (a presumed mix of aluminum and steel), results in a lower overall carbon impact from recycling, despite the increased recovery of glass cullet, paper and plastics. This preliminary finding points to the fact that the total amount being recycled matters less than what is actually recycled. In an almost paradoxical scenario, it is possible to achieve a greater carbon impact, despite recycling less, by targeting specific, high impact materials for recovery.

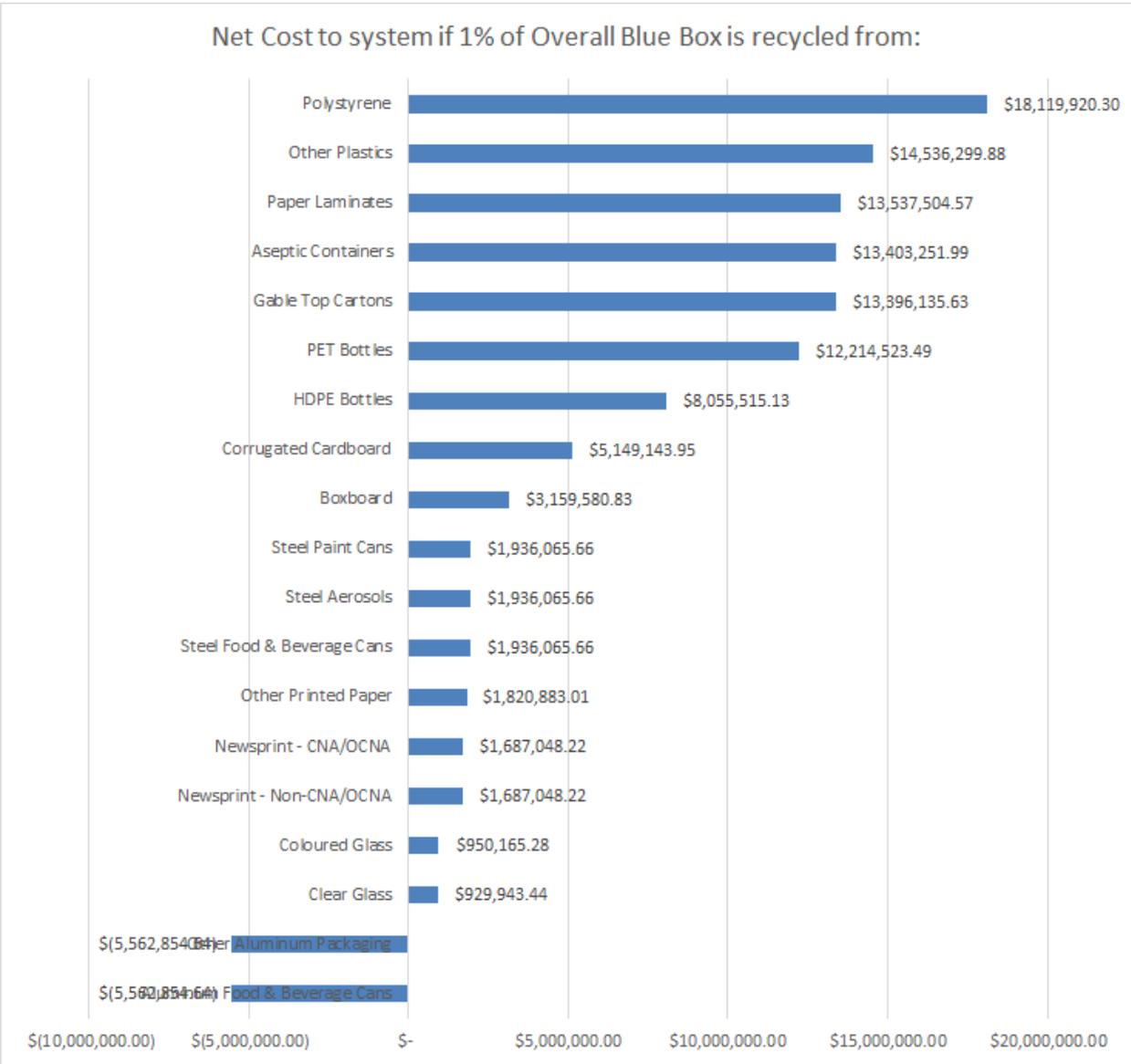
### **Why Recycling isn't always a good thing**

It is imperative that when we evaluate the effectiveness of a recycling system, particularly when looking to replicate that model across multiple jurisdictions, that we ask ourselves: "What is it that we are trying to achieve?". Metrics rooted simply in overall diversion no longer capture the complexity and nuances of an evolving waste management system.

