

# Economic/Financial Analysis of Development and Implementation of EPR in Yukon

Eunomia Research & Consulting

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## Report For

Yukon Government

## Research Team

Julia Marsh, John Carhart, Kyle Hutchens, Sydnee Grushack

## Technical Leads

Mark Cordle

## Prepared By

Julia Marsh, John Carhart

## Quality Review

Sarah Edwards

## Approved By



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Sarah Edwards  
Project Director

## Acknowledgements

Cariboo Regional District (BC)

Raven Recycling

Yukon Government

**Eunomia Research & Consulting Inc**

61 Greenpoint Avenue, Suite 508

New York

USA

Tel +1 646 256-6792

Web [www.eunomia-inc.com](http://www.eunomia-inc.com)

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# Executive Summary



# Introduction

This project has been undertaken to evaluate the impacts of developing and implementing an Extended Producer Responsibility (EPR) program in the Yukon. The Yukon Government is considering the development of an EPR program in the territory and is seeking to evaluate the current state of recycling in the territory as well as the impacts of various future scenarios. The three targeted product categories for EPR are printed paper and packaging (PPP), waste oil, and household hazardous waste (HHW).

The current state of recycling in the territory is facing unsustainable and rising costs, a reality acknowledged by the two recycling processors, located in Whitehorse, that operate in the territory. As a result, if the status quo were to continue, both processors expect to end their processing of PPP.

EPR is a policy approach that assigns producers of covered products with financial and/or operational responsibility for ensuring these products are properly managed at the end of their life cycle. This system is designed to increase collection and recycling rates of targeted products and materials and to shift the environmental and financial costs of end-of-life management of post-consumer products from municipalities and households to producers. When most effective, it incentivizes waste prevention at the source and promotes design-for-recyclability considerations in product design. Under an EPR system, producers usually organize and finance Producer Responsibility Organizations (PROs) that carry out the end-of-life management of products on behalf of their members.<sup>1</sup>

In the Yukon, the Our Clean Future Strategy, published in 2020, outlines actions the Government of Yukon will take to address the impacts of climate change while building a green economy and ensuring access to reliable, affordable, and renewable energy for residents. Our Clean Future includes a goal of improving how waste is managed in the Territory to move toward a more circular economy. As part of this goal, it commits the Yukon Government to designing and implementing an EPR program in the Territory by 2025.<sup>2</sup>

In addition to the analysis of the current state of service for PPP, household hazardous waste, and waste oil and various scenarios, this report also provides recommendations to the Yukon Government on key considerations in establishing EPR. These considerations include the structure, legislative considerations, potential exemptions, and program targets. The learnings from the interviews, along with research on other EPR programs in Canada and Eunomia's existing knowledge of EPR and implementation best practices, informed both the scenario analysis and the recommendations included in this report.

## Baseline Assessment and Scenario Modelling

The first stage of the project was an analysis of the current state, including the current return rates, services, material flows, and costs. As part of this analysis, Eunomia conducted several interviews with stakeholders in the Yukon and in other provinces across Canada. Eunomia then developed a baseline assessment that served as the starting point to evaluate the costs and implications of EPR for PPP, HHW, and waste oil in the territory under a number of different future scenarios.

## Scenarios

The following scenarios, identified by the Yukon Government, were modeled to evaluate the implications of an EPR program in the territory:

- **Scenario 1: Status quo/baseline**

This scenario projects the current state of recycling into future years. This scenario serves as the baseline for comparison of the costs and benefits of the other scenarios. The current recycling system for PPP is largely funded by the Yukon Government and municipal governments with additional support from two privately run recycling processors who use some their profits from refundable beverage containers to subsidize non-refundable PPP recycling. Collection is mostly voluntary, via drop-off at depots for PPP or curbside in Whitehorse (through a subscription service) and Haines Junction and Teslin (provided for residents). Processing and shipping of these materials is carried out by the two processors, who are provided diversion credits for this diversion. HHW is mostly collected at government-funded drop-off events. About half of all waste oil is managed by permitted commercial operations and half is collected at government-funded drop-off events.

- **Scenario 2: Near future – government does not take action, PPP services stop**

In this scenario, without government action, the two recycling processors end their PPP operations in the short term. Recycling for regulated beverage containers continues, but all other PPP is disposed of in landfills. Operations for HHW and waste oil are unchanged.

- **Scenario 3: Near future – government takes over recycling system**

In this scenario, the Yukon Government takes over recycling operations from the current privately operated recycling processors, with the aim of providing the same level of collection, service, and accessibility as in the status quo/baseline scenario.

At baseline, the government provides funding to the community depots and processors through payments and diversion credits. Under Scenario 3, the government takes over the operations officially, and provides some extra funding for wage improvements and some investment. We have also assumed the government takes over the HHW and waste oil collection in the territory.

- **Scenario 4: EPR scenario – current service provided under EPR**

In this scenario, EPR regulation shifts the costs for the system from the government to the producers and requires that PROs meet the goal of providing the same level of collection, services, and accessibility as in the status quo/baseline scenario.

An additional cost over Scenario 3 is assumed in this scenario to cover the program management costs of a PRO. There are no system upgrades modelled in this scenario, despite the fact that EPR is often used as a vehicle for improving the recycling system.

- **Scenario 5: EPR scenario – high recovery**

This scenario models an EPR system with high recovery targets, achieved through interventions to increase recycling from current levels. PROs manage the collection of materials. Recovery targets are similar to those in British Columbia and are set as follows:

- 78% recovery for residential PPP
- Awareness targets for HHW above 70%
- 90% recovery for waste oil

- **Scenario 6: EPR scenario – high service/high accessibility**

This scenario models an EPR system that focuses on accessibility targets and convenience for residents. The modelled system includes the deployment of a curbside blue bin recycling service for PPP across the City of Whitehorse and additional access to depots across the territory in order to achieve both high service and high accessibility. PROs manage the collection of materials. The service/accessibility levels in this scenario are shown in Table 1.



**Table 1: High Service/Accessibility Levels for Scenario 6**

	PPP	HHW	Waste Oil
<b>Whitehorse</b>	Bi-weekly blue bin collection	Monthly drop-off opportunity	Monthly drop-off opportunity
<b>Communities other than Whitehorse with population &gt;500 people</b>	Depots open at least three days a week, every week	Quarterly drop-off opportunity	Quarterly drop-off opportunity
<b>Communities with population less than 500 people</b>	Depots open at least three days in a two week period	Twice-annual drop-off opportunity	Twice-annual drop-off opportunity

Source: Yukon Government.

## Key Findings

Table 2 below shows the results of the cost modelling for the six different scenarios. Under each scenario, there are four possible funders:

- Producers – payments by those who sell material into current and future regulated programs
- Communities – municipalities outside of Whitehorse who pay for some recycling services (e.g HHW)
- Households – households with subscription-based curbside recycling
- Yukon Government – the funding paid by the Yukon Government through depot payments and diversion credits at baseline, and more of the system under future scenarios.

In Scenario 2, the PPP recycling program shuts down as in this scenario the Government does not take action and existing processors are no longer viable. This change results in a drop in recycling costs (from \$384/tonne to \$97/tonne) but an increase in the cost of waste to landfill. Scenarios 3 and 4 have similar service levels to the baseline, however there are increases in wages and a small amount of investment costs into recycling processors and the costs are either covered by the government (Scenario 3) or producers (Scenario 4). The investment costs in those scenarios cover necessary improvements to ensure that they can continue to operate at current levels. Scenarios 5 and 6 model recovery and accessibility improvements, with significant increases in costs due to added services and investment, such as additional capital spending on processing facilities, increased curbside access, additional depot hours, transportation of glass to a recycling facility, additional oversight, and additional staff at depots. However, under EPR, the costs are covered by producers. The cost to households is 0, and the Yukon Government would see cost savings compared to the current scenario as well.

The costs of the recycling program only are shown in Table 2 below, as well as the cost of residential PPP disposed.

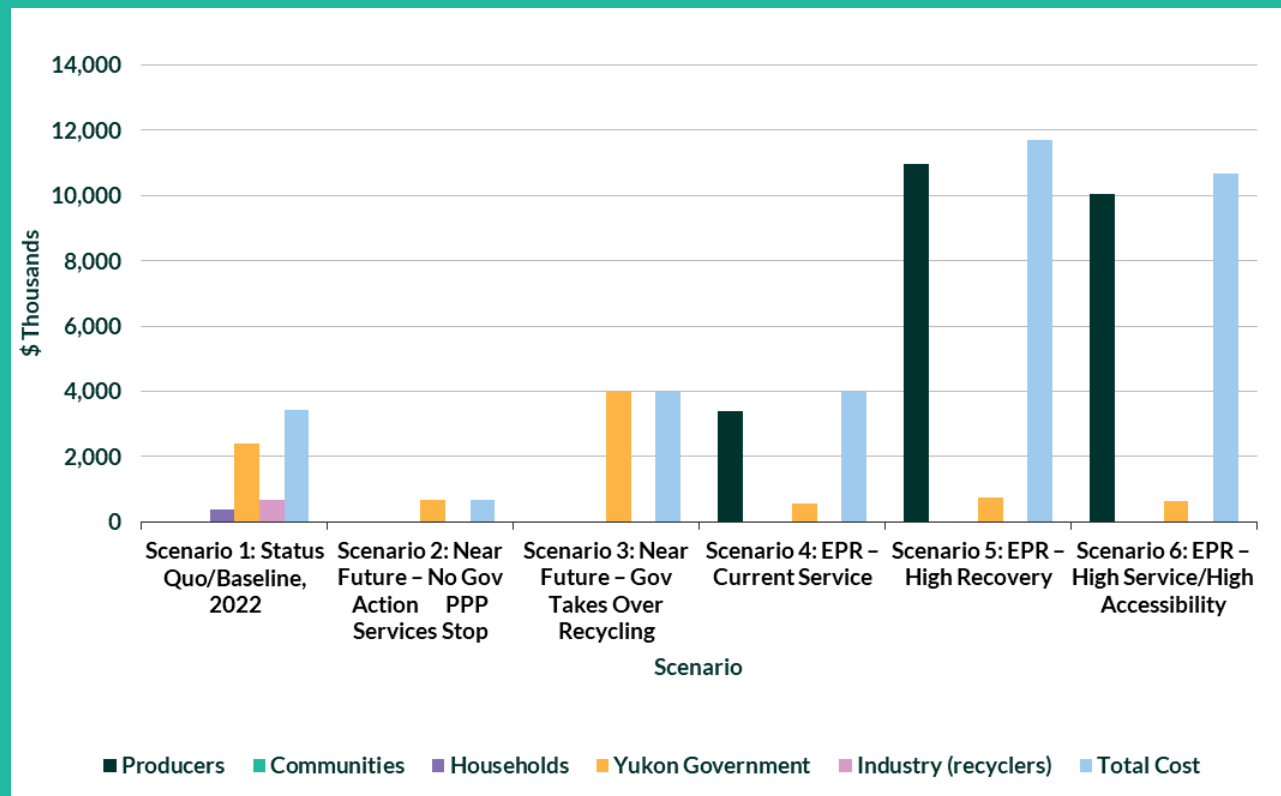
**Table 2: Annual Cost of Recycling Covered by each Stakeholder Group for PPP, HHW, Waste Oil & Cost of Residential PPP Disposal (\$)**

Scenario	Producers	Comm unities	Household	Yukon Government	Industry (recyclers)	Total	Cost of Residential PPP Disposed	Cost per Tonne PPP Recycle d
Scenario 1: Status Quo/Baseline2022	0	0	363,000	2,320,000	300,000	3,060,000	551,000	537
Scenario 2: Near Future - No Gov Action PPP Services Stop	0	0	0	680,000	0	680,000	692,000	134
Scenario 3: Near Future - Gov Takes Over Recycling	0	0	0	3,966,000	0	3,966,000	551,000	755
Scenario 4: EPR - Current Service	3,397,000	0	0	568,000	0	3,965,000	551,000	755
Scenario 5: EPR - High Recovery	10,983,000	0	0	733,000	0	11,716,000	348,000	1,527
Scenario 6: EPR - High Service/High Accessibility	10,059,000	0	0	631,000	0	10,690,000	373,000	1,450

Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report



**Figure 1: PPP, HHW and Waste Oil Cost by Stakeholder (\$)**



Besides the cost benefits to households and the government, the EPR scenarios result in other benefits over the status quo that are shown in Table 3. The high recovery and high accessibility scenarios (Scenarios 5 and 6) result in residential PPP recycling rates (including BCR) of 77% and 72%, compared to 41% in the baseline scenario. They also result in avoided landfill costs of at least \$252,000 above baseline, as well as at least an additional 4,120tCO<sub>2</sub>e of GHG emissions reduction. Furthermore, there are job creation benefits. All EPR scenarios result in an increase in FTE, and both Scenarios 5 and 6 add at least 11 more FTE.

**Table 3 Comparison of Results by Scenario**

Scenario	Residential PPP Recycling Rate (incl BCR)	Residential PPP Total Cost (\$)	Cost Per Capita - Total (\$)	Cost per Capita - Out of Pocket (\$)	Cost per tonne recycled (\$)	Value of material recovered* (\$)	Avoided Landfill Costs (\$)	GHG reduction associated with avoided landfilling (CO <sub>2</sub> e)	Total FTE
Scenario 1: Status Quo/Baseline, 2022	41%	5,300,000	124	60	766	515,000	1,249,000	-6,374	74

Scenario	Residential PPP Recycling Rate (incl BCR)	Total Cost (\$)	Cost Per Capita - Total(\$)	Cost per Capita - Out of Pocket (\$)	Cost per tonne recycled (\$)	Value of material recovered * (\$)	Avoided Landfill Costs (\$)	GHG reduction associated with avoided landfilling (CO <sub>2e</sub> )	Total FTE
Scenario 2: Near Future – No Gov Action PPP Services Stop	14%	3,002,000	70	43	429	234,000	507,000	-2,046	38
Scenario 3: Near Future – Gov Takes Over Recycling	40%	6,176,800	145	43	894	515,000	1,249,000	-6,374	75
Scenario 4: EPR – Current Service	40%	6,176,800	145	127	894	515,000	1,249,000	-6,374	75
Scenario 5: EPR – High Recovery	77%	14,006,800	330	311	1,500	-495,000	1,540,000	-11,130	89
Scenario 6: EPR – High Service/High Accessibility	72%	12,900,800	304	287	1,430	-497,000	1,501,000	-10,494	85

Source: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report

\* Note that a negative number indicates an income.

## Cost Savings

Under EPR, producers cover the costs of recycling services and the Yukon Government, as well as households and communities, experience cost savings. The three EPR scenarios are more costly overall than the other scenarios, as EPR strives not just to cover the cost of existing services, but also increase recycling and provide more equitable access to communities. However, since these costs, under EPR, are covered by producers, the government can expect to reduce expenditures for recycling by an estimated \$1.15 million per year under EPR compared to the status quo. Government spending to support recycling is estimated to go from just over \$1.7 million in the baseline scenario to \$570,000 – \$730,000 under EPR. However, EPR should not only cover

current cost but it should strive to increase recycling. When comparing the cost burden to the Yukon Government under Scenario 3 where they take over the system and make necessary improvements, shifting cost to producers would then reduce expenditures to recycling by \$3.4 million. Households would reduce expenditures by \$363,000, as their cost liability would go to zero. Under scenario 5, the recycling rate of PPP reaches 77% under a system where producers pay \$11 million, and the Yukon Government pays \$730,000. The cost under EPR for the government is to continue to fund depots for commercial collection, as well as some administrative costs.

### **Cost for Third-Party Management of EPR System**

Some jurisdictions, such as New Brunswick, have established an arms-length oversight agency to monitor performance and compliance of producers under EPR. Alberta and Ontario have also adopted this structure in their recently created and updated, respectively, EPR laws. In New Brunswick, Recycle NB is the third-party oversight organization. It was established through the Clean Environment Act regulation and operates as a non-profit whose role is to ensure that materials designated by the Minister of the Environment are managed in a manner that assures a clean and healthy environment.<sup>3</sup> In Ontario, the Resource Productivity and Recovery Authority (RPRA) is the regulator mandated by the government to enforce the circular economy laws of the province.<sup>4</sup>

The cost of establishing a third-party oversight organization to manage an EPR system in the Yukon is estimated to be \$80,000 in upfront costs, including office equipment, furnishings, and technology outfitting, plus an annual cost of \$210,000. This was estimated by extrapolating from Recycle New Brunswick's annual operating reports and their initial upfront costs in their first year of operation. Once established, however, the oversight organization does not require government money, as it is fully funded by the administrative fees it collects from the producers within the programs. Furthermore, in New Brunswick, Recycle NB is prohibited from cross-subsidizing between programs, so the organization's costs are the true costs of overseeing the EPR program.<sup>5</sup>

### **Contracting Opportunities**

Contractors are key stakeholders in operating an effective EPR program. In Yukon, depots are currently operated by private entities that receive funding from the government and a processing fee for containers collected. Haulers are also private entities that are hired by the government. Curbside recycling collection is provided for residents in Haines Junction and Teslin by local governments and is offered in Whitehorse through a private collection service, Whitehorse Blue Bin Recycling. Blue bin collection, depot reception, transportation and depot transportation could all fall under the private contracting umbrella and provide opportunities for local contractors to provide these services. Together, these opportunities have an estimated value of \$1 - \$5 million, depending on the EPR scenarios chosen (Scenarios 4-6).

In developing an EPR system for the Yukon, current contractors and municipalities should be given first right of refusal for service provision based on agreed service level requirements, providing them the opportunity to contract with the EPR stewardship organization to continue providing services, either themselves or by contracting with a third-party commercial provider. If municipalities do not want to provide collection services, the producers would then be responsible for contracting with commercial providers to provide collection services. This was the case in both BC and now in Ontario.

It is recommended that, in the most rural areas of the territory, the Yukon Government and producers look for opportunities to improve efficiencies, such as producers contracting with the Yukon Government to provide services in these areas where the government may already be providing water and other related services. Under true EPR, the government should then be proportionately reimbursed for these services by the producers.

### Job Creation

The scenarios modeled investigated the job creation potential of implementing a government controlled recycling program, EPR, including direct, indirect, and induced jobs. Indirect jobs are those created through activity associated with the direct functioning of the system. Induced jobs are those created, for example, as a result of additional spending, such as by workers employed at a recycling plant with their wages.

The findings show that at baseline, recycling across all material types in the Yukon creates 74 direct, indirect and induced full-time equivalent (FTE) jobs across the territory.

The numbers of jobs created under the other scenarios are shown in Table 4.

**Table 4: Jobs Created By Scenario**

Scenario	Jobs Created (Direct, Indirect, and Induced)
Scenario 1: Status Quo/Baseline, 2022	74
Scenario 2: Near Future – No Gov Action, PPP Services Stop	38
Scenario 3: Near Future – Gov Takes Over Recycling	75
Scenario 4: EPR – Current Service	75
Scenario 5: EPR – High Recovery	89
Scenario 6: EPR – High Service/High Accessibility	85

Source: Eunomia Calculations.

### Initial Infrastructure for EPR

Implementing an EPR system in the Yukon will require infrastructure to support material collection and processing, as well as ensure accessibility for residents. Infrastructure changes or expansion will require investments and planning. One of the processors in Whitehorse expressed in discussion that infrastructure is a constraint to current operations. The existing infrastructure is beyond both capacity and useful life, which affects efficiency of processing as well as maintenance and repair costs. Even continuing current operations, much less expanding them, would necessitate an infrastructure upgrade.<sup>6</sup>

Beyond the infrastructure improvements needed at the processors, infrastructure expansion will be required at depots and collection sites.

The expected cost of initial infrastructure requirements in the Yukon is \$2.5 million per year for facility and depot improvements over the next 15 years. This includes investment for a new building at the processor to cover recyclables and equipment. This cost is assumed for Scenarios 5 and 6. A smaller portion is assumed for Scenario 3 and 4 which are not as high performing, but this cost is assumed to keep the recycling services operating.

## Considerations for EPR

As the Yukon Government develops a legislative proposal for EPR for the territory, it is considering topics related to program design, the policy framework, and program targets. Eunomia was asked to consider other elements of implementing EPR and make recommendations for an effective EPR program. These recommendations are based on the learnings from interviews, EPR systems in other regions, other relevant research, and Eunomia's existing knowledge of EPR and implementation best practices. Key considerations, and recommendations are outlined below.

