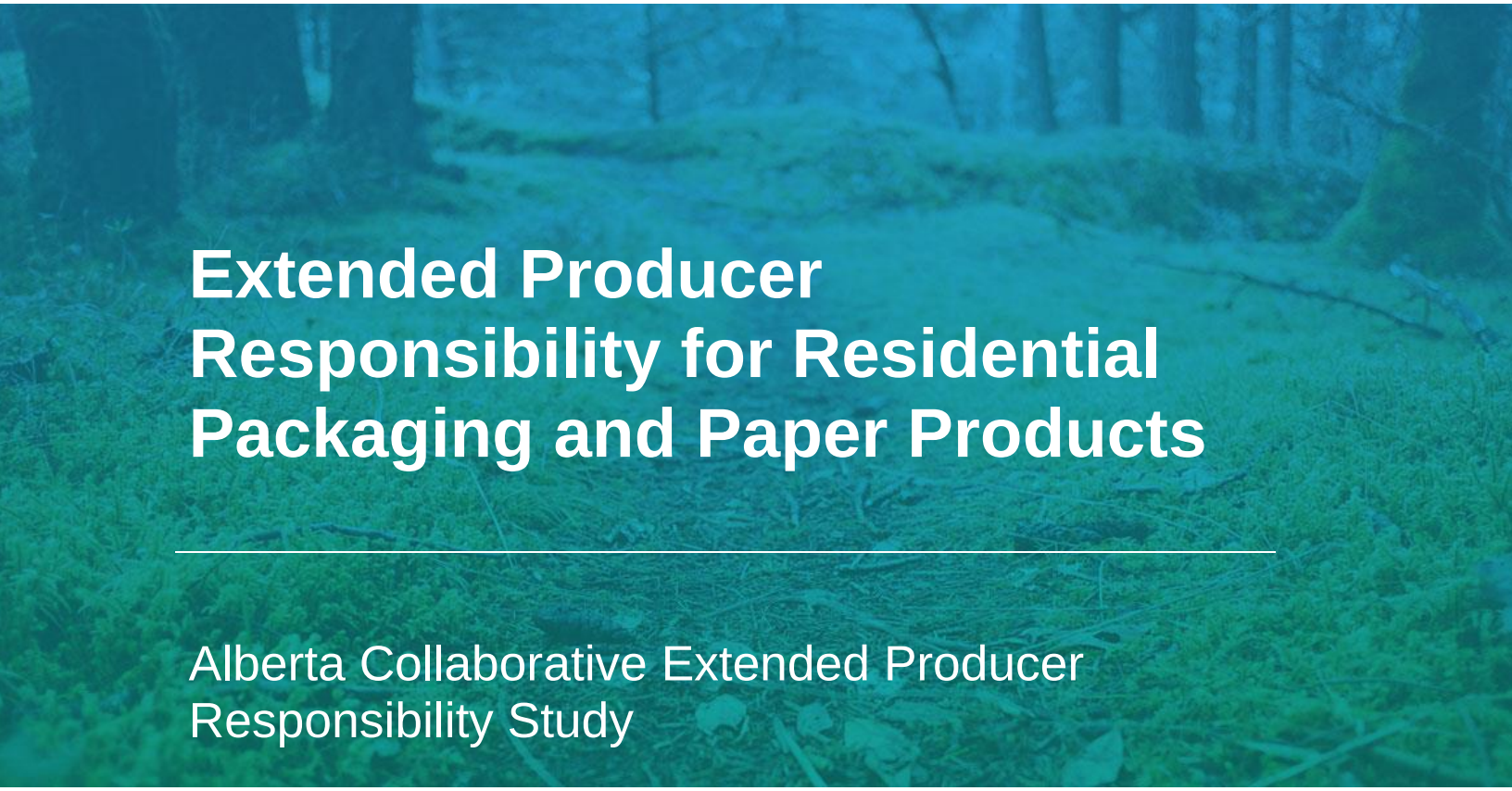

Extended Producer Responsibility for Residential Packaging and Paper Products

Alberta Collaborative Extended Producer Responsibility Study

December 6, 2019

Report for Alberta Urban Municipalities Association, Cities of Edmonton, Calgary and the Canadian Stewardship Services Alliance