Recycle BC's focus on driving diversion and encouraging producers to develop "recyclable" packaging, ultimately loses sight of environmental and economic objectives. In short, recycling "more" is not always the best answer – in fact, in many instances, it can result in poorer environmental performance at a significant increase in the cost of material management.

While Recycle BC does not publish the costs of recycling individual printed paper and packaging materials, using Ontario as a proxy, the figure below shows the net cost if 1% of all material recycled came from each of the following Blue Box materials:

**Fig 3.**



In the above, you can see that if 1% of what was recycled came from Polystyrene, the cost would be \$18+ million dollars. Conversely, if that 1% came from Aluminum, you would actually receive surplus revenue of approximately \$5.5 million.

As jurisdictions move forward with deciding "What should go in the bin", it is important to remember that certain materials are more suitable for recovery (in our existing system) than others. While it may not seem kosher to advocate for saying certain materials should be excluded from the program, it is an important consideration when we are looking to promote the long term sustainability and economic tenability of a residential recycling program. Not all recycling is created equal. In fact, recycling may actually result in a worse environmental outcome when compared to other end of life options if we consider the entire life cycle of a product.

While it would be easy to fault producers for using difficult to recycle materials, we have to take a step back and ask why light weight packaging has become so popular. Despite low levels of recyclability, the benefits of package light weighting include:

A reduction in the amount of materials used, logistical efficiencies (more material can be transported per shipment), increased durability, longer shelf life (both in the store, and in the home), and allowing for discretionary consumption (you only use what you need). As an example, a laminate package for soup (in lieu of the conventional tin can) allows users to reseal the pouch, allowing it to be stored longer and avoiding waste.

When taking a life cycle approach, the environmental impact of light weight packaging is actually superior to conventional packaging in many instances. Much of the carbon savings is realized as avoided food waste and source reduction. In many ways, light weight packaging has revolutionized our food system, helping keep tens of thousands of organics out of provincial landfills.

This tension between designing a package that is recyclable, or designing a package that has a lower environmental impact, is an issue that the waste management sector must address. An EPR program should be centered around environmental outcomes, using a life cycle approach that prioritizes a packages impact on the environment.

In an almost paradoxical scenario, it is possible to recycle less, but achieve greater carbon abatement by focusing on specific materials for recovery. Emphasis should be placed on recycling the materials that can be readily managed by the existing system.

Conversely, for materials that possess low levels of recyclability, but achieve an environmental savings upstream of disposal (plastic laminates, film etc.), alternative end of life scenarios should be considered (waste to energy, plasma gasification etc).

An EPR policy that is designed to be a “one size fits all” fails to capture the complexity of an evolving system – consumer packaging is likely to continue towards light weight, composite materials. This necessitates that we rethink our approach to producer responsibility, allowing for sector based solutions that go beyond “just recycling”

### **Unintended Consequences: The Cost to Consumers**

With BC’s 100% steward lead EPR scheme potentially being replicated in other jurisdictions such as Ontario, it is important to understand that the “costs” associated with waste management and recycling are ultimately born by households.

The purpose of Extended Producer Responsibility is to shift the physical and financial responsibility of end of life waste management onto the producers (or first importers), of a particular good. Conceptually, it is difficult to find fault with the premise – generally speaking, people who make a product, should ultimately be responsible for how it gets managed post consumption.

However, in practice, what producers are financially obligated for is of critical importance when addressing what is literally a billion dollar question. At present, EPR for printed paper and packaging waste has focused on recycling – for both the Blue Box in Ontario, and the Recycle BC program, producers are obliged to pay for the costs associated with recycling post-consumer packaging waste. Where this becomes potentially problematic, is that recycling costs, particularly for composite and light-weight

materials, are going up exponentially – recycling system costs for both Ontario and British Columbia are increasing by double digits year over year. In the case of Ontario, recycling system costs have more than doubled in the past 15 years, while recycling rates have actually decreased.

While advocates of EPR say that producers should be paying these costs irrespective of what they might be, the reality is that these costs are absorbed by the consumer, in the form of increases in the cost of consumer packaged goods.

In the fall of 2019, York University undertook a study to quantify the average increase to a "basket of goods" for households should full EPR be implemented. This assumes that a) end of life material management costs remains unchanged and b) all costs are passed along to the consumer.

In 2018, the average family of four spent \$177 per week on groceries. If full EPR were to be adopted (affecting prices of only packaged goods), our model estimates that grocery costs would increase by between \$11 and \$15 a week (\$188 to \$192 respectively).

While a 6-8% increase in our grocery bills may seem like an inconvenience to some, it has an adverse effect on lower income and marginal families. In a focus group conducted of more than 1800 consumers in the Greater Toronto earlier this year, more than 80% of respondents indicated that price was the primary determinant for making a purchase. If possible, respondents indicated that they would like to make more sustainable purchases, but budgetary restraints largely impeded them from doing so.