Of note, other provinces have EPR in place for different products. As a result, moving in the direction of expanding EPR is to be expected in the Yukon as well, with PPP, HHW, and waste oil as the first phase but other covered materials likely in the future.

### Policy Framework

Providing recycling services to a dispersed, rural population like that of the Yukon is expensive, and there are limited opportunities for economies of scale to drive savings. Despite these challenges, Yukon residents should be entitled to a level of service under the EPR program that is comparable to that received by residents in other provinces with EPR in place. Incorporating considerations into the regulation to create an effective, accessible EPR program will be critical. Key elements to take into account in developing the policy framework include:

- **Establishing an outcome-based system.** Outcomes include reducing the amount of PPP, HHW, and waste oil sent for disposal and supporting the development of a circular economy, ensuring accessibility to collection for Yukon residents, and preventing free riders. The legislation should specify a mechanism for determining and reviewing targets, as well as provisions for continuous improvements and penalties for non-compliance and non-achievement.
- **Program Targets.** Ambitious targets for both performance and service level should be set to achieve the outcomes identified in the program.
  - **Diversion and recycling targets.** Targets should include reporting of material that is actually recycled and used in the production of new products, not just what is collected. Targets should be set that increase over time, are material specific, and are accompanied by penalties for producers if targets are not reached.
  - **Service level/accessibility targets.** Setting service standards is important to ensure equitable access for all Yukon residents, of particular importance given the dispersed nature of much of the territory's population. Accessibility targets should ensure that recycling access is convenient and equitable for residents and should be established as one of the outcomes for producers to achieve. In the Yukon, the legislation should ensure that access stays at least as high as in the current state. It should also be clear on what level of service can be expected in both urban and rural areas. BC's legislation requires PROs to provide a "reasonable" level of access, but this is hard to define with different PROs using different metrics. Setting out clearly what the minimum access requirements are and how they will be measured is important..

- **Defining designated materials.** In addition to clearly defining an obligated producer, materials designated under the EPR system need to be clearly defined. At the same time, the regulation should be written to be able to incorporate new materials that enter the market as needed.
- **Defining roles, responsibilities and funding obligation.** The respective roles, responsibilities, and funding obligations for different stakeholders also need to be clearly outlined. Producers should be individually responsible for meeting targets, with the ability to report through a PRO. Clear timeframes should be established for producers to meet targets
- **Penalties.** Clear timeframes should be established for producers to meet targets, with penalty mechanisms in place for non-compliance on an individual producer basis.

### Program Management

It is recommended that the Yukon Government structure the EPR program with a third-party oversight organization, like the model implemented in New Brunswick and Ontario and soon to be in place in Alberta. This third-party organization would provide the oversight and monitoring of progress against targets. Once established, this structure would require little involvement from the Yukon Government. Costs of the oversight organization would be covered by producers through producer fees determined annually. Recycle New Brunswick and the Resource Productivity & Recovery Authority (RPRA), the oversight organizations in New Brunswick and Ontario, respectively, have very transparent mechanisms in place for establishing producer fees for EPR programs they oversee.

### De Minimis Threshold

De minimis provisions exempt small businesses, below a certain threshold, from paying fees to comply with EPR regulations, thereby relieving them of undue financial or administrative obligations that come with EPR programs. In evaluating the establishment of a de minimis threshold for small businesses for PPP, Yukon is considering de minimis thresholds established in other provinces, as well as Yukon business revenues. It is recommended that the Yukon establish a de minimis exemption aligned with those in other provinces with EPR in place. Thresholds are often established based either on revenue or on tonnage. Table 5 summarises de minimis thresholds in other provinces.

**Table 5: De Minimis Thresholds**

Province	Revenue Threshold	Tonnage Threshold	Other Exclusions
New Brunswick	\$2 million	1 tonne	Charitable organization Franchisee
British Columbia	\$1 million	1 tonne	Charitable organization One point of sale
Ontario	\$2 million	15 tonnes (must register & report, but exempt from fees)	--
Saskatchewan	\$2 million (proposing to lower to \$1 million)	1 tonne	One point of sale (proposing to remove this exemption)

Province	Revenue Threshold	Tonnage Threshold	Other Exclusions
Alberta (proposed)	\$1 million	(to be established in ARMA bylaws)	Charitable organization

Source: Eunomia Research.

It is recommended that the Yukon align de minimis exemptions with those of British Columbia in particular, which has established thresholds based on either gross annual revenue or tonnage of material. If a producer falls below a threshold of either \$1 million in revenue in the province or produces less than 1 tonne of material sold or distributed in the province, then it is exempt.

A de minimis exemption is also linked to how a producer is defined in EPR regulation. This definition varies across provinces. To ensure all companies that supply covered EPR material into the Yukon are identified and contribute to covering the cost of the system, a clear definition of an obligated producer is essential to include in the regulation, in particular to include companies like non-resident online retailers, wholesale importers, and companies with no resident producer (such as couriers that transport online sales) are obligated to participate and free riders are deterred.

### Other Considerations

**Industrial Commercial Institutional (ICI) material.** It is recommended that the Yukon EPR system begin by addressing residential PPP to be consistent with existing programs in Canada. In addition, producers of some products into the ICI sector are different than those of the residential sector. Including ICI materials would thus open the EPR program to many more producers, which would add an additional administrative cost that would be disproportionate in the Yukon given the size of the territory. The Yukon Government could consider requiring producers to report on the quantities of material sold into the ICI sector. This information could be used to establish a baseline and consider addressing ICI PPP in the future. There is increasing pressure for EPR programs to cover the cost of both residential and ICI material as seen in both Europe as well as the US. At the point in time when other provinces start to address ICI, the Yukon could then be ready to capitalize on this change.

**Bans and incentives.** Disposal bans have been shown to be an effective complement to EPR policies. A risk of a disposal ban or user pay system, however, is contamination, with non-recyclable materials mixed in with covered materials. Given this potential and the inherent intention of an EPR system shifting responsibility for product end-of-life management to producers, it is recommended that recovery be incentivized through material-specific targets and accompanying penalties for producers that do not achieve these targets.

**Federal action on plastics.** While the regulation of waste and recycling in Canada is carried out by provincial and territorial governments, the Government of Canada is developing new initiatives and regulations to address plastic pollution, including an initiative to support EPR efforts on the territorial and provincial level.<sup>7</sup>

- The Single-use Plastics Prohibition Regulations, released in June of 2022, places a ban on the manufacture, import, and sale of six categories of single-use plastics items. The regulation will expand to ban the export of the covered single-use plastic items starting in December 2025.<sup>8</sup>
- Development of minimum recycled content requirements for plastic items is in progress. Plastic packaging in Canada will be required to contain at least 50 percent recycled content by 2030<sup>9</sup>



- The government is developing a federal plastics registry that will require producers to report on plastics they place on the Canadian economy. This registry will support provincial and territorial EPR efforts.<sup>10</sup>
- The government is also in the process of developing labelling rules to improve the recycling and composting of plastic packaging and single-use items through accurate labelling.<sup>11</sup>

Developing federal regulations could help facilitate territorial and provincial-level action across Canada, and the in-progress plastic producer registry could contribute to the effectiveness of EPR programs.

## **Conclusion**

EPR for PPP and other covered materials, when accompanied by targets, will ensure that the necessary investment is put in place to meet those targets. An EPR system for PPP that includes recycling targets as well as service level/accessibility standards will increase the overall cost of the system due to the fact that recycling services have a cost, and that cost is higher when serving more rural and dispersed populations. However, under a full cost recovery system, producers are responsible for covering these costs, and the costs to communities and the government decrease.

A well-designed EPR regulation establishes an outcome-based system, specifies mechanisms for setting and reviewing targets, clearly defines covered producers and leaves room to incorporate new covered materials as needed, implements reasonable de minimis exemptions, and ensures accountability for producers to report against and meet targets, with penalties for non-compliance. In implementing such an EPR program, the Yukon can expect to address the existing challenges with the recycling system in the territory as well as see other benefits for households, the government, and the environment.

Table 6 shows the benefits of EPR in the territory. Under a well-designed EPR scenario, the Yukon would see increased amounts of covered material recovered. The EPR scenarios with high recovery and high accessibility (Scenarios 5 and 6), for instance, result in residential PPP recycling rates of 77% and 72% compared to 4% under the current situation. Households and the government would also see cost savings. There would be no cost to households under EPR, and the government could expect to reduce expenditures for recycling by at least \$725,700 per year. An EPR program would result in environmental benefits in the form of greenhouse gas emissions savings. Scenarios 5 and 6 both result in GHG emissions reduction of over 4,000tCO<sub>2</sub>e compared to the baseline scenario.

**Table 6 Benefits of EPR Scenarios Compared to Status Quo**

Scenario	Residential PPP Recycling Rate (Incl. BCR)	Costs to Government (PPP, HHW and Waste Oil)	Costs to Households	Jobs Created	PPP Landfill Costs	GHG Reduction (tCO <sub>2</sub> e)
<b>Scenario 1: Status Quo/Baseline, 2022</b>	41%	2,800,000	363,000	74	551,264	-6,374
<b>Scenario 4: EPR – Current Service</b>	41%	825,300	0	75	551,264	-6,374
<b>Scenario 5: EPR – High Recovery</b>	77%	990,300	0	89	348,006	-11,130
<b>Scenario 6: EPR – High Service/High Accessibility</b>	72%	888,300	0	85	372,896	-10,494

Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report  
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# 1.0

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## Introduction



# 1.1 Background

The Yukon Government is considering the development of Extended Producer Responsibility (EPR) in the territory and is seeking to evaluate the current state of recycling in the territory as well as the impacts of various future scenarios. The three targeted product categories for EPR are printed paper and packaging (PPP), waste oil, and household hazardous waste (HHW).

The Yukon Government selected Eunomia Research & Consulting (Eunomia) to:

- analyze data and provide insights on the current recycling system cost and performance plus how the system could be delivered under a number of future scenarios;
- consider factors relevant to implementing EPR for PPP, waste oil and HHW and make recommendations to Yukon on these factors.

This section of this report includes:

- An overview of the current state of recycling in Yukon
- An introduction to EPR
- An overview of the approach taken to carry out the analysis; and
- A summary of the scenarios modelled.

The analysis of current costs and performance of recycling in the territory is provided in Section 2.0 along with the future costs and benefits of each of the scenarios modelled. Policy considerations and recommendations are included in Section 3.0.

## 1.2 Current State of Recycling in the Yukon

Recycling in the Yukon currently consists of regulated and unregulated programs.

### **Regulated**

Regulated programs are stewardship programs covered by the Beverage Container Regulation (BCR) and Designated Materials Regulation (DMR). In both cases, consumers pay a surcharge when they purchase a covered product or material that is deposited into a Recycling Fund. Covered products are accepted at collection depots and the Recycling Fund is used to return the deposit to the consumer for BCR materials. Processors receive a processing fee from the Recycling Fund for BCR materials, and the government pays a handling fee to depots.<sup>12</sup> DMR materials are managed through contracts.

BCR materials include all ready-to-serve beverage containers. The surcharge and refund amounts are determined by category, with containers classified either as milk and milk substitutes, small beverage containers (< 750 ml), or large beverage containers (> 750 ml).

DMR covers stewardship programs for tires and electronics and electrical products. The Alberta Recycling Management Authority (ARMA) currently manages the administrative requirements of the tire stewardship program, and the Electronics Products Recycling Association (EPRA) manages the electronics and electrical products program. ARMA and EPRA are responsible for the administration, including registering producers and collecting fees, and the Yukon Government is responsible for collection, recycling, and enforcement of the regulation.<sup>13</sup>

## **Unregulated**

Unregulated materials include PPP besides beverage containers and household hazardous waste (HHW). PPP materials other than regulated beverage containers include:

- Cardboard
- Paper
- PET
- HDPE
- TetraPak
- Mixed plastic
- Plastic film
- Styrofoam
- Tin

Expanded polystyrene (Styrofoam) and glass (other than refundable glass beverage containers) are no longer collected for recycling.<sup>14</sup>

Recycling of these materials takes place on a voluntary basis at depots across the territory, as well as at the two recycling processors in Whitehorse. The territorial government as well as municipal governments in Whitehorse and Dawson City provide diversion credits based on a material-specific per tonne rate to processors of these materials to support recycling.

## **Processors**

There are two processors of recycled material in the territory, P&M Recycling and Raven Recycling. Raven Recycling is a social enterprise that operates multiple programs, as well as a bottle depot, and processes approximately 85 percent of the territory's non-refundable recyclables. P&M Recycling processes the remaining 15 percent.<sup>15</sup> These two processors are responsible for finding end markets for recyclable material.

## **Infrastructure**

Materials are accepted for recycling at depots and solid waste management facilities across the territory. Yukon depots, plus P&M Recycling and Raven Recycling, accept beverage containers and non-refundable recyclable materials. Of 24 solid waste management facilities, most accept beverage containers, non-refundable materials, and DMR materials.<sup>16</sup>

Solid waste management facilities are run either by municipalities or by the territorial government. Collection depots are privately run but receive a processing fee from the government based on containers collected and a depot allowance. Transportation is provided by private haulers that are contracted by the government.<sup>17</sup>

Curbside recycling collection is provided by local governments to residents in Haines Junction and Teslin. In Whitehorse, a private collection service of non-refundable recyclables and BCR materials is offered through a subscription service with Whitehorse Blue Bin Recycling. Approximately 1,000 households subscribe to this curbside collection service, at a cost of \$25 per month.

### **Recycling of PPP, HHW, and Waste Oil**

The current system has the following structure for each waste stream<sup>18</sup>:

- PPP
  - Collection is mostly voluntary, via drop-offs at depots or curbside for Whitehorse residents who subscribe to Whitehorse Blue Bin Recycling. Curbside collection is provided for Haines Junction and Teslin residents.
- HHW
  - Mostly collected at government-funded drop-off events and through permanent collection sites at small unincorporated communities.
  - 11 community solid waste management facilities collect HHW year-round.
  - HHW is accepted at many solid waste management facilities only on designated collection days.
- Waste oil
  - As a type of HHW, waste oil is either collected at government-funded drop-off events or at permanent collection sites through permitted commercial operations.

In the current state, recycling for PPP is largely funding by the Yukon Government and municipal governments. The two recycling processors in the territory use some of their profits from refundable beverage containers to subsidize non-refundable PPP recycling. However, diversion credits provided to support recycling of nonrefundable materials are not directly tied to the costs incurred by the processors. With rising costs of recycling, as well as challenges with infrastructure and staffing, the diversion credits do not cover the true cost of recycling.<sup>19</sup>

The Yukon Government and the recycling processors in the territory have acknowledged that this status quo is unsustainable and will not be able to persist for long. Both Raven Recycling and P&M Recycling have expressed that, without change, they expect to cease processing non-refundable recycling.<sup>20</sup>

## **1.3 EPR**

EPR is a policy approach that assigns producers of products and packaging with financial and/or operational responsibility for ensuring these products are properly managed at the end of their life cycle. This system is designed to increase collection and recycling rates of targeted products and materials and to shift the environmental and financial costs of end-of-life management of post-consumer products from municipalities to producers. As a result, it aims to incentivize waste prevention at the source and promote design-for-environment considerations in product design. Under an EPR system, producers usually organize and finance

Producer Responsibility Organizations (PROs) that carry out the end-of-life management of products on behalf of their members.<sup>21</sup>

EPR programs are already in place in many provinces in Canada. For PPP, pricing of products sold nation-wide is set at a national stage. This market reality suggests that Yukon residents are already paying prices that incorporate the EPR fees in other jurisdictions without seeing the benefits of improved end-of-life management of products in the territory. Extrapolating from the fees paid on PPP goods in British Columbia in 2022, Eunomia estimates that Yukon residential consumers are paying an estimated \$1.3M - \$2.9M annually for EPR services that the territory is not getting.

In the Yukon, the Our Clean Future Strategy, published in 2020, outlines actions the Government of Yukon will take to address the impacts of climate change while building a green economy and ensuring access to reliable, affordable, and renewable energy for residents. Our Clean Future includes a goal of improving how waste is managed in the Territory to move toward a more circular economy. As part of this goal, it commits the Yukon Government to designing and implementing an EPR program in the Territory by 2025.<sup>22</sup>

The Yukon Government is considering the development of an EPR program in the territory. A legislative proposal has been developed, and, as of November 1, 2022, the Yukon is conducting public engagement on EPR. Public comments are being accepted until February 17, 2023 on how the program should work, including details on specific products and sources of waste, service level expectations, exemptions for small businesses, and program plans and approvals.<sup>23</sup>

The Yukon is developing an EPR regulation under the Environment Act, which currently provides the legislative framework for existing recycling regulations in the Territory. Yukon is considering existing models in Canada, including the British Columbia (BC) system, for the regulation and service delivery. The Yukon Government has outlined the following goals in implementing EPR in the Territory:<sup>24</sup>

- Reduce the costs of waste management for the territorial government, municipalities, and taxpayers;
- Provide financial stability for recycling;
- Increase the amount of waste kept out of landfills;
- Help reach the waste diversion and greenhouse gas reduction targets under Our Clean Future; and
- Encourage a circular economy.

Three categories of materials will be affected first by the Yukon EPR program:

- Printed paper and packaging (PPP)
- Waste oil and antifreeze
- Household hazardous waste (HHW)

## 1.4 Overview of Approach

This project has been undertaken to evaluate the impacts of developing and implementing an EPR program in the territory. It began with an analysis of the current state, including the current return rates, services, material flows, and costs. As part of this analysis, Eunomia conducted several interviews with stakeholders in the Yukon



and in other provinces across Canada. These stakeholders included representatives from PROs, recycling processors, other provincial government, and other rural municipalities. A complete list of interviews conducted can be found in the Appendix, A 1.0.

Based on the analysis and research conducted at this stage, Eunomia developed a baseline assessment that served as the starting point to evaluate the costs and implications of EPR for PPP, HHW, and waste oil in the territory.

Next, several future scenarios, including several EPR scenarios, were modeled and evaluated to understand the level of change and associated economic impacts. The Appendix, A 2.0, includes information on calculations and assumptions incorporated in the modelling.

This project was also intended to provide recommendations to the Yukon Government on key considerations in establishing EPR, including the structure, specific elements, and potential exemptions. The learnings from the interviews, along with research on other EPR programs in Canada and Eunomia’s existing knowledge of EPR and implementation best practices, informed both the scenario analysis and the recommendations included in this report.

## 1.5 Scenarios Evaluated

Table 7 below describes the six different scenarios modelled for this study. In addition to the status quo scenario, which served as a baseline assessment, five other scenarios were evaluated, including three EPR scenarios with differing levels of recovery, service, and accessibility. The table includes the title of each scenario, and the specific interventions which affect the cost and performance of each scenario.

**Table 7: Modelled Scenarios for Study**

Scenario #	1	2	3	4	5	6
Scenario Title	Status quo (baseline)	Near future - no gov action, PPP services stop	Government takes over recycling system	Current service EPR	EPR scenario - high recovery	EPR scenario - high service high accessibility
PPP Curbside Recycling Access	Limited to subscription in Whitehorse and two other municipalities	Same as baseline	Same as baseline	Same as baseline	Expanded curbside for all Whitehorse residents	Expanded curbside for all Whitehorse residents

Scenario #	1	2	3	4	5	6
Scenario Title	Status quo (baseline)	Near future - no gov action - PPP services stop	Government takes over recycling system	Current service EPR	EPR scenario, high recovery	EPR scenario - high service high accessibility
<b>PPP Depot Access</b>	13 community depots covering > 90% of population - varying hours of operation. Run by a mix of private and municipal operators	Same as baseline	Same as baseline	Same as baseline	Every community has a community recycling depot. Increase hours depots are open per week	Every community has a community recycling depot that is open 3 days a week for cities greater than 500 people, and 3 times in 2 weeks for populations less than 500 people.
<b>Bottle Return Depot Access</b>	17 bottle depots covering >90% of population	Same as baseline	Same as baseline	Same as baseline	Every community has a bottle return depot	Every community has a bottle return depot
<b>PPP Depot Instruction</b>	Assumed limited instruction	Same as baseline	Same as baseline	Same as baseline	Depots staffed with observers to ensure material is sorted correctly (same at SWDF's)	Same as baseline
<b>Worker Compensation</b>	Baseline salaries	Same as baseline	Increased payment to workers	Increased payment to workers	Increased payment to workers	Increased payment to workers
<b>Cost Recovery</b>	Varies by program - BCR cross supporting other streams	Same as baseline - recyclers shut down	Full cost recovery for programs	Full cost recovery for programs	Full cost recovery for programs	Full cost recovery for programs
<b>Admin &amp; Education</b>	Baseline levels of admin	Same as baseline	Current education & admin costs for government	Current education & admin costs for PRO	Increased education & admin costs for PRO	Increased education & admin costs for PRO needed to achieve awareness targets.