Prepared by Dr. Dominic Hogg, Sarah Edwards, Sydnee Grushack, John Carhart, Sanan Hajiyev, Maria Kelleher, Samantha Millette, Geoff Love, Stacey Schaub-Szabo, Tammy Schwass and Salah Borno

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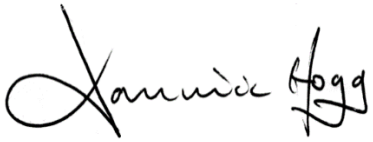

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Version Control Table

Version	Date	Author	Description
FINAL	12/06/19	Sydnee Grushack	Client Approved

Executive Summary

Eunomia Research & Consulting (Eunomia), along with its sub-contractors Kelleher Environmental, Love Environment, S-Cubed Environmental and Morrison Hershfield, has been contracted by the Alberta Urban Municipalities Association (AUMA), the Cities of Edmonton and Calgary and the Canadian Stewardship Services Alliance (CSSA) to carry out an extended producer responsibility (EPR) study for packaging and paper products (PPP) to meet the following key objectives:

- Outline a vision for EPR for residential PPP in Alberta which includes high level assumptions about a future state for the purpose of informing and consulting with key stakeholders;
- Provide an overview of the current state of the residential PPP recycling system and supply chains and their related costs across the province of Alberta; and
- Categorize and detail the potential impacts of a future state, as described in the vision, with an EPR system that outlines the potential benefits, challenges and risks in relation to the major stakeholders.

EPR is one way of facilitating Alberta's transition to a circular economy, where materials and products are used as long as possible and are recirculated into the economy through recycling, refurbishing or repurposing.[1] EPR is a policy approach under which producers are given a responsibility – financial and/or operational – for the end-of-life management of post-consumer products. Assigning such responsibility can, in principle, provide incentives to prevent waste at the source, promote product design for the environment and support the achievement of public recycling and materials management goals.[2]

To achieve such a system in Alberta, it is necessary to create an outcomes-based EPR regulatory framework that:

1) uses audited data to enable insight that will help drive continuous innovation and improvement in packaging and system design, driving higher waste reduction and recycling rates, which are necessary for a circular economy;

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[1]Canadian Council of Ministers of the Environment. (2019). *Canada-Wide Action Plan on Zero Plastic Waste - Phase 1.* <https://www.ccme.ca/files/Resources/waste/plastics/1289_CCME%20Canada-wide%20Action%20Plan%20on%20Zero%20Plastic%20Waste_EN_June%2027-19.pdf>

[2] OECD Global Forum on the Environment. (2014). *The State of Play on Extended Producer Responsibility (EPR): Opportunities and Challenges* <https://www.oecd.org/environment/waste/Global%20Forum%20Tokyo%20Issues%20Paper%2030-5-2014.pdf>

2) allows municipalities the flexibility to continue to provide PPP services complementary to garbage and organics services;
3) provides producers with economic incentives and sufficient flexibility to establish an effective and efficient PPP reverse supply-chain in Alberta;
4) provides regulators and producers with the flexibility to adapt to change over time without having to resort to prescriptive regulatory amendments, allowing for quick adaptation to market and environmental conditions; and
5) establishes strong governance and an oversight organization that has sufficient power to address non-compliance.

This report compares the triple bottom line benefits associated with a future state where PPP services are delivered under an EPR system in line with current levels of service provision. It also outlines what will need to be considered when moving to, and implementing, a residential PPP EPR system, and how the roles and responsibilities of existing stakeholders will need to change to ensure success.

E.1.1 Future State

Vision

To map the path to a future state for residential PPP services under EPR, a guiding vision for the future state was developed through stakeholder engagement, defined as one that:

- is easy for residents to use and understand;
- is convenient, consistent and equitable across the province;[3]
- provides municipalities with the option to be involved in the collection of PPP;
- sets outcome-based performance targets;
- transfers responsibility for collection, post-collection and processing to producers, thus enabling producers to take responsibility and control of the end-of-life management of the PPP that they supply into the marketplace and protect municipalities from material risk;
- is operated and financed by producers as a reverse supply-chain for the collection, management and reutilization of PPP in a circular economy;
- incorporates considerations for producers that supply quantities of PPP below an established threshold;