During focus group sessions, families expressed concern that they were unable to keep up with the rising cost of food, and would have to "go without" should prices continue to increase.

In a 2019 analysis of consumer purchasing preferences in the Greater Toronto Area, households characterized as "low income" (household income less than \$40,000 per year) consumed 18.4% more pre-packaged goods (namely grains, produce and frozen meats), when compared to families whose household income exceeded \$100,000 a year. There is an inverse, statistically significant correlation between household income and % of prepackaged foodstuff of overall weekly purchases. Given that lower income groups are the greatest consumers of packaged goods (both in absolute terms, and as a relative % of the overall purchasing basket), any upwards pressure in the cost of food stuff could have potentially adverse impacts.

Ultimately, the decision to force producers to use recyclable packaging, and pick up the tab for doing so, has an unintended effect that disproportionately affects the most vulnerable and marginalized families.

## Conclusions

This examination of the Recycle BC program should be seen as an ongoing project – one of the primary limitations of this study is the lack of public data available. Despite repeated efforts to reach out to Recycle BC to provide additional context and detail surrounding their annual reports, the university received no follow up, and subsequently, was forced to rely on documents that could be gleaned from public sources.

Why this poses a significant issue is that it is difficult, if not impossible, to do a deep dive into the absolute and relative performance of the program without knowing information surrounding detailed operational costs (collection, processing, administration, interest on capital etc.), and material specific management data (cost by material type, revenue by material type, a granular breakdown of recovery and generation by material type, i.e. newsprint, printed paper, corrugated cardboard, boxboard etc.).

To date, we are expected to take claims made by Recycle BC and its supporters at face value – that a steward run recycling program is more efficient (both with respect to cost containment and recovery performance) when compared to alternative models, namely, the shared municipal model presently in place in Ontario.

This study, while still ongoing, conclusively demonstrates that the Recycle BC program has actually experienced year over year cost increases that exceed that of any other jurisdiction, and that recovery rate performance has stalled.

Perhaps most telling is that by all conventional metrics, 2015 was actually the best performing year of the program - this is atypical, considering program development costs exceeded \$8 million dollars (compared to an average of \$218,000 since). Essentially, despite the growing pains of a new program - the year of inception has been the most successful (unless it is measured in terms of service coverage).

The purpose of this study is not necessarily to criticize the approach used by Recycle BC, but merely to illustrate that the program is not immune from the challenges and obstacles facing other jurisdictions (namely Ontario). A steward run program has not resulted in any perceptible improvement in recovery rate performance or costs. A common claim made by supporters of the Recycle BC model is that stewards will be able to achieve cost efficiencies and simultaneously develop packaging that is compatible with a steward owned and operated waste management system. To date, there has been no evidence of this, in either British Columbia or elsewhere.

Stewards have demonstrated an ability to develop more sustainable packaging (from a life cycle perspective), but not necessarily material that can be readily recycled or diverted within the existing system. In many ways, the development of sustainable packaging is at odds with the development of recyclable packaging – many of the efforts designed to reduce both the weight and quantity of packaging used (in addition to increasing product longevity), results in materials that either cannot be readily recycled, or have low value when recovered.

It is imperative that BC, and jurisdictions across Canada and the world, rethink both attitudes and approaches towards recycling and EPR. Perhaps the greatest challenge facing the sector is that we no longer have viable end markets or applications for much of the packaging that we attempt to recycle. The unexpected fallout of the Chinese National Sword (which has grown to include other markets in South East Asia), has demonstrated the short sighted nature of attempting to recycle everything, everywhere.

The deterioration of end markets calls into question Recycle BC's approach of fixating on producers making (and paying for) recyclable packaging. While yes, there are certain site and situation specific scenarios where re-processors such as Terracycle have developed an innovative use for problematic materials – but these “solutions” are neither economical or scalable.

There is no evidence to date that shows a steward-led EPR program will lead to either increased recycling or cost containment. In fact, all current data points to the exact opposite scenario, where recycling a package is coming at an enormous financial cost, with questionable environmental benefits.

Once again, the question becomes: What is the goal of our waste management system? Is it an optimal environmental outcome (measured in terms of reduced carbon and other global warming potential metrics), or is it increased diversion?

Recycle BC and its supporters seemingly remain fixated on diversion based outcomes and methods of evaluation, which will ultimately prove problematic moving forward (as already evidenced by increasing costs and stagnating recovery rates).

Other jurisdictions need to think very carefully before adopting a similar model, simply assuming that it works. It is imperative that policy makers begin to dig deeper into the numbers, and demand greater transparency from Recycle BC, in order to truly determine whether it is a model worth following.