Scenario #	1	2	3	4	5	6
Scenario Title	Status quo (baseline)	Near future - no gov action, PPP services stop	Government takes over recycling system	Current service EPR	EPR scenario, high recovery	EPR scenario - high service high accessibility
BCR Performance	72% return rate	Same as baseline	Same as baseline	Same as baseline	Same as baseline	Same as baseline
Glass Recyclability	Glass containers collected are landfilled	Same as baseline	Same as baseline	Same as baseline	Pay necessary transport costs to Airdrie, Alberta for glass processing	Same as baseline
Waste Oil	Not under program - limited collection	Same as baseline	Same as baseline	Same as baseline	Mandate waste oil - have collection system similar to other jurisdictions with high recovery - includes car repair collecting Waste Oil	Increased waste oil collection event frequencies. Monthly for Whitehorse, Quarterly for pop. >500, twice-annually for pop. <500.
HHW	Not under program - limited collection	Same as baseline	Same as baseline	Same as baseline	70% awareness target of HHW - no access changes	Monthly drop off for Whitehorse, quarterly drop-off for pop'n > 500, twice-annual drop-off for communities with < 500 people.



# 2.0

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## Findings

# 2.1 Current System

## 2.1.1 Return Rates

To evaluate the changes from potential future scenarios of recycling under EPR, Eunomia first conducted a baseline assessment to calculate the return rates of the current state of recycling in the Yukon. This baseline assessment provides the information necessary to evaluate the cost of implementing an EPR program as well as understanding the level of change and costs associated with meeting the future state of each scenario.

The current services that are provided in Yukon for each of the three waste streams of interest are shown in Table 8. This information was provided by the Yukon Government in project scope documents. Though three HHW collection days were planned in Whitehorse in 2022, only two were held, and one was held in other communities (including Watson Lake, Dawson, and Haines Junction, as well as communities under 1,000 people). The table below reflects these updated numbers; the other service and accessibility levels have been assumed to be accurate. The collection target is based on the current return rate, which Eunomia calculated by creating a bottom-up estimate of waste generation. This calculation was determined by using the City of Whitehorse’s 2017-2018 waste characterization data, Statcan data, and Yukon recycling processor data. A more detailed description can be found in the appendix, A 2.0. Combined with data on the amount of material collected, the return rate was determined for the levels of service and accessibility that are currently provided, as indicated below.

**Table 8: Current Collection, Service, and Accessibility in Yukon**

	PPP	HHW	Waste Oil
Collection Rate	41%	N/A	37%
Service Level	Two depots in Whitehorse, one depot in all other communities with population >500 people, all open at least 3 days/week.	Twice-annual drop off days in Whitehorse, once annual in other communities (both with population > 1000 and < 1000 people) <sup>25</sup>	Thrice-annual drop off days in Whitehorse, twice-annual in other communities with population > 1000 people and once annual drop off day in other communities.

<b>Accessibility</b>	90% of the population have a collection site within 30 minutes drive, for areas with population greater than 500 people <sup>26</sup> , and 45 minutes drive for areas with less than 500 people <sup>27</sup>	90% of the population have a collection site within 30 minutes drive, for areas with population greater than 500 people, and 45 minutes drive for areas with less than 500 people	90% of the population have a collection site within 30 minutes drive, for areas with population greater than 500 people, and 45 minutes drive for areas with less than 500 people
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Source: Eunomia Calculations, Yukon Government.

## 2.1.2 Economic and Environmental Costs and Benefits

For the current system, Eunomia calculated the economic and environmental costs and benefits using the following metrics.

Economic Costs and Benefits:

- Total cost
- Cost per household
- Cost per tonne recycled
- Cost per tonne disposed
- Quality and value of material recovered
- Cost to Yukon government
- Jobs created by scenario
- Avoided landfill costs (not including landfill liabilities)

Environmental Benefits:

- GHG reduction associated with avoided landfilling

These costs and benefits of the current system are shown in the analysis of the status quo scenario in Table 10 on the following page. They will be used as the baseline against which the other potential future scenarios will be compared.

# 2.2 Economic and Environmental Impacts of Future Scenarios

## 2.2.1 Scenario 1: Status Quo (Baseline), 2022

To model the status quo scenario, Eunomia continued to project the baseline into future years, including the existence of a depot that sorts and bales recyclables manually and availability of a subscription service for curbside recycling in Whitehorse, used by approximately 1,000 subscribers.

Since the Yukon Government and recycling processors in the territory have acknowledged that the current system is unsustainable, this scenario serves primarily as a basis of comparison for the costs and benefits of the other scenarios evaluated. The characteristics of this status quo scenario are shown in Table 9.

**Table 9: Scenario 1 Characteristics**

<b>Scenario #</b>	<b>1</b>
<b>Scenario Title</b>	<b>Status Quo / Baseline</b>
<b>PPP Curbside Recycling Access</b>	Limited to subscription in Whitehorse and two other municipalities
<b>PPP Depot Access</b>	13 community depots covering > 90% of population – varying hours of operation. Run by a mix of private and municipal operators
<b>Bottle Return Depot Access</b>	17 bottle depots covering >90% of population
<b>PPP Depot Instruction</b>	Assumed limited instruction
<b>Worker Compensation</b>	Baseline salaries
<b>Cost Recovery/System Funder</b>	Varies by program – BCR cross supporting other streams
<b>Admin &amp; Education</b>	Baseline levels of admin
<b>BCR Performance</b>	72% return rate
<b>Glass Recyclability</b>	Glass containers collected are landfilled
<b>Waste Oil</b>	Not under program - limited collection
<b>HHW</b>	Not under program – limited collection

Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report

The findings on the costs and benefits of are provided in Table 10. To calculate the landfill costs, a value of \$116/tonne was assumed, based on the “large load” value for residual waste for Whitehorse tipping fees.<sup>28</sup>

**Table 10: Scenario 1 Annual Economic Costs and Benefits (\$)**

<b>Material</b>	<b>Total cost of Recycling</b>	<b>Cost per Capita – Total System</b>	<b>Cost per Capita – Out of Pocket</b>	<b>Cost per tonne recycled</b>	<b>Value of material recovered</b>	<b>Avoided landfill costs</b>
<b>BCR</b>	1,205,000	29	26	1,225	-234,000	114,000

Material	Total cost of Recycling	Cost per Capita – Total System	Cost per Capita – Out of Pocket	Cost per tonne recycled	Value of material recovered	Avoided landfill costs
PPP	2,400,000	57	16	537	-282,000	519,000
DMR Tires	581,000	14	8	1,081	0	62,000
DMR E-waste	374,800	9	10	2,840	0	15,000
Waste Oil	330,000	8	0	942	0	41,000
HHW	350,000	8	0	805	0	50,000
<b>Total</b>	<b>5,620,000</b>	<b>132</b>	<b>67</b>	<b>814</b>	<b>-515,000</b>	<b>1,025,000</b>

Sources: Enomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report

In this scenario, the total cost for recycling products in scope is nearly \$5 million, which equates to approximately \$166 per household. This scenario also sees benefits of over \$500,000 in revenue from sales of recycled materials and \$1.2 million in avoided landfill costs as a result of diverting these materials from disposal. The value of the recovered material is based on revenues taken from 2021-2022 averages from Raven Recycling and recyclingmarkets.net.

There is also a greenhouse gas (GHG) emissions reduction associated with avoided landfilling in this scenario of 6,374 tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e). This environmental benefit is associated with recycling material as opposed to landfilling. Greenhouse gas emissions were estimated using Environment and Climate Change Canada's GHG Calculator for Waste Management.

Table 11 below shows the baseline scenario cost by funder, based on 2021 data. For example, the BCR program is currently funded by producers, with the Yukon Government paying administrative costs, while the collection of PPP is mostly funded through subsidies by the Yukon government. In addition to producers, communities, households and the Yukon government, recyclers in the territory have indicated they have an investment in managing PPP at a cost to them. This cost is included in the table below, minus the diversion credits, material revenues and tipping fees which have already been accounted for. In subsequent scenarios, the costs are assumed to be taken off of the recyclers.



**Table 11: Cost of Recycling System by Funder per Annum (\$)**

	Producers	Communities	Households	Industry (recyclers)	Balance (Funded by Yukon Govt)	Total Cost
<b>BCR</b>	1,083,000	0	0	0	122,000	1,205,000
<b>PPP</b>	0	0	363,000	300,000	1,716,000	2,400,000
<b>DMR Tires</b>	345,000	0	0	0	236,000	581,000
<b>DMR E-waste</b>	404,000	0	0	0	-29,000	375,000
<b>Waste Oil</b>	0	0	0	0	330,000	330,000
<b>HHW</b>	0	0	0	0	350,000	350,000
<b>Total</b>	<b>1,832,000</b>	<b>0</b>	<b>363,000</b>	<b>300,000</b>	<b>2,095,000</b>	<b>5,300,000</b>
<b>PPP, HHW and Waste Oil Only</b>	<b>0</b>	<b>0</b>	<b>363,000</b>	<b>300,000</b>	<b>1,716,000</b>	<b>3,100,000</b>

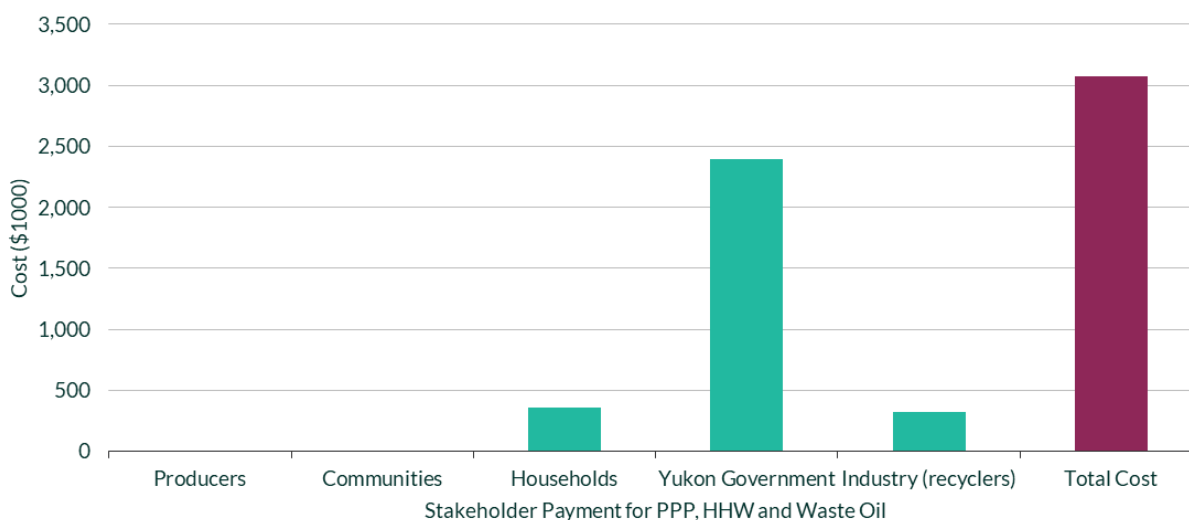
Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report

BCR and DMR materials are currently intended to be funded through fees and, in the case of BCR, unredeemed deposits plus the portion of the fee not refunded. Therefore, most of those costs fall under the producer categories. There is a small amount of subscription based curbside recycling for PPP material, which is the value falling under “Households” in the table above. Oil and HHW do not have a funding mechanism and are currently paid for by municipalities. Waste oil management costs of commercial clients are excluded.

Figure 2 below shows the current cost burden to each stakeholder of the PPP, HHW and waste oil recycling programs in Yukon under scenario 1, as well as the total cost of the system. Currently, the Yukon government pays the most of any stakeholder at over \$1.5M for PPP services. Producers do not pay into the system currently, households have more limited payments, at just under \$400,000. The total cost of the three streams is \$3.4M.



**Figure 2: Cost to Each Stakeholder of PPP, HHW and Waste Oil Recycling Under Scenario 1**



Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report

Table 12 below shows the tonnes recycled by category and the cost per tonne recycle of those tonnes. PPP in this table includes both residential and ICI tonnes.

**Table 12: Scenario 1 Tonnes Collected for Recycling per Annum and Cost per Tonne**

Material	Tonnes Collected for Recycling	Cost per Tonne (\$)
BCR	984	1,225
PPP	4,470	537
DMR Tires	537	1,081
DMR E-waste	132	2,840
Waste Oil	350	942
HHW	435	805
Other	1,929	26

Source: Eunomia Calculations

The majority of material recycled is PPP, which also has one of the lowest costs per tonne to recycle at \$325. DMR e-waste is the most expensive material to recycle at \$2,840.

PPP and BCR are both primarily depot-based collection programs, there are slightly greater than 1000 households who receive curbside recycling. However, the BCR program receives more funding per tonne to recycle than the PPP program. The majority of the BCR funding is given through handling fees, which are just

under \$650 per tonne. Raven Recycling mentioned that they use the funding from the BCR program to subsidize some of the other recycling programs they handle, such as the non-refundable PPP and DMR programs.

Table 13 below shows the cost of collecting PPP material by population region.

**Table 13: Cost of Collecting PPP by Region per Annum (\$)**

	Whitehorse	> 500 Non-Whitehorse	<500 Non-Whitehorse
PPP	485,000	271,000	314,000
Cost per Tonne	88	481	975

Source: Eunomia Calculations

The cost of PPP collection increases per tonne as the density of populations decreases. Depots in Yukon maybe have similar staffing arrangements between the more populous and less populous areas. As a result, the less populous areas category will have similar costs to denser areas at the point of collection (however they will have greater transportation costs), but they'll also have a lower tonnage yield. This results in a higher cost per tonne, as illustrated.

## 2.2.2 Scenario 2: Near Future – Government Does Not Take Action

The two currently operational PPP recycling processors in Yukon have indicated to the Yukon Government that the current system is unsustainable. Unless fundamental system changes are made, both are preparing to end their PPP operations in the near term. Scenario 2 models what happens if the government does not take action and current PPP operations end. Recycling for beverage containers remains, but all other PPP is disposed of in landfills. Operations for HHW and waste oil remain unchanged. Tires and e-waste programs remain the same.

Table 14 compares Scenario 2 to the baseline scenario.

**Table 14: Scenario 2 Characteristics**

Scenario #	2
Scenario Title	Near future – no gov action, PPP services stop
PPP Curbside Recycling Access	Same as baseline – Limited to subscription in Whitehorse and two other municipalities
PPP Depot Access	Same as baseline – 13 community depots covering > 90% of population – varying hours of operation. Run by a mix of private and municipal operators
Bottle Return Depot Access	Same as baseline – 17 bottle depots covering >90% of population
PPP Depot Instruction	Same as baseline – Assumed limited instruction

<b>Scenario #</b>	<b>2</b>
<b>Scenario Title</b>	<b>Near future – no gov action, PPP services stop</b>
<b>Worker Compensation</b>	Baseline salaries
<b>Cost Recovery/System Funder</b>	Same structure as status quo – recyclers shut down
<b>Admin &amp; Education</b>	Baseline levels of admin
<b>BCR Performance</b>	Same as baseline – 72% return rate
<b>Glass Recyclability</b>	Same as baseline – Glass containers collected are landfilled
<b>Waste Oil</b>	Same as baseline – Not under program – limited collection
<b>HHW</b>	Same as baseline – Not under program – limited collection

Source: Eunomia Modelling.

The costs and benefits for this scenario are provided in Table 15.

**Table 15: Scenario 2 Economic and Costs and Benefits per Annum (\$)**

	<b>Total Cost</b>	<b>Cost Per Capita – Total</b>	<b>Cost per capita – out of pocket</b>	<b>Cost per Tonne Recycled</b>	<b>Value of Material Recovered *</b>	<b>Avoided Landfill Costs</b>
<b>BCR</b>	1,205,000	29	26	1,225	-234,000	114,000
<b>PPP</b>	0	0	0	0	0	0
<b>DMR Tires</b>	581,000	14	8	1,081	0	62,000
<b>DMR E-waste</b>	487,000	12	10	2,940	0	15,000
<b>Waste Oil</b>	330,000	8	0	942	0	41,000
<b>HHW</b>	350,000	8	0	805	0	50,000
<b>Other</b>	50,000	1	0	26	0	224,000
<b>Total</b>	<b>3,002,000</b>	<b>70</b>	<b>43</b>	<b>429</b>	<b>-234,000</b>	<b>507,000</b>

Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report  
 \* Note that a negative number indicates an income.

Under this scenario, the PPP collection program shuts down, and therefore there are no costs associated with collecting PPP material, as well as no avoided landfill costs because more material will be sent to landfill. Over

4,000 tonnes would be sent to landfill rather than recycled if all non-refundable PPP collections were halted. Disposal costs for these materials would fall on tipping fees and be borne by ratepayers.

In this scenario, the GHG emissions reduction associated with avoided landfilling fall by 68% from 6,374tCO<sub>2e</sub> in Scenario 1 to 2,046tCO<sub>2e</sub> in Scenario 2. Meanwhile, the total costs of recycling fall by 40%, showing the impact of PPP as the highest volume of material, but one of the lowest cost to recycle.

Table 16 below shows the cost of each program by funder type.

**Table 16: Scenario 2 Cost of Recycling System by Funder per Annum (\$)**

Material	Producers	Communities	Households	Yukon Government	Total	% Change from Baseline
BCR	1,083,000	0	0	122,000	1,205,000	0%
PPP	0	0	0	0	0	N/A
DMR Tires	345,000	0	0	236,000	581,000	0%
DMR E-waste	404,000	0	0	-29,000	404,000	0%
Waste Oil	0	0	0	330,000	330,000	0%
HHW	0	0	0	350,000	350,000	0%
Other	0	0	0	50,000	50,000	0%
<b>Total</b>	<b>749,000</b>	<b>0</b>	<b>0</b>	<b>1,060,000</b>	<b>1,715,000</b>	<b>-42%</b>
<b>PPP, HHW and Waste Oil Only</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>680,000</b>	<b>680,000</b>	<b>-75%</b>

Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report

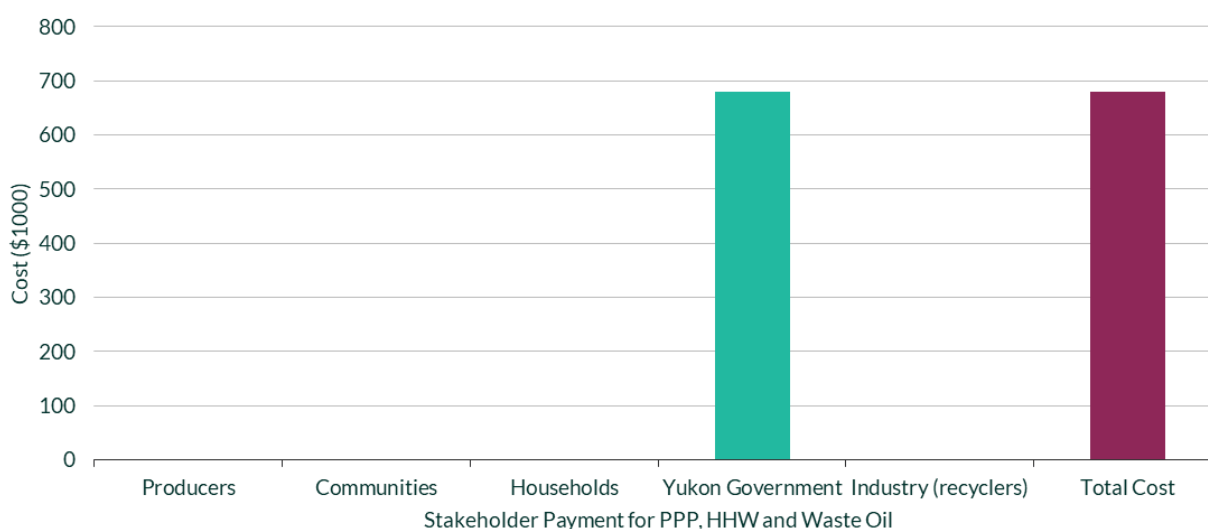
PPP no longer appears as a recycling cost, as no PPP is collected in this scenario. Instead, it is all landfilled with an estimated increase in total disposal costs of \$500,000, or a cost per tonne of \$116, which would be paid primarily by rate payers. In addition to the costs above, Eunomia also calculated other elements of the likely near-future of recycling in the Territory if no action is taken. With the end of PPP operations of the two recycling processors in Whitehorse, there is an expected increase in PPP disposed of over 4000 tonnes in landfills, a 30% increase in MSW disposed. In 2019, the Yukon government estimated there were 30 years of landfill capacity left if diversion rates were kept constant<sup>29</sup>. This would mean landfill capacity would be full in 2049. Under the scenario where processors shut down, this timeline is estimated to accelerate, and the landfill would be at capacity between 2044 and 2045. This estimate assumes that the percentage of waste going to

landfill stays the same, so the tonnage going to landfill increases as generation increases. As landfilled PPP increases, there will come a point when the generation of waste outpaces the territory’s ability to manage it.