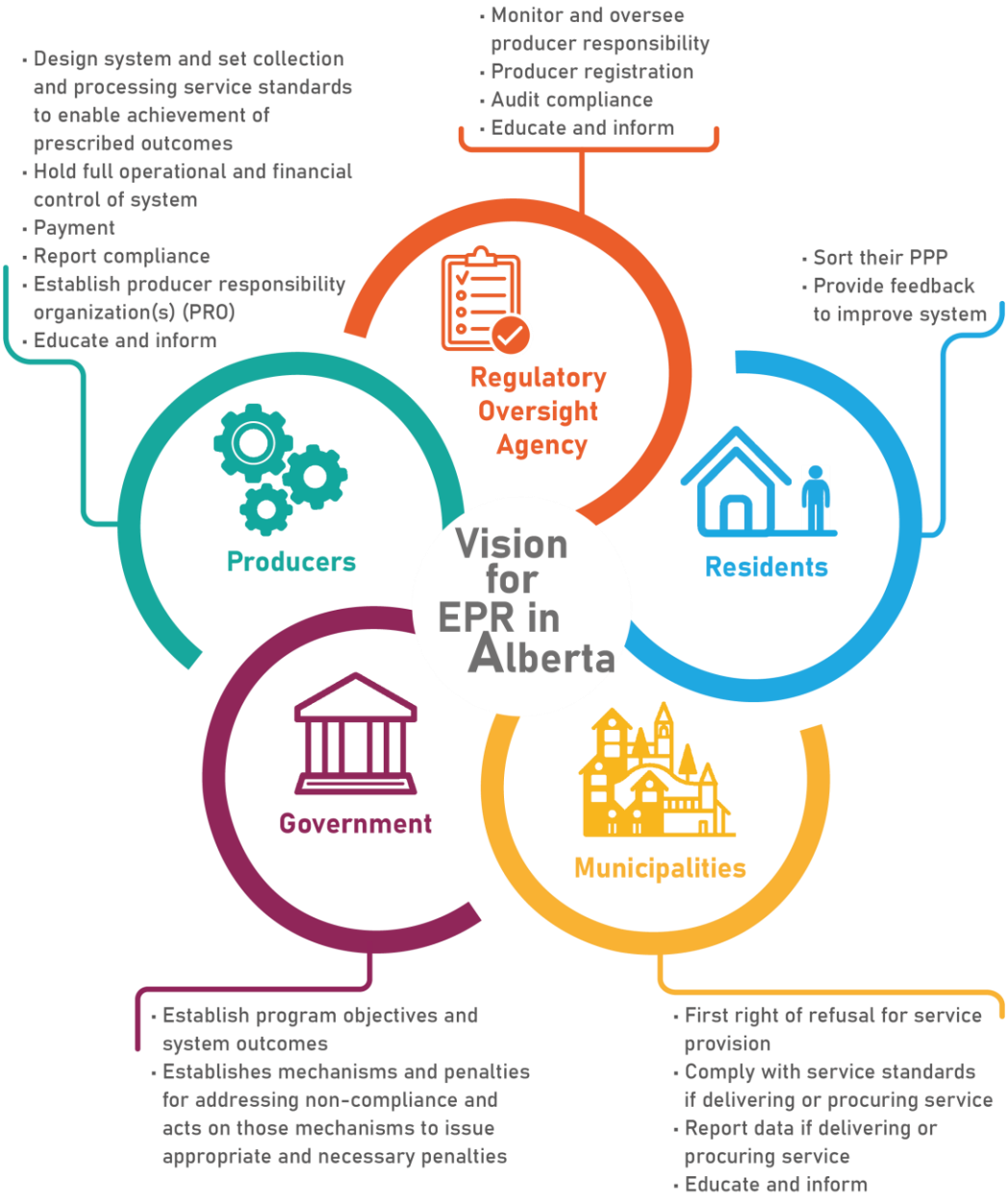
[3] For instance, standardized PPP materials collected for recycling

- ensures improved environmental outcomes and drives a circular economy including:
    - increased waste diversion;
    - increased recycling of PPP;
    - reduced contamination and increase in quality of PPP collected and processed;
    - potential reduction in packaging placed on the market;
    - potential improvement in packaging design if Alberta harmonizes with other Canadian EPR frameworks to allow for ease of recycling, and re-introduction of the recycled material into a circular economy model;
    - improved tracking and transparency regarding the end-fate of PPP materials; and
- adds value to the Alberta economy.