An additional issue with landfilling of PPP under this scenario is the City of Whitehorse Waste Management Bylaw that designates cardboard as controlled waste that cannot be disposed of with residual waste and is banned from landfills.<sup>30</sup> Furthermore, with PPP recycling operations shutting down, another anticipated consequence of Scenario 2 will be job losses at recycling processors and depots.

Figure 3 below shows the cost of the PPP, HHW and waste oil recycling programs under scenario 2 for each stakeholder. In this scenario, the PPP system shuts down, so the only payments left are those paid for by communities for HHW and waste oil collection at just under \$700,000.

**Figure 3: Cost to Each Stakeholder of PPP, HHW and Waste Oil Recycling Under Scenario 2**



Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report

Table 17 below shows the tonnage collected and cost per tonne in Scenario 2.

**Table 17: Scenario 2 Tonnes Collected for Recycling per Annum and Cost per Tonne Recycled**

Material	Tonnes Collected for Recycling	Cost per Tonne (\$)
BCR	984	1,225
PPP	0	N/A
DMR Tires	537	1,081
DMR E-waste	132	2,840

Waste Oil	350	942
HHW	435	805
Other	1,929	26

Source: Eunomia Calculations

There are no changes to non-PPP tonnage collected in this scenario. The cost per tonne of PPP recycled is not applicable as PPP is no longer collected.

## 2.2.3 Scenario 3: Near Future – Government Takes Over Recycling System

In this scenario, the Yukon government takes over recycling operations from the current privately operated recycling processors, with the aim to provide the same level of collection, service, and accessibility as in the status quo scenario. This scenario does include some infrastructure costs necessary to keep the current system functioning, but it does not account for any new infrastructure. The government program also includes increased wages for those in the recycling system, resulting in a slightly higher cost.

Table 18 compares Scenario 3 to the baseline and identifies changes incorporated into the model for this scenario.

**Table 18: Scenario 3 Characteristics**

Scenario #	3
Scenario Title	Government takes over recycling system
PPP Curbside Recycling Access	Same as baseline - Limited to subscription in Whitehorse and two other municipalities
PPP Depot Access	Same as baseline - 13 community depots covering > 90% of population - varying hours of operation. Run by a mix of private and municipal operators
Bottle Return Depot Access	Same as baseline - 17 bottle depots covering >90% of population
PPP Depot Instruction	Same as baseline - Assumed limited instruction
Worker Compensation	Increased payment to workers
Cost Recovery/System Funder	Full cost recovery for programs by government
Admin & Education	Current education & admin costs for government
BCR Performance	Same as baseline - 72% return rate
Glass Recyclability	Same as baseline - Glass containers collected are landfilled

<b>Scenario #</b>	<b>3</b>
<b>Scenario Title</b>	<b>Government takes over recycling system</b>
<b>Waste Oil</b>	Same as baseline - Not under program - limited collection
<b>HHW</b>	Same as baseline - Not under program - limited collection

Source: Eunomia Modelling.

The economic costs and benefits, as calculated in the other scenarios, are shown in Table 19 below. There is also GHG emissions reduction associated with avoided landfilling in this scenario of 6,374tCO<sub>2e</sub>, as in Scenario 1.

**Table 19: Scenario 3 Economic Costs and Benefits per Annum (\$)**

Material	Total Cost	Cost Per Capita - Total	Cost per Capita - Out of Pocket	Cost Per Tonne Recycled	Value of Material Recovered *	Avoided Landfill Costs
BCR	1,205,000	29	26	1,225	-234,000	114,000
PPP	3,286,000	78	0	735	-282,000	742,000
DMR Tires	581,000	14	8	1,081	0	62,000
DMR E-Waste	374,800	9	10	2,840	0	15,000
Waste Oil	330,000	8	0	942	0	41,000
HHW	350,000	8	0	805	0	50,000
Other	50,000	1	0	26	0	224,000
<b>Total</b>	<b>6,177,000</b>	<b>145</b>	<b>43</b>	<b>894</b>	<b>-515,000</b>	<b>1,025,000</b>

Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report  
\* Note that a negative number indicates an income.

The costs in this scenario are mostly the same as Scenario 1 except for a 37% increase in the cost to recycle PPP. Eunomia has calculated the estimated costs that the government will incur if it assumes control of recycling services. These costs include:

- Necessary investment in equipment for sorting and processing facilities
- Additional labour to service collection depots
- Labour for staffing sorting and processing facilities
- Administration staff
- Maintenance costs

Under this scenario, there is an assumption that the government taking over the recycling system will result in higher wages for the labour in the system. Additionally, the system will achieve full cost recovery for the costs listed in the bullets above.

Recycling depots under the current system are privately run but funded by the government. Under Scenario 3, the depots will become government run. The government will also assume the education and administration costs under this scenario.

The scenario does not assume any expansion of infrastructure or recycling access to residents, only that the government takes over the full cost of the entire system. There is still funding being paid through the stewardship programs of the DMR and BCR. The government therefore does not cover the *entire* cost of the recycling system, only what the producer fees cannot cover. This cost split by funder is shown in Table 20 below.

**Table 20: Scenario 3 Total Annual Cost of Recycling System by Funder per Annum (\$)**

Material	Producers	Communities	Households	Yukon Government	Total	% change from baseline
BCR	1,083,000	0	0	122,000	1,205,000	0%
PPP	0	0	0	3,286,000	3,286,000	58%
DMR Tires	345,000	0	0	236,000	581,000	0%
DMR E-waste	403,500	0	0	-28,700	374,800	0%
Waste Oil	0	0	0	330,000	330,000	0%
HHW	0	0	0	350,000	350,000	0%
Other	0	0	0	50,000	50,000	0%
<b>Total</b>	<b>1,831,500</b>	<b>0</b>	<b>0</b>	<b>4,345,300</b>	<b>6,176,800</b>	<b>24%</b>
<b>PPP, HHW and Waste Oil Cost</b>	<b>3,397,000</b>	<b>0</b>	<b>0</b>	<b>568,000</b>	<b>3,965,000</b>	<b>44%</b>

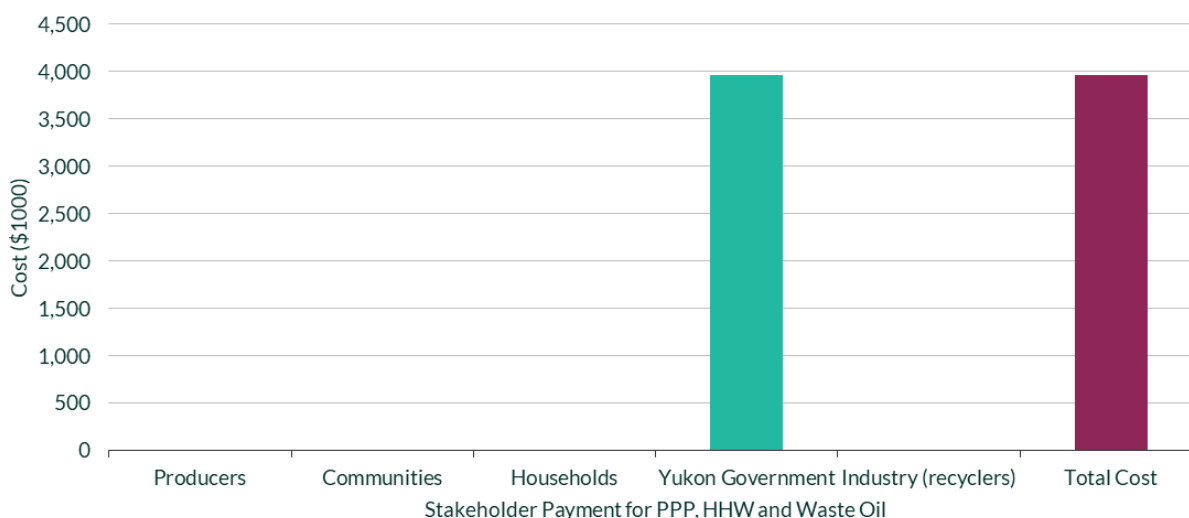
Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report

Under this scenario, the Yukon Government will cover 70% of the cost of the recycling programs in the Yukon, and 100% of PPP, HHW and waste oil programs. This represents a doubling, or 106%, cost burden for the Yukon Government. Producers will cover 30% of the cost through their fees paid into the BCR and DMR programs. Communities also no longer contribute to the recycling system, as the provincial government has taken over those programs.

Figure 4 below shows the cost to each stakeholder under Scenario 3.



**Figure 4: Cost to Each Stakeholder of PPP, HHW and Waste Oil Recycling Under Scenario 3**



Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report

The additional calculated additional costs to the Yukon government for this scenario are provided in Table 21. The additional PPP costs for the Yukon Government costs have been broken down into capital expenditures and investments required, as the government makes some investments to maintain the recycling system. Capital expenditures are spread over fifteen years.

**Table 21: Scenario 3 Additional Costs to Yukon Government per Annum (\$) - PPP**

	Sorting and processing facilities – Capital (annualized)	Labour to service collection depots	Labour to service processing facilities	Administration staff
<b>Additional Investments</b>	289,000	10,000	616,000	82,000

Source: Eunomia Calculations, Raven Recycling

Sorting and processing facility capital investments is the minimum quoted as being needed by processors, which include sheds for material and increased maintenance of machinery. There are increases in depot and processor workers’ wages, and additional workers at processing facilities.

Table 22 shows the annual costs of Scenario 3 for PPP by region. Changes in cost compared to the baseline scenario are due to additional wage costs and slight necessary capital investments

**Table 22: Scenario 3 PPP Costs per Annum by Region (\$)**

	Whitehorse	> 500 non-Whitehorse	<500 non-Whitehorse
PPP Cost of Recycling	486,000	276,000	318,000
PPP Cost Per Tonne	122	881	1,701

Source: Eunomia Calculations

Table 23 below shows the tonnes collected for recycling and costs per tonne under Scenario 3, in which the government takes over the recycling system.

**Table 23: Scenario 3 Tonnes Collected for Recycling and Cost per Tonne (Annual)**

Material	Tonnes Collected for Recycling	Cost per Tonne (\$)
BCR	984	1,225
PPP	4,470	514
DMR Tires	537	1,081
DMR E-waste	132	2,840
Waste Oil	350	942
HHW	435	805
Other	1,929	26

Source: Eunomia Modelling

There are no increases in the tonnage recycled under this scenario, but costs per tonne do increase due to the investments made in facilities and labour associated with PPP recycling, as described above. It is possible that investments by Yukon in the infrastructure, staff salaries and education may increase the tonnes collected for recycling.

## 2.2.4 Scenario 4: EPR Scenario – Current Service Provided Under EPR

In this scenario, EPR regulation shifts the costs for the system from the government to the producers, with the same level of collection, services, and accessibility as in the status quo scenario. An additional cost that is not present in Scenarios 1-3 is the costs of program management for a producer responsibility organization (PRO) to run the EPR program, as well as a regulatory body to oversee the program. This scenario also includes the same necessary infrastructure investments to keep the current system functioning as in Scenario 3. It does not

model any system upgrades, despite the fact that EPR is often used as a vehicle for improving the recycling system (these improvements are modelled in Scenarios 5 and 6).

Table 24 compares Scenario 4 to the baseline and identifies changes incorporated into the model for this scenario.

**Table 24: Scenario 4 Characteristics**

Scenario #	4
Scenario Title	Current service EPR
PPP Curbside Recycling Access	Same as baseline - Limited to subscription in Whitehorse and two other municipalities
PPP Depot Access	Same as baseline - 13 community depots covering > 90% of population – varying hours of operation. Run by a mix of private and municipal operators
Bottle Return Depot Access	Same as baseline - 17 bottle depots covering >90% of population
PPP Depot Instruction	Same as baseline – Assumed limited instruction
PPP Worker Compensation	Increased payment to workers
PPP/HHW/Oil Cost Recovery/System Funder	Full cost recovery for programs by producers
Admin & Education	Current education & admin costs for PRO
BCR Performance	Same as baseline – 72% return rate
Glass Recyclability	Same as baseline - Glass containers collected are landfilled
Waste Oil	Same as baseline - Not under program - limited collection
HHW	Same as baseline - Not under program - limited collection

Source: Eunomia Modelling.

The costs and benefits of this EPR scenario are provided in Table 25. In this scenario, producers are responsible for maintaining the recycling system. Therefore, a small amount of investment into the sorting centres and increased wages for workers to make the system more sustainable has been assumed and incorporated. The investment is considered minimal to ensure sustainability of the system under current levels of operation. Scenarios 5 and 6 include further investment to improve the system.

**Table 25: Scenario 4 Economic and Environmental Costs and Benefits (\$)**

	Total Cost	Cost Per Capita - Total	Cost per Capita - Out of Pocket	Cost Per Tonne Recycled	Value of Material Recovered *	Avoided Landfill Costs
<b>BCR</b>	1,205,000	29	29	1,225	-234,000	114,000
<b>PPP</b>	3,286,000	78	64	735	-282,000	742,000
<b>DMR Tires</b>	581,000	14	8	1,081	0	62,000
<b>DMR E-waste</b>	374,800	9	10	2,840	0	15,000
<b>Waste Oil</b>	330,000	8	8	942	0	41,000
<b>HHW</b>	350,000	8	8	805	0	50,000
<b>Other</b>	50,000	1	0	26	0	224,000
<b>Total</b>	6,175,000	145	127	894	-515,000	1,249,000

Sources: Eonomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report  
 \* Note that a negative number indicates an income.

There is virtually no difference in total costs under Scenario 3 and Scenario 4, as both scenarios continue with the base level of recycling coverage, with modest increases in wages as well as some administration and necessary infrastructure improvements needed to keep the current system functioning. The regulatory agency costs are assumed to be picked up by the producers.

There is also a GHG emissions reduction associated with avoided landfilling in this scenario of 6,374tCO<sub>2</sub>e, which is equivalent to Scenarios 1 and 3.

Table 26 provides a breakdown of the costs by funder in Scenario 4.

**Table 26: Scenario 4 Cost of Recycling System by Funder per Annum (\$)**

Material	Producers	Communities	Households	Yukon Government	Total	% Change from Baseline
<b>BCR</b>	1,205,000	0	0	0	1,205,000	0%
<b>PPP</b>	2,717,000	0	0	568,000	3,285,000	58%

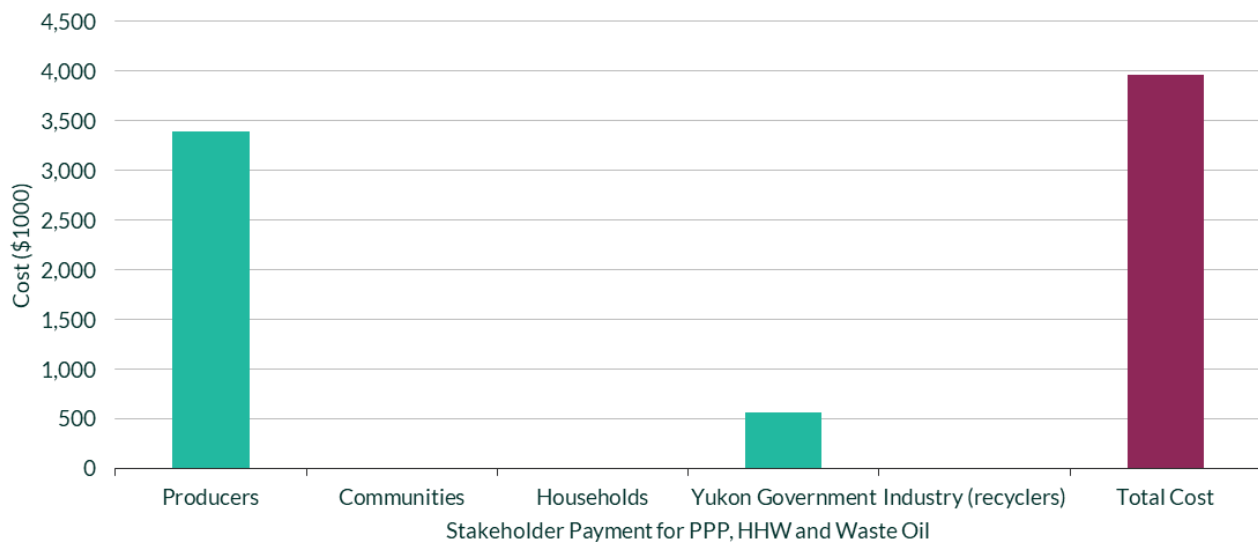
Material	Producers	Communities	Households	Yukon Government	Total	% Change from Baseline
DMR Tires	345,000	0	0	236,000	581,000	0%
DMR E-waste	403,500	0	0	-28,700	374,800	0%
Waste Oil	330,000	0	0	0	330,000	0%
HHW	350,000	0	0	0	350,000	0%
Other	0	0	0	50,000	50,000	0%
<b>Total</b>	<b>5,350,500</b>	<b>0</b>	<b>0</b>	<b>825,300</b>	<b>6,175,800</b>	<b>24%</b>
<b>PPP, HHW and Waste Oil Cost</b>	<b>3,397,000</b>	<b>0</b>	<b>0</b>	<b>568,000</b>	<b>3,965,000</b>	<b>44%</b>

Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report

In this scenario, producers take over nearly all of the costs of the programs. The only costs which will remain with the Yukon government are some administrative PRO costs, and “other” costs such as managing scrap metal. In addition, the government continues payments to depots for commercial operations, as the EPR program is modelled to cover residential. The total cost of the system is just over \$6.1 million, similar to the \$6.0 million in Scenario 3.

Figure 5 below shows the cost to each stakeholder of the PPP, HHW and waste oil recycling programs under Scenario 4. As this is an EPR scenario where producers are meant to cover the cost of collection and processing of material, most of the costs fall onto the producers, who pay just under \$3.5M. The Yukon government pays a little over \$500,000 for commercial depot collection and administration costs. The total cost of the three streams under Scenario 4 is just under \$4M. Eunomia assumed 50% of the costs of PPP services are for residential services. The total of Scenario 4 are the same as Scenario 3, however most of the costs have shifted from the Yukon government to the producers.

**Figure 5: Cost to Each Stakeholder of PPP, HHW and Waste Oil Recycling Under Scenario 4**



Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report

Table 27 provides a breakdown of the costs for Scenario 4 by region and Table 28 provides a breakdown of tonnes collected for recycling of each material and the cost per tonne. Both of these amounts match the costs and tonnes in Scenario 3.

**Table 27: Scenario 4 PPP Cost per Annum by Region (\$)**

	Whitehorse	> 500 Non-Whitehorse	<500 Non-Whitehorse
PPP	486,000	276,000	318,000
Cost per Tonne	122	881	1,701

Source: Eunomia Calculations

**Table 28: Scenario 4 Tonnes Collected for Recycling and Cost per Tonne**

	Tonnes Collected for Recycling	Cost per Tonne (\$)
BCR	984	1,225
PPP	4,470	735
DMR Tires	537	1,081
DMR E-waste	132	2,840
Waste Oil	350	942

	Tonnes Collected for Recycling	Cost per Tonne (\$)
HHW	435	805
Other	1,929	26

Source: Eunomia Calculations.

Tonnes collected for recycling do not increase under Scenario 4 compared to baseline, but there are increases in cost per tonne recycled to maintain the current system recycling performance.