Roles and Responsibilities

Under EPR the roles and responsibilities of the different stakeholders processing will change. These changes are summarized in Figure E 1 and discussed further in Section 3.0.

Figure E 1: Roles and Responsibilities of Stakeholders



Source: Eunomia

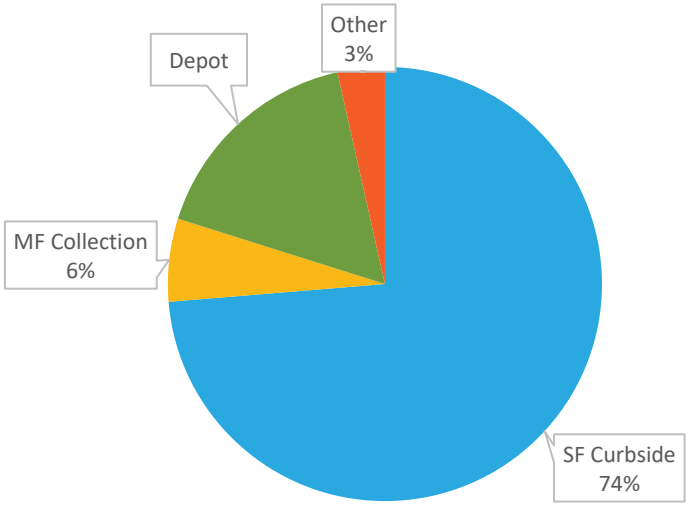
E.1.2 Current State Assessment

Access to PPP collection services varies across the province. While 74% of single-family (SF) households across Alberta are estimated to have access to curbside services for recycling, only

43% of multi-family (MF) households have collection services provided or managed by the municipality. The relatively high level of access for SF households to curbside services is attributable to the fact that 80% of Albertans live in either cities or towns.[4] Albertans who live outside of urban areas are less likely to have access to curbside garbage collection and/or recycling service and may be reliant on permanent or mobile depots.

Approximately 197,600 tonnes of PPP were collected for recycling in Alberta in 2018, with an estimated 163,200 tonnes recycled.[5] The recycled number is lower than the collected number, as the collected tonnes include non-target materials (contamination or residuals) that have to be removed through sorting processes prior to recycling. Figure E 2 summarizes the tonnes of material collected by method of collection.

Figure E 2: Percentage of PPP Collected in Alberta in 2018 by Collection Method



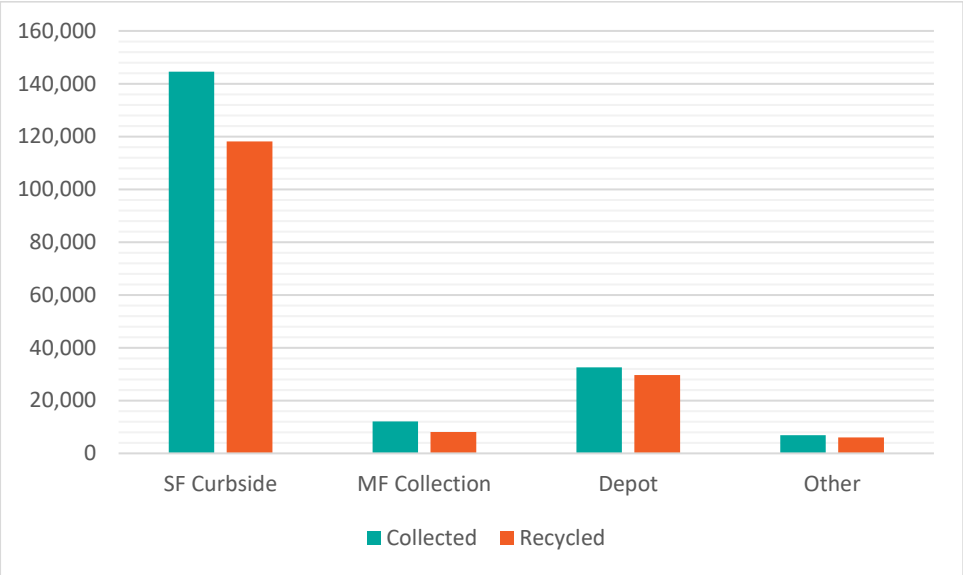
Source: Survey responses and Eunomia calculations

Across all municipality types, SF curbside collected the most tonnes per household annually. Figure E 3 summarizes the average tonnes collected and recycled per household by collection method.