## 2.2.5 Scenario 5: EPR Scenario – High Recovery

In this scenario, it is assumed that EPR regulations require high recovery targets. These targets are only achievable if interventions occur to increase recycling from current levels. Interventions in this scenario include an expansion of curbside recycling access to all residents of Whitehorse, expanded depot hours for community depots, and additional personnel at depots to aid in the sorting of waste. PROs manage the collection of materials, which could include depot drop-offs, collection events, and/or blue box collection for PPP. Additional HHW and waste oil collection events were also modelled to achieve higher recovery.

Recovery targets for this scenario are set at:

- 78% recovery for residential PPP
- Awareness targets for HHW, as established in BC. Targeted consumer awareness levels in BC are above 70%.<sup>31</sup>
- 90% recovery of waste oil available for collection

Table 29 identifies the elements modeled in this scenario.

**Table 29: Scenario 5 Characteristics**

Scenario #	5
Scenario Title	EPR scenario, high recovery
PPP Curbside Recycling Access	Expanded curbside for all Whitehorse residents
PPP Depot Access	Every community has a community recycling depot. Increase hours depots are open per week
Bottle Return Depot Access	Every community has a bottle return depot
PPP Depot Supervision	Depots staffed with observers to ensure material is sorted correctly (same at SWDF's)
PPP Worker Compensation	Increased payment to workers
Cost Recovery/System Funder	Full cost recovery for programs by producers
Admin & Education	Increased education & admin costs for PRO



<b>Scenario #</b>	5
<b>Scenario Title</b>	<b>EPR scenario, high recovery</b>
<b>BCR Performance</b>	Same as baseline
<b>Glass Recyclability</b>	Pay necessary transport costs to Airdrie, Alberta for glass processing
<b>Waste Oil</b>	Mandate waste oil - have collection system similar to other jurisdictions with high recovery - includes car repair collecting Waste Oil
<b>HHW</b>	70% awareness target of HHW - additional HHW events in all three population bands

Source: Eunomia Modelling.

The costs and benefits calculated for this high recovery EPR scenario are provided in Table 30.

**Table 30: Scenario 5 Economic and Environmental Costs and Benefits (\$)**

	<b>Total Cost</b>	<b>Cost Per Capita - Total</b>	<b>Cost Per Capita - Out of Pocket</b>	<b>Cost per tonne recycled</b>	<b>Value of material recovered *</b>	<b>Avoided Landfill Costs</b>
<b>BCR</b>	1,284,000	30	30	1,305	-234,000	114,000
<b>PPP</b>	10,298,000	244	230	1,207	-261,000	990,000
<b>DMR Tires</b>	581,000	14	8	1,081	0	62,000
<b>DMR E- waste</b>	374,800	9	10	2,840	0	15,000
<b>Waste Oil</b>	698,000	17	17	962	0	84,000
<b>HHW</b>	720,000	17	17	1,657	0	50,000
<b>Other</b>	50,000	1	0	26	0	224,000
<b>Total</b>	14,005,000	330	311	1,234	-495,000	1,540,000

Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report  
\* Note that a negative number indicates an income.

Costs in this scenario have increased to just over \$14 million, as investment is needed to achieve the recycling targets set by the government. These include expanding curbside recycling access, increasing the hours that depots are open, and increased investment in processing facilities.

The glass recycled under Scenario 5 is for glass recycled under BCR. The cost of shipping collected glass to Airdrie is estimated to be \$80,000/year at a net cost of 160 dollars per tonne. The net cost of shipping glass includes the cost of transportation (\$295/tonne), the revenue received for the glass (\$20/tonne) and avoided landfill fees (\$115/tonne). The net cost is therefore  $295 - 20 - 115 = 160$ /tonne.

However, the increase in recycling equates to a GHG emissions savings of 11,708tCO<sub>2</sub>e, an 84% increase over Scenarios 1, 3 and 4. This is the highest GHG emissions savings of any scenario.

Table 31 provides a breakdown of the costs by funder under this scenario. The Yukon Government continues payments to depots for commercial operations.

**Table 31: Scenario 5 Costs by Funder per Annum (\$)**

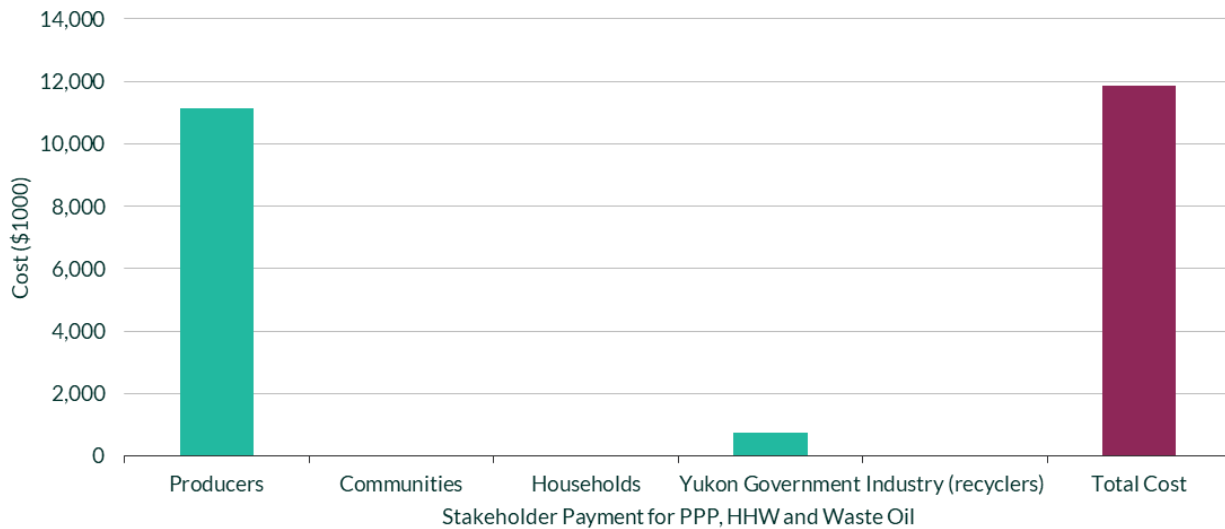
	Producers	Communities	Households	Yukon Government	Total	% Change from Baseline
BCR	1,284,000	0	0	0	1,284,000	7%
PPP	9,565,000	0	0	733,000	10,298,000	395%
DMR Tires	345,000	0	0	236,000	581,000	0%
DMR E-waste	403,500	0	0	-28,700	374,800	0%
Waste Oil	698,000	0	0	0	698,000	112%
HHW	720,000	0	0	0	720,000	106%
Other	0	0	0	50,000	50,000	0%
<b>Total</b>	<b>13,015,500</b>	<b>0</b>	<b>0</b>	<b>990,300</b>	<b>14,005,800</b>	<b>182%</b>
<b>PPP HHW and Waste Oil Cost</b>	<b>10,983,000</b>	<b>0</b>	<b>0</b>	<b>733,000</b>	<b>11,716,000</b>	<b>325%</b>

Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report

Similar to Scenario 4, most costs are borne by the producers in this scenario, however they are more than twice as high in this scenario than in Scenario 4.

Figure 6 below shows the cost to each stakeholder of the PPP, HHW and waste oil recycling programs under Scenario 5. This is another EPR scenario wherein the producers are intended to cover most of the costs. The cost to producers under this scenario is over \$11M, which is around three times as high as Scenario 4. This is because there is more investment in facilities, access to recycling, and infrastructure under Scenario 5 versus Scenario 4. The Yukon government again pays a smaller portion of the total cost at just over \$700,000. Scenario 5 includes the most additional cost versus the status quo of any of the scenarios and has the highest residential recycling rate of 77%.

**Figure 6: Cost to Each Stakeholder of PPP, HHW and Waste Oil Recycling Under Scenario 5**



Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report

Table 32 provides the cost of PPP recycling by region.

**Table 32: PPP Cost per Annum by Region (\$)**

	Whitehorse	> 500 Non-Whitehorse	<500 Non-Whitehorse
PPP	4,243,000	884,000	527,000
Cost per Tonne	730	1,500	2,130

Source: Eunomia Calculations.

Table 33 below shows the tonnes collected for recycling per annum and cost per tonne recycled under Scenario 5.

**Table 33: Scenario 5 Tonnes Collected for Recycling per Annum and Cost per Tonne**

Material	Tonnes Collected for Recycling	Cost per Tonne Recycled (\$)
BCR	1,230	1,305
PPP	6,600	1,581
DMR Tires	537	1,081
DMR E-waste	132	2,840

Material	Tonnes Collected for Recycling	Cost per Tonne Recycled (\$)
Waste Oil	350	962
HHW	870	1,657
Other	1,929	26

Source: Eunomia Calculations.

Costs per tonne for most materials increase under this scenario, as the upgrades to the system are realized.

## 2.2.6 Scenario 6: EPR Scenario – High Service/High Accessibility

This scenario models an EPR system that focuses on accessibility targets and convenience for residents. The modelled system includes the deployment of a curbside blue bin recycling service for PPP across the City of Whitehorse and additional access to depots across the territory in order to achieve both high service and high accessibility. In this scenario, PROs manage the collection of materials.

The service and accessibility standards of this EPR scenario are provided in Table 34.

**Table 34: High Service/High Accessibility Standards**

	PPP	HHW	Waste Oil
<b>Whitehorse</b>	Bi-weekly blue bin collection	Monthly drop-off opportunity	Monthly drop-off opportunity
<b>Communities other than Whitehorse with pop'n &gt;500 people</b>	Depots open at least three days a week, every week	Quarterly drop-off opportunity	Quarterly drop-off opportunity
<b>Communities with pop'n &lt;500 people</b>	Depots open at least three days in a two week period	Twice-annual drop-off opportunity	Twice-annual drop-off opportunity

Source: Yukon Government.

Table 35 identifies the elements modelled in this scenario.

**Table 35: Scenario 6 Characteristics**

<b>Scenario #</b>	<b>6</b>
<b>Scenario Title</b>	<b>EPR scenario - high service high accessibility</b>
<b>PPP Curbside Recycling Access</b>	Expanded curbside for all Whitehorse residents
<b>PPP Depot Access</b>	Every community has a community recycling depot that is open 3 days a week for cities greater than 500 people, and 3 times in 2 weeks for populations less than 500 people.
<b>Bottle Return Depot Access</b>	Every community has a bottle return depot
<b>PPP Depot Instruction</b>	Same as baseline – Assumed limited instruction
<b>Worker Compensation</b>	Increased payment to workers
<b>Cost Recovery/System Funder</b>	Full cost recovery for programs
<b>Admin &amp; Education</b>	Increased education & admin costs for PRO needed to achieve awareness targets.
<b>BCR Performance</b>	Same as baseline – 72% return rate
<b>Glass Recyclability</b>	Same as baseline - Glass containers collected are landfilled
<b>Waste Oil</b>	Increased waste oil collection event frequencies. Monthly for Whitehorse, Quarterly for pop. >500, twice-annually for pop. <500.
<b>HHW</b>	Monthly drop off for Whitehorse, quarterly drop-off for pop'n > 500, twice-annual drop-off for communities with < 500 people.

Source: Eunomia Modelling.

The calculated economic costs of the scenario with these service and accessibility standards are provided in Table 36. These costs incorporate the costs of labour, infrastructure, and equipment necessary to deliver the services outlined above. There is also a GHG emissions reduction associated with avoided landfilling in this scenario of 10,494 tCO<sub>2e</sub>. This is 10% less than in Scenario 5.

**Table 36: Scenario 6 Economic Costs and Benefits (\$)**

	<b>Total Cost</b>	<b>Cost Per Capita – Total</b>	<b>Cost Per Capita – Out of Pocket</b>	<b>Cost per tonne recycled</b>	<b>Value of material recovered</b>	<b>Avoided Landfill Costs</b>
<b>BCR</b>	1,205,000	29	29	1,225	-234,000	114,000
<b>PPP</b>	9,474,000	224	212	1,156	-263,000	951,000
<b>DMR Tires</b>	581,000	14	8	1,081	0	62,000

	Total Cost	Cost Per Capita – Total	Cost Per Capita – Out of Pocket	Cost per tonne recycled	Value of material recovered	Avoided Landfill Costs
DMR E-waste	374,800	9	10	2,840	0	15,000
Waste Oil	598,000	14	14	825	0	84,000
HHW	618,000	15	15	1,422	0	50,000
Other	50,000	1	0	26	0	224,000
<b>Total</b>	<b>12,900,000</b>	<b>304</b>	<b>287</b>	<b>1,172</b>	<b>-497,000</b>	<b>1,501,000</b>

Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report

Under Scenario 6, the system is 9% less expensive compared to Scenario 5, as service upgrades in Scenario 5 necessary to reach the performance targets are greater than the access targets set out for Scenario 6. Scenario 6 meets service and access targets, which drive most of the cost increases between this scenario and Scenario 1. Access targets include increased HHW collection, PPP depots and waste oil collection events. Additionally, all Whitehorse households have access to curbside recycling in this scenario.

Table 37 provides the cost by funder for Scenario 6. The Yukon Government continues payments to depots for commercial operations.

**Table 37: Scenario 6 Cost by Funder per Annum (\$)**

	Producers	Communities	Households	Yukon Government	Total	% Change from Baseline
BCR	1,205,000	0	0	0	1,205,000	0%
PPP	8,843,000	0	0	631,000	9,474,000	356%
DMR Tires	345,000	0	0	236,000	581,000	0%
DMR E-waste	403,500	0	0	-28,700	374,800	0%
Waste Oil	598,000	0	0	0	598,000	81%
HHW	618,000	0	0	0	618,000	77%
Other	0	0	0	50,000	50,000	0%
<b>Total</b>	<b>12,012,500</b>	<b>0</b>	<b>0</b>	<b>888,300</b>	<b>12,900,800</b>	<b>160%</b>

	Producers	Communities	Households	Yukon Government	Total	% Change from Baseline
<b>PPP, HHW and Waste Oil Cost</b>	10,059,000	0	0	631,000	10,690,000	287%

Sources: Eunomia Modelling, City of Whitehorse Waste Characterization Study 2017-2018, Industry Data, Statcan Data, RecycleNB Annual Report, Yukon Extend Producer Responsibility Discussion Paper, Recycling in the Yukon 2019-2021, Vermont DEQ HHW CEG Survey Results, Yukon BCR, YG and DMR Cost Accounts, RCA Economic Benefits of Recycling in Alberta Report, RecycleBC Annual Report

Similar to Scenario 5, producers cover nearly all of the cost under Scenario 6. Figure 7 shows the cost to each stakeholder under Scenario 6. The Yukon Government again retains some cost for administration, scrap metal collection, as well as continues to provide payments to depots which cover the cost of collecting commercial recyclables at the same level as the baseline.

**Figure 7: Cost to Each Stakeholder of PPP, HHW and Waste Oil Recycling Under Scenario 6**

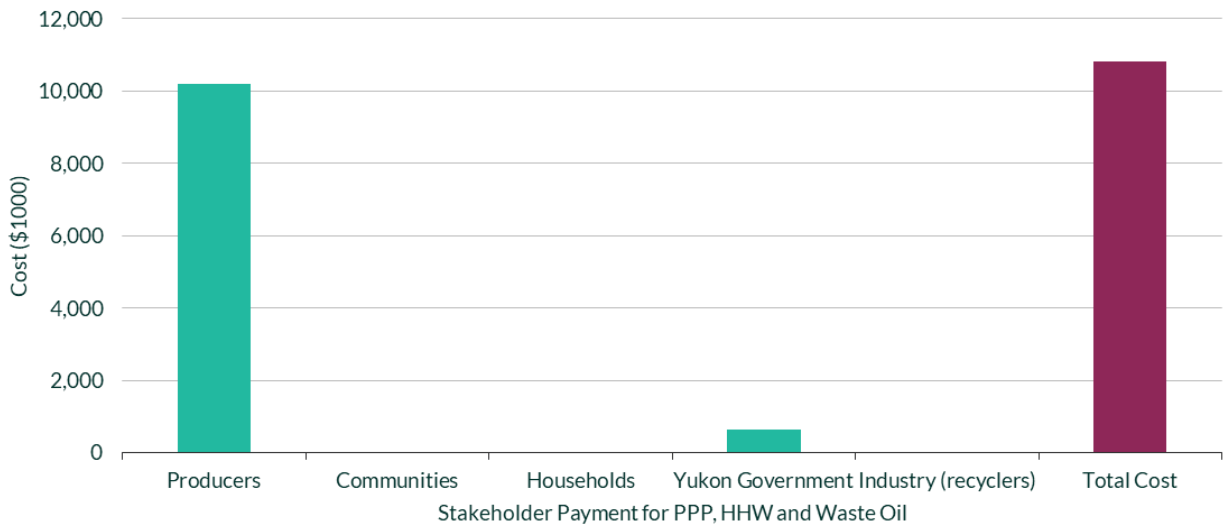


Table 38 provides the cost of collection by region and Table 39 provides the tonnes collected for recycling and cost per tonne of each material recycled. The “Other” category includes mostly scrap metal.

**Table 38: Cost of Collecting PPP by Region per Annum (\$)**

	Whitehorse	> 500 Non-Whitehorse	<500 Non-Whitehorse
<b>PPP</b>	4,136,000	302,000	434,000
<b>Cost per Tonne</b>	723	950	1,935

Source: Eunomia Calculations



**Table 39: Tonnes Collected for Recycling per Annum and Cost per Tonne**

	Tonnes Collected for Recycling	Cost per Tonne Recycled (\$)
BCR	984	1,225
PPP	8,197	1,156
DMR Tires	537	1,081
DMR E-waste	132	2,840
Waste Oil	350	825
HHW	870	1,422
Other	1,929	26

Source: Eunomia Calculations

The cost by region is lower than in Scenario 5, especially in regards to the communities with over 500 people that are not Whitehorse, as these communities would receive additional hours and staffing of depots under Scenario 5 that they would not receive in Scenario 6. Therefore, the cost is nearly a third as expensive, at \$302,000 as opposed to \$902,000. The cost per tonne recycled of PPP in this scenario is 5% less than in Scenario 5.

## 2.3 Comparison of Results

Table 40 summarizes the tonnages of each material recycled under each of the various scenarios. Scenario 5 recovered the most material as there are specific recycling and awareness targets that need to be met and as such there is the necessary investment in the system to enable these to be met.

**Table 40: Tonnes Collected for Recycling Under Each Scenario per Annum**

Material	Scenario 1 - Status Quo / Baseline	Scenario 2 - Near future - no gov action, PPP services stop	Scenario 3 - Government takes over recycling system	Scenario 4 - Current service EPR	Scenario 5 - EPR scenario, high recovery	Scenario 6 - EPR scenario - high service high accessibility
BCR	984	984	984	984	984	984
PPP	4,470	0	4,470	4,470	6,606	6,268
DMR Tires	537	537	537	537	537	537
DMR E-Waste	132	132	132	132	132	132

Material	Scenario 1 - Status Quo / Baseline	Scenario 2 - Near future - no gov action, PPP services stop	Scenario 3 - Government takes over recycling system	Scenario 4 - Current service EPR	Scenario 5 - EPR scenario, high recovery	Scenario 6 - EPR scenario - high service high accessibility
Waste Oil	350	350	350	350	725	725
HHW	435	435	435	435	435	435
Other	1,929	1,929	1,929	1,929	1,929	1,929
<b>Total</b>	<b>8,836</b>	<b>4,367</b>	<b>8,836</b>	<b>8,836</b>	<b>11,300</b>	<b>11,000</b>

Scenarios 5 and 6 have the most material collected. These are the scenarios with increased recycling access and recycling targets. PPP recycled increases 33% and 28%, in scenarios 5 and 6, respectively when compared to baseline. Under these scenarios, collection of waste oil and HHW practically double when compared to baseline, Scenarios 3 and 4 have similar collection levels to baseline, as no recycling improvements that affect collection are made in those scenarios, only investment to maintain the current level of recycling infrastructure.

Scenarios 5 and 6 also enable future growth of recycling services and EPR programs. The other scenarios do not incorporate recycling system upgrades that often accompany implementation of EPR, nor do they expand recycling service access. Thus, without improvements or expansion to existing services, infrastructure, or systems, Scenarios 1-4 do not leave room for future growth.

A comparison of the costs and benefits of each scenario is shown in Table 41 below.

**Table 41: Comparison of Results – All Programs**

Scenario	Total Cost Of all Programs	Cost Per Capita - total	Cost Per Capita - Out of Pocket	Cost per tonne recycled	Value of material recovered *	Avoided Landfill Costs	GHG reduction associated with avoided landfilling	Total FTE
Scenario 1: Status Quo/Baseline, 2022	5,300,000	124	59	766	-515,000	1,025,000	-6,374	74
Scenario 2: Near Future – No Gov Action PPP Services Stop	3,002,000	70	43	429	-234,000	507,000	-2,046	38
Scenario 3: Near Future – Gov Takes Over Recycling	6,177,000	145	43	894	-515,000	1,025,000	-6,374	75

Scenario	Total Cost Of all Programs	Cost Per Capita - total	Cost Per Capita - Out of Pocket	Cost per tonne recycled	Value of material recovered *	Avoided Landfill Costs	GHG reduction associated with avoided landfilling	Total FTE
Scenario 4: EPR – Current Service	6,175,000	145	127	894	-515,000	1,249,000	-6,374	75
Scenario 5: EPR – High Recovery	14,005,000	330	311	1,234	-495,000	1,540,000	-11,130	89
Scenario 6: EPR – High Service/High Accessibility	12,900,000	304	287	1,172	-497,000	12,900,000	-10,494	85

Source: Eunomia Calculations.

\* Note that a negative number indicates an income.

Scenarios 5 and 6 have the highest costs, more than doubling the cost of the program at baseline. Part of this increase, both in absolute cost and cost per tonne, is due to upgrades in the recycling system. However, as can be seen in the material revenue column, material revenues do not increase that much over the scenarios. The reason for this is that at baseline, mixed plastics are a large proportion of what is disposed. For the system to reach recycling targets, it is necessary for mixed plastic tonnage recycled to triple. Mixed plastic, however, has a negative material value in the Yukon. The negative value from the increase in mixed plastic tonnage recycled therefore offsets the additional material revenue from diverting positive value materials, such as aluminum cans and cardboard.

Scenarios 5 and 6 do, however, have an 84% and 65% increase in greenhouse gas emissions savings, respectively, when compared to baseline. It is possible there are additional GHG emissions under the higher performing scenarios if end markets are further away. Table 42 shows GHG emissions savings by scenario.

**Table 42 GHG Emissions Reduction by Scenario (tCO<sub>2</sub>e)**

Scenario	GHG Emissions Reduction
Scenario 1: Status Quo/Baseline, 2022	-6,374
Scenario 2: Near Future – No Gov Action, PPP Services Stop	-2,046
Scenario 3: Near Future – Gov Takes Over Recycling	-6,374
Scenario 4: EPR – Current Service	-6,374
Scenario 5: EPR – High Recovery	-11,130
Scenario 6: EPR – High Service/High Accessibility	-10,494

Source: Eunomia Calculations.

A comparison between the funding sources for the recycling system is shown in Table 43 below.

**Table 43: Comparison of Cost by Stakeholder for All Materials by Scenario per Annum (\$) for PPP, HHW and Waste Oil**

Scenario	Producers	Communities	Households	Yukon Government	Industry (recyclers)	Total
Scenario 1: Status Quo / Baseline, 2022	0	0	363,000	2,320,000	300,000	3,060,000
Scenario 2: Near Future – No Gov Action PPP Services Stop	0	0	0	680,000	0	680,000
Scenario 3: Near Future – Gov Takes Over Recycling	0	0	0	3,966,000	0	3,966,000
Scenario 4: EPR – Current Service	3,397,000	0	0	568,000	0	3,965,000
Scenario 5: EPR – High Recovery	10,983,000	0	0	733,000	0	11,716,000
Scenario 6: EPR – High Service/High Accessibility	10,059,000	0	0	631,000	0	10,690,000

Source: Eunomia Calculations.

The Yukon Government pays the least under the three EPR scenarios, despite those scenarios having more costs overall than the other scenarios.

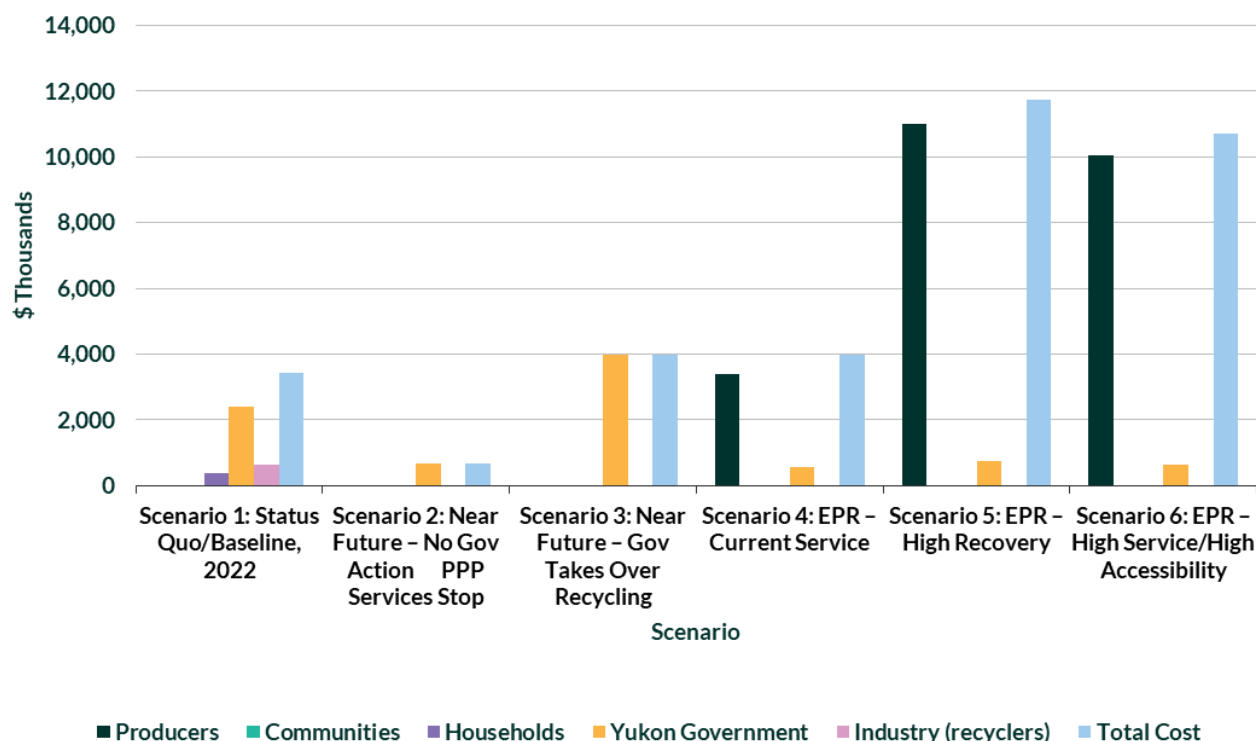
### 2.3.1 Cost Savings Under EPR

Based on the modelling conducted of the current system and the potential future systems, Eunomia calculated the avoided expenditures that the Yukon Government would realize by shifting to an EPR system. These numbers were found by comparing the status quo to the three EPR scenarios (Scenarios 4, 5, and 6).

With producers covering the costs, the resulting cost obligations are shown in Figure 8, where the Yukon Government can expect cost savings under the EPR scenarios compared to the baseline assessment. These savings are estimated to be \$900,000- \$1.15M per year under EPR. The government will continue to incur some administrative costs under EPR, estimated to be approximately \$200,000 in the territory.

A key challenge with EPR in Yukon is providing services to rural areas, where transport is the greatest cost factor. To avoid duplication of travel and the associated costs to these areas, it could be most efficient for the Yukon Government to continue providing recycling services to remote rural areas where it may already be traveling for waste, water, and other necessary functions. However, under EPR, the financial responsibility for these services should rest with the producers, so the government should be reimbursed by the PRO for any recycling services provided to rural areas.

**Figure 8 Annual Cost Obligation by Stakeholder for PPP, HHW, and Waste Oil by Scenario**



Source: Eunomia Calculations.

**Error! Reference source not found.**above shows six different scenarios. However, it should be noted that recyclers in the territory have stated that Scenarios 1-2 are unsustainable for continuing to operate the recycling programs. Scenarios 3 and 4 include minimum investments which may allow for continued operation, while Scenarios 5 and 6 are consistent with what recyclers state is needed to have a well-funded system.

### 2.3.2 Cost for Third-Party Management of EPR System

Some jurisdictions, including New Brunswick, have established an arms-length oversight agency to monitor performance and compliance of producers under EPR. Eunomia interviewed representatives from the Government of New Brunswick to discuss this setup and its implications. Alberta and Ontario have also adopted this structure in their recently created and updated, respectively, EPR laws.

Additionally, the transition to EPR and the associated logistics and costs were discussed with RecycleBC, the PRO in British Columbia (BC) as well as Cariboo Regional District, a rural municipality in BC that was responsible for complying with the transition to EPR on the ground.

In New Brunswick, Recycle NB is the third-party oversight organization. It was established through the Clean Environment Act regulation and operates as a non-profit whose role is to ensure that materials designated by the Minister of the Environment are managed in a manner that assures a clean and healthy environment.<sup>32</sup>

Recycle NB manages programs for paint, oil & glycol, electronics, tires, and is in the process of putting a management plan in place for PPP. It is fully funded by these programs on a cost recovery basis. Each producer is assessed a fee used to cover the educational and administrative costs of the program.

As established in the terms of the EPR agreement, Recycle NB charges producers the costs incurred while administering the oil, paint, and e-waste programs on an annual basis.<sup>33</sup>

In Ontario, the Resource Productivity & Recovery Authority (RPRA), established by the Government of Ontario as the regulator responsible for administering EPR programs, has transparent mechanisms and processes in place for setting fees for each program.<sup>34</sup>

The estimated cost of providing oversight annually to manage an EPR system is estimated to be approximately \$40,000. This was taken by pro-rating the cost from Resource Productivity and Resource Authority (RPRA). However, this is likely an underestimate as there will be additional upfront costs to setting up the agency such as IT, office space and compliance systems. Therefore, this estimate was uplifted to \$80,000 per year.

Once established, however, the oversight organization does not require government money, as it is fully funded by the administrative fees it collects from the programs. Furthermore, in New Brunswick, Recycle NB is prohibited from cross-subsidizing between programs, so the organization's costs are the true costs of overseeing the EPR program.<sup>35</sup>

## 2.4 Other Benefits of Moving to EPR for PPP, HHW, and Waste Oil

Full cost recovery EPR that includes both recycling rate targets and access rate targets means that more material will need to be collected and sorted for recycling. In addition to reducing the amount of material sent to landfill and reducing GHG emissions, further benefits potentially include:

- Increasing the value of work that can be provided by local companies and service providers;
- Increased number of jobs associated with the improved services

These benefits and expected implications for the Yukon are discussed below.

## 2.4.1 Initial Infrastructure for EPR

Implementing an EPR system in the territory will require infrastructure to support material collection and processing, as well as ensure accessibility for residents. Infrastructure changes or expansion will require investments and planning. One of the processors in Whitehorse expressed in discussion that infrastructure is a constraint to current operations. The existing infrastructure is beyond both capacity and useful life, which affects efficiency of processing as well as maintenance and repair costs. Even continuing current operations, much less expanding them, would necessitate an infrastructure upgrade.<sup>36</sup>

Beyond the infrastructure improvements needed at the processors, infrastructure expansion will be required at depots and collection sites. When BC implemented its EPR program, this was a challenge for the Cariboo Regional District, which, after the launch of the program, had to invest in shelters, shipping containers, and fencing for depots. HHW and waste oil, necessary infrastructure will include containers designed to hold the hazardous waste or waste oil in question. Recycle BC, the PRO responsible for PPP, let every depot that wanted to join participate when the program launched in 2014. Since then, the number of depots has doubled; depot expansion is a combination of communities requesting depots, Recycle BC identifying a gap and targeting a location based on need, and Recycle BC conducting pop-up events to serve a community that does not have a depot. If a gap is identified, Recycle BC reaches out to local governments or private or non-profit entities to identify a party interested in operating a depot.<sup>37</sup>

For used oil in BC, infrastructure includes public drop-off facilities and service stations that also accept public drop-offs. The infrastructure needs are dependent upon the characteristics of the area and the proportion of residents changing their own oil versus going to a service station for an oil change. The BC Used Oil Management Association (BCUOMA), the PRO for used oil, provides modified containers to facilities that operate as public drop-offs. These containers are provided through infrastructure grants from BCUOMA. Once a facility collects used oil for five years, the container belongs to the facility. In addition to the commercial and public drop-off infrastructure points, mobile pick-ups are also used to fill in gaps in access, as well as government-sponsored collection events that BCUOMA supports.<sup>38</sup>

The expected cost of initial infrastructure requirements in the Yukon is \$2.5 million per year for facility and depot improvements over the next 15 years

## 2.4.2 Value of Local Contracting

Contractors are key stakeholders in operating an effective EPR program. In Yukon, depots are currently operated by private entities that receive funding from the government and a processing fee for containers collected. Haulers are also private entities that are hired by the government. Curbside recycling collection is offered to residents in Haines Junction and Teslin by local governments and is offered in Whitehorse through a private collection service, Whitehorse Blue Bin Recycling. Blue bin collection, depot reception, transportation and depot transportation could all fall under the private contracting umbrella and provide opportunities for local contractors to provide these services. Together, these opportunities can have a value of \$1 - \$5 million, depending on the EPR scenarios chosen (Scenarios 4-6).

For HHW, the Yukon Government has a direct contract set up with a provider. Collection events are run by municipalities and by the territorial government for small communities, and a private hauler picks up the waste collected.

In developing an EPR system for the Yukon, current contractors and municipalities should be given first right of refusal for service provision, providing them the opportunity to contract with the EPR stewardship organization to continue providing services, either themselves or by contracting with a third-party commercial provider. If municipalities do not want to provide collection services, the producers would then be responsible for contracting with commercial providers to provide collection services.

British Columbia, in establishing EPR for paper and packaging, gave local governments the right of first refusal to serve as collectors. Local governments could choose to opt in to the program, continuing to provide collection services and receiving payment from the PRO, they could choose to opt out and operate outside of the EPR system, or they could hand over existing collection services to be operated on their behalf through direct service. Recycle BC has seen that direct service is a competitive request for proposal (RFP) to waste management companies. Post collection, Recycle BC contracts with one service provider, who in turn subcontracts with a network of material recovery facilities (MRFs) individually.

In Alberta, the Alberta Recycling Management Authority (ARMA), the stewardship program, contracts with processors, who are paid based on processed weight.<sup>39</sup>

As a means of more direct comparison to the Yukon, Eunomia consulted the Cariboo Regional District (CRD) in BC, as an example of a rural community that, in implementing EPR, confronts the challenges of a dispersed and rural population that the Yukon will likely face as well. The CRD contracts out the operations of facilities. For depots, the contractor provides attendants, bins, and hauling services for depots. CRD noted that it is the hauling element that attracts the contractors; the other services would not be profitable for a contractor to undertake without it. Given the dispersed demographics of much of the Yukon population outside Whitehorse and the transport inherently required to service dispersed, rural areas, it is likely that hauling would similarly be the most profitable element for contractors in the Yukon as well.

To improve efficiencies, it is recommended that the Yukon Government and producers look for opportunities to streamline services; in rural areas where the government is already providing services, for example, producers could contract with the Yukon Government to provide services in these areas.

### **2.4.3 Job Creation**

The current recycling system in Yukon is unsustainable, and Eunomia heard from one of the processors in the territory that a key current challenge is staffing. Both recycling processors currently operating in Yukon have communicated to the Yukon Government that even at current levels, there is a need for additional staff resources. Thus, there is already the potential for job creation if funding were there to support it. With the expansion of collection and processing expected under an EPR system, the potential for job creation is even greater.

The scenarios modeled investigated the job creation potential of implementing EPR. Jobs created include direct, indirect, and induced jobs. Indirect jobs are those created through activity associated with the direct



functioning of the system. Induced jobs are those created, for example, as a result of additional spending. For example, by workers employed at a recycling plant with their wages.

The findings show that at baseline, recycling across all material types in the Yukon creates 74 direct, indirect and induced full-time equivalent (FTE) jobs across the territory. Job creation by scenario is shown in Table 44.

**Table 44: Jobs Created by Scenario**

Scenario	Total FTE
Scenario 1	74
Scenario 2	38
Scenario 3	75
Scenario 4	75
Scenario 5	89
Scenario 6	85

Source: Eunomia Calculations.

Scenarios with higher job totals (e.g. scenarios 5 and 6) have higher job totals due to expansion of curbside recycling which requires additional collection drivers, as well as additional staff to support sorting commingled material.

# 3.0

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## EPR Considerations



## 3.1 Policy Framework

Based on the findings of the scenario modelling, interviews conducted with stakeholders and other jurisdictions, research on other EPR programs throughout Canada, and Eunomia's existing expertise on EPR policies and implementation, the following recommendations have been developed for the Yukon to consider in establishing an EPR regulation for PPP, HHW and waste oil.

In rural areas, recycling collection haulage and processing are expensive. This is particularly true in the Yukon, where the population density per square kilometer is 0.1, nearly 80 percent of the population lives in Whitehorse, and the remaining 20 percent is heavily dispersed.<sup>40</sup> The costs for improving recycling service will increase exponentially with limited ability to drive savings through economies of scale. Despite these challenges of providing services to a rural and dispersed population, Yukon residents should be entitled to a level of service under the EPR program that is comparable to that of residents in other provinces with EPR in place. It is likely to be difficult for the government to continue to sustainably fund recycling services, and improvements to enable a reasonable level of convenience are needed to deliver higher diversion rates. Cost savings to producers in servicing rural areas can be achieved through contracting with the government to provide services in these areas where services like water and others are already being provided.

Eunomia is currently conducting a review of convenience standards in BC for all its programs to enable the province to consider how better to improve access in rural areas. Once complete, anticipated towards the end of the first quarter of 2023, this review will be useful for the Yukon Government to take into consideration in establishing access standards for its own rural populations.

### 3.1.1 Outcome-Based Regulation

For an effective EPR program, it is important to establish a non-prescriptive, results-based system. The government must specify the prescribed outcomes for the programs and the penalties for outcomes not met. Key outcomes include:

- Reducing the amount of PPP, HHW, and waste oil that are sent for disposal and support the development of a circular economy by supplying recycled materials to manufacturers through a reverse supply chain;
- Ensuring accessibility to PPP, HHW, and waste oil collection for Yukon residents; and
- Preventing free riders while incorporating considerations for producers that supply quantities of material below an established threshold.

A mechanism for determining and reviewing targets should be specified in the legislation. It should include provisions for continuous improvements to increase the targets progressively over time to increase the quantity and quality of material recycled. Provisions for producers that help secure better access to recycled materials so that they can meet their internal circular economy commitments and goals should be established as well. The analysis of the modelled scenarios shows that, when comparing Scenario 5, the EPR scenario with

specific recycling rate targets, with Scenario 6, which only specified high accessibility targets, the investment required to meet the recycling targets was higher than that needed to meet the accessibility targets.

## 3.1.2 Program Targets

Setting ambitious targets – both for performance and service level – will be necessary to achieve the outcomes identified in the program. Producers should be individually legally required to report against these targets and demonstrate that targets have been met.

### Diversion and Recycling Targets

As two goals of an EPR system are to increase waste diversion and increase recycling of covered products, targets that track diversion and recyclability are important elements. Definitions for targets should ensure reporting of material that is actually recycled and used in the production of new products, not just collected.

A common approach to achieving the outcome of reducing the amount of covered materials destined for disposal is to set high targets that:

- increase over time
- are material specific
- are accompanied by penalties for producers if targets are not reached

Targets must be material specific, not just to the category (PPP, HHW, waste oil), but to the particular material within the category (e.g., different types of plastics, metals, paint, antifreeze, etc.). Setting high material-specific targets ensures that all material types are addressed, not only those that are easiest to recycle. It also incentivizes producers to use easier-to-recycle materials.

As an example of recovery targets that increase over time and are material specific, Ontario has set the following recovery percentages for its Blue Box EPR program for PPP materials relevant to the Yukon:<sup>41</sup>

- Paper: 80% (2026-2029), 85% (2030 onwards)
- Rigid Plastic: 50% (2026-2029), 60% (2030 onwards)
- Flexible Plastic: 25% (2026-2029), 40% (2030 onwards)
- Glass: 75% (2026-2029), 85% (2030 onwards)
- Metal: 67% (2026-2029), 75% (2030 onwards)

Targets and penalties must be set high enough to avoid any financial incentive not to recycle, which can happen when the costs of recycling are higher than the costs of disposal. This consideration could be of particular concern in the Yukon, where a dispersed population means more expensive transport and collection, which can increase recycling costs.

Performance should be measured against targets, tracking both what is collected and what is actually recycled. To calculate recycling, it is important that data be based on accurate reporting. Accurate reporting is also critical to ensure that all obligated producers are paying their fair share. Penalties established for targets not met will deter non-compliance and under-performance.

## Service Level/Accessibility Targets

Accessibility to depots and collection sites is a critical element that impacts the redemption rate of covered materials. Therefore, accessibility targets are essential for the Yukon EPR program to be successful. Setting accessibility standards is particularly important for the Yukon, where one-fifth of the population lives in rural areas, to ensure that producers do not meet recovery targets by only concentrating on the urban area of Whitehorse. It is noted, however, that if the recovery targets are set sufficiently high then adequate coverage will be needed to meet these performance targets and will ensure that the access targets are met as well.

Accessibility standards should ensure that recycling access is convenient and equitable for residents, including residents in different types of dwellings (e.g. single-family and multifamily buildings) and in different settings throughout the Territory (i.e. in Whitehorse or in a rural area). Clarifying what level of service can be expected in both urban and rural areas will be important. BC's EPR legislation requires PROs to provide a "reasonable" level of access; however, this standard is hard to define, with different PROs using different metrics. Setting out clearly what the minimum access requirements are and how they will be measured is needed up-front. Accessibility standards should be established in the regulation as one of the outcomes set for producers to achieve and should include a requirement to guarantee a minimum level of convenience for all Yukon residents.

With the Yukon's existing network of depots and collection sites, the EPR legislation should at least ensure that access stays as high as in the current state, with the following accessibility standards:

- For PPP, 90% of the population have a collection site within 30-minute drive, for areas with population greater than 500 people, and 45-minute drive for areas with less than 500 people
- For HHW, 90% of the population have a collection site within 30-minute drive, for areas with population greater than 500 people, and 45-minute drive for areas with less than 500 people
- For waste oil, 90% of the population have a collection site within 30-minute drive, for areas with population greater than 500 people, and 45-minute drive for areas with less than 500 people

Once the EPR legislation is enacted, producers will be accountable for meeting the accessibility standards in addition to the collection and recycling targets.

### 3.1.3 Penalties

Penalties should be in place alongside the targets for non-compliance and non-achievement. Clear timeframes should be established for producers to meet targets, with penalty mechanisms in place for non-compliance on an individual producer basis. Ultimately, the Yukon Government should be responsible for ensuring compliance.

### 3.1.4 Clear Definitions

In addition to clearly defining obligated producers in the regulation, other elements of the EPR system must be clearly defined, including designated materials and the roles and responsibilities of different stakeholders.

Materials designated under the EPR system must be clearly defined. At the same time, EPR regulations should be written so that they can easily incorporate new materials that enter the market, such as new packaging materials, so that producers of those products contribute to the collection costs as well.



In addition, the respective roles, responsibilities, and funding obligations for different stakeholders also need to be clearly outlined.

## 3.2 Program Management

### 3.2.1 Program Administrator

The Yukon government should consider structuring the program with a government-appointed third-party oversight organization. This structure would follow the model implemented in New Brunswick, where Recycle NB serves as the third-party oversight organization established through legislation to oversee the EPR program. Alberta and Ontario have also adopted this structure in their recently created and updated, respectively, EPR laws.

In the Yukon, a third-party organization would provide oversight and monitor progress against targets. It would establish processes to verify the data provided by producers and ensure that producers are held accountable for their supply chains and that data provided is accurate under the standards established through regulation. Producers would be required to register with this oversight organization, which would be responsible for periodic audits of both producer data and the composition and quantity of materials generated in both the garbage and recycling streams. It would also serve as a resource for education and information for residents.

If the Yukon does not establish a third-party organization, the function of oversight would be performed by the government in lieu of a third party.

Structuring the program with a third-party oversight organization is recommended, as the third-party agency would act on behalf of the government but be funded by producers and would result in the following expected benefits:

- **Capacity** - with limited government capacity, a third-party organization would take responsibility for the implementation and oversight functions, enabling the Yukon government to focus on other priorities and future program expansion.
- **Resourcing** - a third-party organization could likely more easily acquire additional resources, such as hiring additional staff, by identifying the need and passing the cost along to the producers. It is likely more difficult for the government to hire additional resources as needed.
- **Independence** - it is possible that a third-party organization might be more insulated from industry voices and lobbying efforts than a government-affiliated group.
- **Transparency and accountability** - the oversight agency would be required to disclose costs, financial information, results, and other information in regular reporting. There would be full transparency and accountability, and fees charged to PROs would be entirely representative of the true cost of program oversight, as would be evidenced through audited annual reports.

This structure would require little involvement from the Yukon Government, with some requirements for reporting of the third-party agency back to the government on progress on an annual or semi-annual basis. In Alberta, for instance, ARMA is accountable to the Minister of Environment and Parks and must provide business plans, reports, and audited financial statements to the minister on an annual basis, as well as provide notice of changes to its bylaws.<sup>42</sup>

## 3.2.2 Yukon Government Expenditures

If the Yukon Government were to be responsible for administration and oversight of the EPR system, it will continue to incur estimated costs of approximately \$210,000 per year, with cost savings of an estimated \$1.7 million compared to current expenditures.

The cost of establishing a third-party oversight organization to manage an EPR system in the Yukon is estimated to be \$80,000 in upfront costs, including office equipment, furnishings, and technology outfitting, plus an annual cost of \$210,000. This was estimated by extrapolating from Recycle New Brunswick's annual operating reports and their initial upfront costs in their first year of operation. Once established, however, the oversight organization does not require government money, as it is fully funded by the administrative fees it collects from the producers within the programs.

## 3.3 De Minimis Standards

### 3.3.1 De Minimis Thresholds

The definition of “producer” in EPR regulation generally includes de minimis thresholds to relieve small businesses from undue EPR administrative or financial obligations. De minimis standards in EPR programs establish a threshold below which small businesses do not have to pay fees to comply with EPR regulations, though they may still be required to register with the oversight organization and report data, such as quantity of material sold into the market. A de minimis provision can be based on the producer's turnover or the quantity of packaging they place on the market. In evaluating the establishment of a de minimis threshold for small businesses for PPP, Yukon is considering de minimis thresholds established in other provinces, as well as Yukon business revenues.

The de minimis standards that are in place for EPR programs in other provinces are described below and shown in Table 45.

#### **New Brunswick**

The New Brunswick Designated Materials Regulation (Regulation) does not apply to a brand owner who generates less than \$2 million dollars in gross annual revenue in the Province of New Brunswick; manufactures, distributes, sells, or offers for sale less than one tonne of applicable product annually in New Brunswick, or; is a charitable organization registered under the Income Tax Act (Canada).<sup>43</sup>

In the case of a franchise agreement, the Regulation does not apply to a person who is a franchisee. It applies to the franchisor who owns the intellectual property, patents, and trademarks of the brand or business being franchised.<sup>44</sup>

Brand owners that are exempt from the regulation do not have to register with Recycle New Brunswick (Recycle NB), the PRO that manages the stewardship plans for EPR materials in the province.<sup>45</sup>

#### **Ontario**

There are two de minimis thresholds in place in Ontario, one based on revenue and one on weight. Any producer whose annual revenue from products and services is less than \$2 million is exempt from the EPR regulation and must only keep records that demonstrate that its annual revenue is less than this amount. These producers do not need to register with Stewardship Ontario or collect or report material data.<sup>46</sup>

Producers with gross revenue over \$2 million annually but with total reported packaging and paper product quantities of less than 15,000 kg (15 tonnes) must register and report their materials to Stewardship Ontario but are exempt from paying fees.<sup>47</sup>

### **British Columbia**

British Columbia's EPR regulation for PPP does not apply to a small producer, defined as a charitable organization registered under the [Income Tax Act](#) (Canada), or; a producer with a gross revenue in the most recent calendar year of less than \$1 million in British Columbia, and/or who produced in the most recent calendar year less than 1 tonne of PPP products that have been or will be used in a commercial enterprise, sold, offered for sale or distributed in British Columbia, or; a producer (other than a producer of newspaper) that does not have more than one point of retail sale in British Columbia. If the producer is operating under a franchise agreement, the producer, the franchisor and the other parties with whom the franchisor has a franchise agreement in relation to the same product are counted as a single producer.<sup>48</sup>

These businesses are exempt from the regulation and do not need to register with Recycle BC.

### **Saskatchewan**

Saskatchewan is in the process of developing its EPR regulatory framework for a model that will include exemptions for stewards that fall below either a revenue or tonnage threshold. The current exemptions are for businesses that generate less than \$2 million in gross annual revenue, supply or distribute less than 1 tonne of paper and packaging, or operate as a single point of retail sale but does not generate its revenues exclusively from online sales.<sup>49</sup> However, the government is proposing to lower the revenue exemption to \$1 million and remove the single point of retail exemption.<sup>50</sup>

### **Alberta**

Alberta's recently established EPR regulation includes exemptions for charitable organizations as well as producers below either a revenue or a designated material threshold, with these thresholds to be established in the bylaws developed by the Alberta Recycling Management Authority (ARMA), the program's oversight organization.<sup>51</sup> Alberta has proposed an exemption for charitable organizations and small businesses with gross revenue of less than \$1 million in Alberta.<sup>52</sup>

Table 45 provides a summary of the de minimis thresholds of other provinces, as described above.



**Table 435: De Minimis Thresholds in Other Provinces**

Province	Revenue Threshold	Tonnage Threshold	Other Exclusions
New Brunswick	\$2 million (proposing to lower to \$1 million)*	1 tonne	Charitable organization Franchisee
British Columbia	\$1 million	1 tonne	Charitable organization One point of sale
Ontario	\$2 million	15 tonnes (must register & report, but exempt from fees)	--
Saskatchewan	\$2 million (proposing to lower to \$1 million)	1 tonne	One point of sale (proposing to remove this exemption)
Alberta (proposed)	\$1 million	(to be established in ARMA bylaws)	Charitable organization

Source: Eunomia Research.

\* the Yukon Government shared that New Brunswick indicated plans to lower the revenue threshold to \$1 million at a Canadian Council of Ministers of the Environment Environmental Planning and Protection Committee meeting.

The Yukon Bureau of Statistics' 2021 Yukon Business Survey published information about the industry sector types, employees, revenue, hiring, and expected growth of the businesses in the territory. While there is no breakdown of packaging producers in particular, the overall revenue breakdown of Yukon businesses as provided in this survey is shown in Table 46. This table also shows the split between home-based and non-home-based businesses.

**Table 44: Yukon Business Revenue**

Revenue	< \$50,000	\$50,000 - \$99,999	\$100,000 - \$499,999	\$500,000 - \$999,999	\$1M or more
Total Number of Businesses	1,044	383	898	113	419
Home-Based	805	260	450	25	72
Non-Home-Based	239	123	448	88	347

Source: Yukon Bureau of Statistics, 2021 Yukon Business Survey.

With the lowest threshold revenue of those with existing Canadian EPR programs applied, only 419 Yukon-based businesses would potentially be affected; however, as this number includes all industries, the number actually producing covered materials would be significantly lower. Furthermore, with the application of a tonnage threshold, it is likely that many or all of the home-based Yukon businesses would be excluded from EPR for producing below the threshold amount of covered material.

It is important to note, however, that all producers doing business in the territory will need to comply with the EPR program, not only those that are Yukon-based. Most of the affected supply is likely to be from larger, out-of-territory businesses. In existing EPR programs, the exemptions apply based on the revenue recognized in the province or the quantity of material offered for sale or distributed within the province.

### 3.3.2 Recommendation for Yukon

It is recommended that the Yukon, in establishing a de minimis threshold under its EPR program, align this exemption to some extent with those of other provinces, in particular BC and Saskatchewan.

Both of these provinces have both revenue or tonnage thresholds; if a producer falls below one of the thresholds, it is exempt. It is recommended that the threshold in the Yukon be no higher than those of BC, so 1 tonne of material or \$1 million in revenue. If a producer meets either of these criteria, then it would be exempt from the EPR requirements. In addition, similar to the BC exemption (as well as other provinces), including an exemption for registered charitable organizations is recommended. It is not recommended that the Yukon include an exemption for a franchisee as in New Brunswick, but instead that the EPR requirements apply to both franchisee and franchisor.

After discussion with the Yukon Government, it is clear that many businesses, including large retailers such as Walmart, only operate one point of sale in the territory. Thus, unlike in BC, one point of sale would not be a reasonable additional exclusion to incorporate in the Yukon.

Whatever the de minimis threshold established, the regulation needs to ensure that all companies that supply EPR material into the Yukon are identified and that those companies contribute to covering the cost of the system. Clearly defining in the regulation which producers are obligated will be necessary to accomplish this. The Yukon's Environment Act currently defines both a producer and a steward. The steward would be responsible for the collection and recovery of designated EPR material.

As specified in the Act, a steward is defined as follows:

- (a) a producer who first imports the designated material into Yukon
  - (i) for supply or use by another person, or
  - (ii) for their own use; or
- (b) a person
  - (i) who is located in a place other than Yukon, and
  - (ii) who supplies the designated material to a person who is located in Yukon.<sup>53</sup>

A producer is defined as a person who manufactures or supplies a designated material in the Yukon.<sup>54</sup> There is potential for the EPR regulation to provide additional details to refine this definition to add clarity for certain situations. The BC regulation, for instance, defines a producer as follows:

(b)(i) a person who manufactures the product and uses in a commercial enterprise, sells, offers for sale or distributes the product in British Columbia under the manufacturer's own brand,

(ii) if subparagraph (i) does not apply, a person who is not the manufacturer of the product but is the owner or licensee of a trademark under which a product is used in a commercial enterprise, sold, offered for sale or distributed in British Columbia, whether or not the trademark is registered, or

(iii) if subparagraphs (i) and (ii) do not apply, a person who imports the product into British Columbia for use in a commercial enterprise, sale, offer for sale or distribution in British Columbia.”<sup>55</sup>

Programs delivered against a clear definition of “producer” are better equipped to deter free riders. The language needs to be such that companies, including non-resident online retailers, wholesale importers (as first importers) and where there is no resident producer (for instance, couriers that transport online sales into Yukon<sup>56</sup>), are obligated to participate.

## 3.4 Other Considerations

### 3.4.1 ICI Materials

In interviews, representatives from other jurisdictions, notably from the Cariboo Regional District in BC, recommended that the Yukon consider including Industrial Commercial Institutional (ICI) material in its PPP EPR system, or, if not including all ICI, considering including it at least for schools and office buildings. Currently, commercial collection services are offered by recycling collection services in Whitehorse, with cardboard representing the majority of what is collected from the commercial recycling stream.

While the inclusion of ICI in EPR would result in the opportunity to manage it, it is recommended that the Yukon EPR system begin by addressing residential PPP to be consistent with existing programs in Canada. Furthermore, producers of some products into the ICI sector are different than those of the residential sector. Including ICI materials would thus open the EPR program to many more producers, which would add an additional administrative cost to the program. Given the size of the territory, this cost would be disproportionate.

In line with this recommendation, the scenarios evaluated did not model changes to ICI tonnages; all scenarios include the baseline amount for the ICI sector that was modelled for the status quo scenario, but there are no modelled changes to these amounts.

However, the Yukon Government could consider requiring producers to report on the quantities of material sold into the ICI sector. This information could be used to establish a baseline and consider addressing ICI waste in the future. At the point when other provinces start to address ICI, the Yukon should be ready to capitalize on this change and could use collected information to facilitate this.

## 3.4.2 Bans and Incentives

Another recommendation from the Cariboo Regional District in BC was to consider bans and incentives in the design of the program, such as landfill bans or a user pay system, as a way to incentivize individuals to fully participate in the program and increase recovery of covered materials. The City of Whitehorse does have an existing cardboard ban that designates cardboard as controlled waste that cannot be disposed of with residual waste and is banned from the city landfill. Disposal bans have been shown to be an effective complement to EPR policies for plastics. Recent European data indicates that countries with landfill restrictions on recyclable and recoverable materials, on average, achieve higher recycling rates of post-consumer plastics.<sup>57</sup>

A risk of a user pay system, however, is contamination, with non-recyclable materials mixed in with covered materials. Given this potential and the inherent intention of an EPR system shifting responsibility for product end-of-life management to producers, it is recommended that recovery be incentivized through material-specific targets and accompanying penalties for producers that do not achieve these targets.

## 3.4.3 Federal Action on Plastics

While the regulation of waste and recycling in Canada is carried out by provincial and territorial governments, the Government of Canada is developing new initiatives and regulations to address plastic pollution, including an initiative to support EPR efforts on the territorial and provincial level. These developments are further evidence of growing collective action on addressing plastic waste and could facilitate more effective recycling and management of EPR while promoting additional action on the provincial and territorial level.

- The Single-use Plastics Prohibition Regulations, released in June of 2022, places a ban on the manufacture, import, and sale of six categories of single-use plastics items. These items are checkout bags, cutlery, foodservice ware in the form of clamshell containers, lidded containers, cups, plates, and bowls containing expanded polystyrene foam, extruded polystyrene foam, polyvinyl chloride, carbon black, and oxodegradable plastic, ring carriers for beverages, stir sticks, and straws. The regulation will expand to ban the export of the covered single-use plastic items starting in December 2025.<sup>58</sup>
- Development of minimum recycled content requirements for plastic items is in progress. Plastic packaging in Canada will be required to contain at least 50 percent recycled content by 2030. The proposed regulations, expected to be published in fall 2023, will also include labelling requirements for plastic items.<sup>59</sup>
- The government is developing a federal plastics registry that will require producers to report on plastics they place on the Canadian economy. This registry will support provincial and territorial EPR efforts.<sup>60</sup>
- The government is also in the process of developing labelling rules to improve the recycling and composting of plastic packaging and single-use items through accurate labelling.<sup>61</sup>

Developing federal regulations could help facilitate territorial and provincial-level action across Canada, and the in-progress plastic producer registry could contribute to the effectiveness of EPR programs.

## 3.5 Conclusion

EPR for PPP and other covered materials, when accompanied by targets, will ensure that the necessary investment is put in place to meet those targets. An EPR system for PPP that includes recycling targets as well as service level/accessibility standards will increase the overall cost of the system due to the fact that recycling services have a cost, and that cost is higher when serving more rural and dispersed populations. However, under a full cost recovery system, producers are responsible for covering these costs. Thus, while the overall system costs that come with EPR increase, the costs to communities and the government decrease.

With a well-designed EPR regulation, the Yukon can expect to address the existing challenges with the sustainability of the recycling system in the territory, as well as see other benefits for households, the government, and the environment. This regulation must:

- establish an outcome-based system;
- specify mechanisms for setting and reviewing targets,;
- clearly define covered producers and leave room to incorporate new covered materials as needed;
- outline clear roles, responsibilities, and obligations of the different stakeholder;
- implement reasonable de minimis exemptions; and
- ensure accountability for producers to report against and meet targets, with penalties for non-compliance.

Under EPR, the Yukon would see increased amounts of covered material recovered. Households and the government would see cost savings, and environmental benefits would be greenhouse gas emissions savings compared to the current state.



# Appendix



# A 1.0 Interviews

Table 47 provides a summary of the interviews conducted that informed the research and study results.

**Table 47: Interviews Conducted**

Name	Organization	Date Interviewed
Natalia Baranova	Yukon Government	14 July 2022
Tamara Burns	RecycleBC	30 August 2022
David Lawes	BC Used Oil Management Association	31 August 2022
Mark Kurschner & Mannie Cheung	Product Care Recycling	12 September 2022
Edward Gugenheimer	Alberta Recycling Management Authority	16 August 2022
Heather Ashthorn	Raven Recycling	3 August 2022
Tera Grady	Cariboo Regional District (BC)	4 August 2022
Jeffrey Porter & Mark Miller	Government of New Brunswick	4 August 2022
Dave Albisser	Yukon Government Community Services	1 February 2023
Daniel Lessnard	Whitehorse Blue Bin Recycling	<i>Information provided via email</i>

# A 2.0 Cost Modelling & Assumptions

Costs were estimated at baseline by using government cost accounts for the following streams:

- DMR
- BCR
- YG – Non-Refundable

Material that is not under regulation, and therefore had to be estimated using cost modelling were:

- Waste oil
- HHW

Waste oil and HHW costs were estimated using survey data on the cost of running HHW events in Vermont.

At baseline, only around 1100 households have access to curbside recycling services. Under future scenarios, this is assumed to expand to all of Whitehorse as well as some additional households in larger non-Whitehorse municipalities.

Under the baseline scenario, the cost per household for PPP was calculated by calculating the cost of collecting material from both depot-based and curbside based recycling programs separately. The cost of curbside collection and sorting for Whitehorse curbside collection is \$25 per household per month. This was turned into a curbside cost per tonne by using splits given from Raven Recycling on the total tonnage of curbside blue bin material delivered annually.

For depot collection, government cost accounts for depot operation, depot transportation and secondary processing were used to estimate a cost per tonne of material collected through depots. Tonnage collected through depots were also estimated using Raven Recycling data.

Total depot and curbside collection costs were then added together and divided by total population in Yukon, resulting in a cost per capita figure under each scenario. Yukon Bureau of Statistics data from the 2021 Census was used for the number of households. <sup>lxii</sup> Additionally, a cost per capita “out of pocket” measure was also calculated, subtracting the cost to governments from the total cost of the system and then dividing by the population totals.



**Table 48: Number of Residential Customers with Curbside Access to Recycling**

Scenario 1 - Status Quo / Baseline	Scenario 2 - Near future - no gov action, PPP services stop	Scenario 3 - Government takes over recycling system	Scenario 4 - Current service EPR	Scenario 5 - EPR scenario, high recovery	Scenario 6 - EPR scenario - high service high accessibility
1,100	0	1,100	1,100	13,609	12,209

Under Scenarios 5 and 6, curbside recycling access is expanded to above 12,000 households throughout the Yukon, including communities other than Whitehorse, Haines Junction, and Teslin. This covers roughly 70-80% of the households in Yukon.<sup>lxiii</sup>

Curbside recycling was calculated to have a higher recycling tonnage yield per household at baseline. This higher yield was then applied to the households who received new curbside recycling. The assumed yields for both curbside and depot recycling are shown below. These numbers are based on information provided by Raven Recycling and Whitehorse Blue Bin Recycling. They do not include BCR materials.

**Table 49: Recycling tonnes per household by collection method**

	Curbside	Depot
PPP tonnes/household/year	0.216	0.081

In addition to increased curbside recycling access, there is also additional capital spent on physical recycling infrastructure under the future scenarios. Capital first is spent on upgrading processing facilities. An estimated \$25 million<sup>lxiv</sup> is needed to fully outfit processing facilities under the high performing scenarios. These costs include a structure for the facilities to house and cover their equipment. Under Scenarios 3 and 4, only a portion of this is assumed to be invested into the facilities, assumed to be enough to cover the maintenance costs of equipment. The total investment amount in processing facilities is shown in Table 50 below.

**Table 50: Estimated capital spend on processing facilities (\$)**

Scenario 1 - Status Quo / Baseline	Scenario 2 - Near future - no gov action, PPP services stop	Scenario 3 - Government takes over recycling system	Scenario 4 - Current service EPR	Scenario 5 - EPR scenario, high recovery	Scenario 6 - EPR scenario - high service high accessibility
No change	No change	3,000,000	3,000,000	25,000,000	25,000,000

Under future scenarios, depots are assumed to be open more hours per week to allow for additional opportunities for diversion. The additional hours open per week for all depots in a given population band are shown below:

**Table 51: Additional hours open per week of community depots under each scenario**

	Scenario 1 - Status Quo / Baseline	Scenario 2 - Near future - no gov action, PPP services stop	Scenario 3 - Government takes over recycling system	Scenario 4 - Current service EPR	Scenario 5 - EPR scenario, high recovery	Scenario 6 - EPR scenario - high service high accessibility
Communities >500	No change	No change	No change	No change	16	16
Communities <500	No change	No change	No change	No change	25	25

In addition to increased hours, there is also an increased number of collection events for HHW and waste oil collection in Scenarios 5 and 6. Table below shows the total number of collection events for HHW and waste oil combined per year by population band.

**Table 52: Number of Annual HHW and Waste Oil Collection Events**

	Scenario 1 - Status Quo / Baseline	Scenario 2 - Near future - no gov action, PPP services stop	Scenario 3 - Government Takes over recycling system	Scenario 4 - Current service EPR	Scenario 5 - EPR scenario, high recovery	Scenario 6 - EPR scenario - high service high accessibility
Whitehorse	6	6	6	6	14	6
Communities >500	8	8	8	8	16	16
Communities <500	18	18	18	18	36	36

To increase diversion at solid waste disposal facilities, additional staff are added to supervise the material being brought by residents, ensuring that recyclables are not being thrown away. The additional staff hours per week at these facilities is shown in Table 53.

**Table 53: Additional staff hours for Solid Waste Disposal Facilities**

	Scenario 1 - Status Quo / Baseline	Scenario 2 - Near future - no gov action, PPP services stop	Scenario 3 - Government takes over recycling system	Scenario 4 - Current service EPR	Scenario 5 - EPR scenario, high recovery	Scenario 6 - EPR scenario - high service high accessibility
Whitehorse	No Change	No Change	No Change	No Change	68	No Change
Communities >500	No Change	No Change	No Change	No Change	34	No Change
Communities <500	No Change	No Change	No Change	No Change	34	No Change

The overall tonnage recycled by material for PPP is shown below. As can be seen, mixed plastic is the largest tonnage of residential recycling. Glass recycling is shown as 0 since BCR material is excluded in this table.

**Table 54: Residential PPP Recycled - Excluding BCR Tonnage**

	Scenario 1 - Status Quo / Baseline	Scenario 2 - Near future - no gov action, PPP services stop	Scenario 3 - Government takes over recycling system	Scenario 4 - Current service EPR	Scenario 5 - EPR scenario, high recovery	Scenario 6 - EPR scenario - high service high accessibility
cardboard	352		352	352	643	607
mixed waste paper	482		482	482	881	832
office paper	0		0	0	0	0
#1 plastic	14		14	14	47	43
#2 plastic	19		19	19	62	56
mixed plastic	322		322	322	1,060	969
film plastic	8		8	8	209	184

aluminium cans	0	0	0	0	0
tin cans	20	20	20	69	63
non-ferrous metal	0	0	0	0	0
ferrous metal	0	0	0	0	0
tetrapaks	9	9	9	32	30
wet cell batteries	37	37	37	37	37
E-waste	154	154	154	154	154
glass	0	0	0	0	0
beer bottles	56	56	56	56	56

In addition to the recycling tonnages calculated above, the tonnage of material that ends up in disposal was also calculated using Whitehorse's 2017-2018 waste characterization. The splits in the Whitehorse waste characterization were then scaled up to the entire territory for 2021 using StatsCAN data for overall residential MSW disposed.<sup>lv</sup> Disposal tonnages for 2021 residential PPP can be seen below:

**Table 55: PPP Disposed in the Yukon 2021**

Material Category	Tonnes Disposed (2021)
Paper	780
Glass	220
Metals	540
Plastic	1,270
<b>Total</b>	<b>2,800</b>

To calculate the baseline recycling rate, the recycling tonnes, disposal tonnes, and BCR tonnage were brought together. The results are shown below.

**Table 56: Residential Recovery Rate of PPP at Baseline (2021) in the Yukon**

	Non-BCR Recycled (tonnes)	BCR Recycled (tonnes)	Tonnes Disposed	Total Generated (tonnes)	Recovery Rate
Paper & Cardboard	830	40	780	1,610	52%
Glass	60	320	220	1,760	63%*
Metals	20	170	540	730	26%
Plastic	360	130	1,270	600	28%
Total	1,270	660	2,810	4,700	41%

\*this is a collected figure for glass, as there are no end markets for the material currently in the Yukon

ICI tonnages were included in the calculation of PPP tonnages in the baseline scenario, however the baseline recycling rate does not count the ICI tonnage. Modelled scenarios include this baseline amount, but do not model changes to ICI tonnages; all interventions in the other scenarios are only residential. The total costs for each scenario thus include the baseline amount for the ICI sector.

The assumed material revenues for each PPP material are shown below. Revenues were taken from 2021-2022 averages from Raven Recycling and recyclingmarkets.net.

**Table 57: Assumed Material Revenue**

PPP Material	Revenue per Tonne (\$/tonne)
cardboard	129
mixed waste paper	-6
office paper	155
#1 plastic	176
#2 plastic	550

- <sup>1</sup> OECD Global Forum on the Environment. (2014). *The State of Play on Extended Producer Responsibility (EPR): Opportunities and Challenges*.
- <sup>2</sup> Yukon Government (2020), *Our Clean Future: A Yukon strategy for climate change, energy and a green economy*. <https://yukon.ca/en/our-clean-future-yukon-strategy-climate-change-energy-and-green-economy>.
- <sup>3</sup> Recycle NB. *About Us*. <https://recyclenb.com/about>
- <sup>4</sup> Resource Productivity & Recovery Authority. *Who We Are*. <https://rp-ra.ca/about-us/who-we-are/>
- <sup>5</sup> Miller, Mark and Porter, Jeff. Interview with Eunomia Research & Consulting, Inc. 4 August 2022.
- <sup>6</sup> Ashthorn, Heather, Raven Recycling. Interview with Eunomia Research & Consulting, Inc. 3 August 2022.
- <sup>7</sup> Government of Canada (2022). *Plastics initiatives and regulations*. <https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/reduce-plastic-waste/initiative-regulation.html>.
- <sup>8</sup> Government of Canada (2022). *Single-use Plastics Prohibition Regulations: SOR/2022-138*. <https://www.gazette.gc.ca/rp-pr/p2/2022/2022-06-22/html/sor-dors138-eng.html>.
- <sup>9</sup> Government of Canada (2022). *Development of Minimum Recycled Content Requirements for plastic items – Overview*. <https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/reduce-plastic-waste/recycle-content.html#toc3>
- <sup>10</sup> Government of Canada (2022). *Share your thoughts: Development of a proposed federal plastics registry for producers of plastic products*. <https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/consultations/consultation-registry.html>
- <sup>11</sup> Government of Canada (2022). *Share your thoughts: Development of rules to strengthen the recycling and composting of plastics through accurate labelling*. <https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/consultations/consultation-labelling.html>.
- <sup>12</sup> Yukon. (2021). *Extended Producer Responsibility in the Yukon: Exploration and Implementation Considerations Part 1: Current programs and infrastructure*. <https://yukon.ca/sites/yukon.ca/files/env/env-epr-yukon-part-1.pdf>.
- <sup>13</sup> Yukon. (2021). *Extended Producer Responsibility in the Yukon: Exploration and Implementation Considerations Part 1: Current programs and infrastructure*. <https://yukon.ca/sites/yukon.ca/files/env/env-epr-yukon-part-1.pdf>.
- <sup>14</sup> Yukon Government (2022). *Recycling in the Yukon: 2019-2021*. <https://open.yukon.ca/sites/default/files/recycling-yukon-2019-2021.pdf>.
- <sup>15</sup> Yukon Government (2021). *Extended Producer Responsibility in the Yukon: exploration and implementation considerations – Part 1: Current programs and infrastructure*. <https://yukon.ca/sites/yukon.ca/files/env/env-epr-yukon-part-1.pdf>.
- <sup>16</sup> Yukon Government (2022). *Recycling in the Yukon: 2019-2021*. <https://open.yukon.ca/sites/default/files/recycling-yukon-2019-2021.pdf>.
- <sup>17</sup> Baranova, Nathalia, Yukon Government. Interview with Eunomia Research & Consulting, Inc. 14 July 2022.
- <sup>18</sup> Yukon Government (2021). *Extended Producer Responsibility in the Yukon: exploration and implementation considerations – Part 1: Current programs and infrastructure*. <https://yukon.ca/sites/yukon.ca/files/env/env-epr-yukon-part-1.pdf>.
- <sup>19</sup> Ashthorn, Heather, Raven Recycling. Interview with Eunomia Research & Consulting, Inc. 3 August 2022.
- <sup>20</sup> Yukon Government (2021). *Extended Producer Responsibility in the Yukon: exploration and implementation considerations – Executive Summary*. <https://yukon.ca/sites/yukon.ca/files/env/env-epr-yukon-executive-summary.pdf>.
- <sup>21</sup> OECD Global Forum on the Environment. (2014). *The State of Play on Extended Producer Responsibility (EPR): Opportunities and Challenges*.
- <sup>22</sup> Yukon Government (2020), *Our Clean Future: A Yukon strategy for climate change, energy and a green economy*. <https://yukon.ca/en/our-clean-future-yukon-strategy-climate-change-energy-and-green-economy>.
- <sup>23</sup> Yukon. *Extended producer responsibility (EPR) in the Yukon*. <https://yukon.ca/en/engagements/extended-producer-responsibility-epr-yukon>.
- <sup>24</sup> Yukon. *Learn about Extended Producer Responsibility*. <https://yukon.ca/en/extended-producer-responsibility>.
- <sup>25</sup> Include two communities (Dawson City, Watson Lake)
- <sup>26</sup> Includes seven communities (Carcross, Carmacks, Dawson City, Haines Junction, Teslin, Watson Lake and Whitehorse)
- <sup>27</sup> Includes nine communities (Beaver Creek, Burwash Landing, Destruction Bay, Faro, Mayo, Old Crow, Pelly Crossing, Ross River and Tagish).
- <sup>28</sup> Whitehorse, *Tipping Fees – Updated March 2022*. <https://www.whitehorse.ca/wp-content/uploads/2022/05/2021TippingFees.pdf>
- <sup>29</sup> Morrison Heshfield, 2019. “Assessment of the Impacts of Yukon’s Recycling”
- <sup>30</sup> City of Whitehorse Bylaw 2018-05, *Waste Management Bylaw*. <https://www.whitehorse.ca/wp-content/uploads/2022/06/2018-05-Waste-Management-Bylaw-2022-Schedule-G-Amended.pdf>.
- <sup>31</sup> Product Care Association of Canada. (2022). *British Columbia Paint and Household Hazardous Waste Program Annual Report 2021*. <https://www.productcare.org/app/uploads/2022/06/BC-Paint-HHW-Annual-Report-2021.pdf>.
- <sup>32</sup> Recycle NB. *About Us*. <https://recyclenb.com/about>
- <sup>33</sup> Recycle NB. (2021). *Moving Beyond Waste: Annual Report 2021*. [https://recyclenb.com/storage/files/shares/publications-english/annual-reports/RNB\\_AR\\_2021\\_EN\\_final\\_LR.pdf](https://recyclenb.com/storage/files/shares/publications-english/annual-reports/RNB_AR_2021_EN_final_LR.pdf)
- <sup>34</sup> Resource Productivity & Recovery Authority. (2022). *General Fee-Setting Policy*. <https://rp-ra.ca/wp-content/uploads/FINAL-approved-RPRA-General-Fee-Setting-Policy-2022.pdf>.
- <sup>35</sup> Miller, Mark and Porter, Jeff. Interview with Eunomia Research & Consulting, Inc. 4 August 2022.
- <sup>36</sup> Ashthorn, Heather, Raven Recycling. Interview with Eunomia Research & Consulting, Inc. 3 August 2022.
- <sup>37</sup> Burns, Tamara, Recycle BC. Interview with Eunomia Research & Consulting, Inc. 30 August 2022.
- <sup>38</sup> Lawes, David, BC Used Oil Management Association. Interview with Eunomia Research & Consulting, Inc. 31 August 2022.
- <sup>39</sup> Gugenheimer, Ed, Alberta Recycling Management Authority. Interview with Eunomia Research & Consulting, Inc. 16 August 2022.
- <sup>40</sup> Statistics Canada. (2021). *Census Profile, 2021 Census of Population*. <https://www12.statcan.gc.ca/census-recensement/2021/dp->

[pd/prof/details/page.cfm?Lang=E&SearchText=Yukon&DGUIDlist=2021A000260&GENDERlist=1.2.3&STATISTIClist=1&EADERlist=0](#)

<sup>41</sup> Ontario Regulation 391/21: Blue Box, Resource Recovery and Circular Economy Act (2016).

<https://www.ontario.ca/laws/regulation/210391>

<sup>42</sup> Alberta, Regulated Extended Producer Responsibility programs. <https://www.alberta.ca/regulated-extended-producer-responsibility-programs.aspx#jumplinks-1>

<sup>43</sup> New Brunswick Regulation 2008-54 under the Clean Environment Act (O.C. 2008-180), 2008, Government of New Brunswick.

<https://laws.gnb.ca/en/ShowPdf/cr/2008-54.pdf>.

<sup>44</sup> Ibid.

<sup>45</sup> Recycle NB. (2021), Amendments to the Designated Materials Regulation to Include Packaging and Paper Products (PPP).

[https://recyclenb.com/storage/files/shares/Guidance\\_document\\_FINAL.pdf](https://recyclenb.com/storage/files/shares/Guidance_document_FINAL.pdf).

<sup>46</sup> <https://www.ontario.ca/laws/regulation/r21391>

<sup>47</sup> Stewardship Ontario. Steward Information: Am I a Blue Box Steward? <https://stewardshipontario.ca/steward-information/new-stewards/am-i-a-blue-box-steward/>.

<sup>48</sup> [https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/449\\_2004](https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/449_2004)

<sup>49</sup> Saskatchewan Ministry of Environment. *The Household Packaging and Paper Stewardship Program Regulations and Multi-Material Recycling Program Discussion Paper*. <https://www.retailcouncil.org/wp-content/uploads/2018/08/SK-HPPSPR-MMRP-Discussion-Paper.pdf>.

<sup>50</sup> Saskatchewan Government. (2022). *The Household Packaging and Paper Stewardship Program Regulations: Summary of Proposed Regulatory Changes*. <https://www.saskatchewan.ca/residents/environment-public-health-and-safety/saskatchewan-waste-management/multi-material-recycling-program>

<sup>51</sup> Alberta, Regulated Extended Producer Responsibility programs. <https://www.alberta.ca/regulated-extended-producer-responsibility-programs.aspx>

<sup>52</sup> Alberta Environment and Parks. (2021). EPR for Packaging, Paper Products, Single-Use Plastics, as well as Hazardous and Special Products. <https://your.alberta.ca/19738/widgets/83280/documents/52493>

<sup>53</sup> Yukon Environment Act Part 8, Section 109.01. <https://laws.yukon.ca/cms/images/LEGISLATION/PRINCIPAL/2002/2002-0076/2002-0076.pdf>

<sup>54</sup> Yukon Environment Act Part 8, Section 105.01. <https://laws.yukon.ca/cms/images/LEGISLATION/PRINCIPAL/2002/2002-0076/2002-0076.pdf>

<sup>55</sup> British Columbia Environmental Management Act, Recycling Regulation. B.C. Reg. 449/2004

O.C. 995/2004 [https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/449\\_2004#part2](https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/449_2004#part2)

<sup>56</sup> Noted that Canada Post can only be federally regulated.

<sup>57</sup> Plastics Europe. (2018). *Plastics – The Facts 2018: An Analysis of European Plastics Production, Demand and Waste Data*, by Plastics Europe, 2018, p. 35.

<sup>58</sup> Government of Canada (2022). *Single-use Plastics Prohibition Regulations: SOR/2022-138*. <https://www.gazette.gc.ca/rp-pr/p2/2022/2022-06-22/html/sor-dors138-eng.html>.

<sup>59</sup> Government of Canada (2022). *Development of Minimum Recycled Content Requirements for plastic items – Overview*.

<https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/reduce-plastic-waste/recycle-content.html#toc3>

<sup>60</sup> Government of Canada (2022). *Share your thoughts: Development of a proposed federal plastics registry for producers of plastic products*. <https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/consultations/consultation-registry.html>

<sup>61</sup> Government of Canada (2022). *Share your thoughts: Development of rules to strengthen the recycling and composting of plastics through accurate labelling*. <https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/consultations/consultation-labelling.html>.

<sup>lxii</sup> Yukon Bureau of Statistics. (2021). Population and Dwellings: Census 2021. <https://yukon.ca/sites/yukon.ca/files/ybs/fin-population-and-dwellings-census-2021.pdf>

<sup>lxiii</sup> Yukon Bureau of Statistics, *Populations and Dwellings – Census 2021*. <https://yukon.ca/sites/yukon.ca/files/ybs/fin-population-and-dwellings-census-2021.pdf>

<sup>lxiv</sup> Estimated amount provided by Raven Recycling. A further breakdown is not available.