[4] 2018 Municipal Affairs Population List

[5] Calculation based on collection data and provided contamination or residue rates.

Figure E 3: Tonnes of PPP Collected and Recycled per Household by Collection Method in 2018[6]



Source: Eunomia calculations

The total cost of collecting and processing 197,600 tonnes of PPP from households in Alberta is estimated to be approximately $107.0 million, as shown in Table E 1.

Table E 1: Total Cost of Collecting and Recycling PPP from Households in Alberta in 2018

Municipality Type	Total ($ million)
Large Municipalities[7]	48.9
Medium Municipalities[8]	31.7
Small Municipalities[9]	15.1
Other Municipality & Community Types[10]	11.3

[6] Includes PPP costs for eco-centres and semi-annual big bin recycling events.

[7] For the purposes of this study, cities with populations of over 500,000

[8] For the purposes of this study, cities, towns and specialized municipalities with populations of between 10,000 and 500,000.

[9] For the purposes of this study: towns, specialized municipalities, villages and summer villages with less than 10,000 residents.

[10] For the purposes of this study, this includes: special areas, municipal districts, regional waste authorities, improvement districts, First Nations, Metis settlements.

Municipality Type	Total ($ million)
Total	107.0

Source: Eunomia calculations

E.1.3 Triple Bottom Line Assessment

Using the vision as a guide, the following assumptions were developed in order to assess the potential triple bottom line benefits of the future state of EPR for residential PPP in Alberta:

1) All SF households in large municipalities will retain curbside collection services;
2) All MF households in large municipalities will be guaranteed collection services through the EPR system;
3) All SF households in medium and small municipalities that already have a curbside garbage service will have curbside recycling service;
4) All MF households in medium and small municipalities with municipality-managed garbage service will receive PPP recycling collection service; and
5) All depots and curbside programs in large, medium, small and other municipality and community types will accept the same range of material for recycling.

The level of service described in the assumptions above is projected to result in the following benefits:

- An additional approximate 29,300 tonnes of PPP collected (for a total of 226,900 tonnes), of which 20,900 tonnes would be recycled, increasing the total tonnes recycled from 163,200 to 184,100;
- An additional estimated $4.7 million of avoided disposal and collection costs, reducing costs to taxpayers;
- About 219 full-time equivalent (FTE)[11] direct, indirect and induced jobs are created, resulting in a total of 1,581 jobs created by recycling in Alberta;[12] and
- An additional 71,900 tonnes of CO_2e avoided, increasing the total tonnes of CO_2e avoided to approximately 541,600 tonnes[13] (equivalent to taking over 120,300 passenger vehicles off the road).

[11] Proportionate to increase in tonnes recycled. Does not incorporate potential reductions in tonnages associated with garbage collection. An assessment of efficiencies in garbage collection would be required to calculate this potential reduction.
[12] Based on the collection and recycling of tonnages of PPP in the future state.
[13] Calculated using Environment and Climate Change Canada's GHG Model.

A further comparison of the benefits, risks and challenges to different stakeholders under both the current and future state is available in Section 5.2.

Table E 2 summarizes the future costs of the system based on the collection and processing of 226,900 tonnes of PPP. The future costs are an extrapolation of existing costs, although it is expected that a producer financed and operated model will be able to drive efficiencies through economies of scale and consolidation of activities. As such, this is likely to be a high estimation of future costs.

Table E 2: Projected Annual Costs for Recycling Across Municipality Types in the Future State[14]

Municipality Type	Total ($ million)
Large Municipalities	53.1
Medium Municipalities	35.8
Small Municipalities	18.3
Other Municipality & Community Types	12.1
Total	119.3

Source: Eunomia calculations

Of the 226,900 tonnes of material collected, 184,100 tonnes of PPP is expected to be recycled and diverted from the residential garbage stream, reducing costs by an estimated $38.2 million per year in collection and disposal across the province.

It is estimated that approximately 1,362 FTE direct, indirect and induced jobs were created as a result of the recycling of residential PPP in Alberta in 2018. Under an EPR system, this is expected to rise to over 1,581 FTE. The gross value added (GVA), which is the contribution the sector makes to Alberta's GDP, was estimated to be $132.4 million in 2018 and is expected to rise to approximately $148.4 million in the future state.

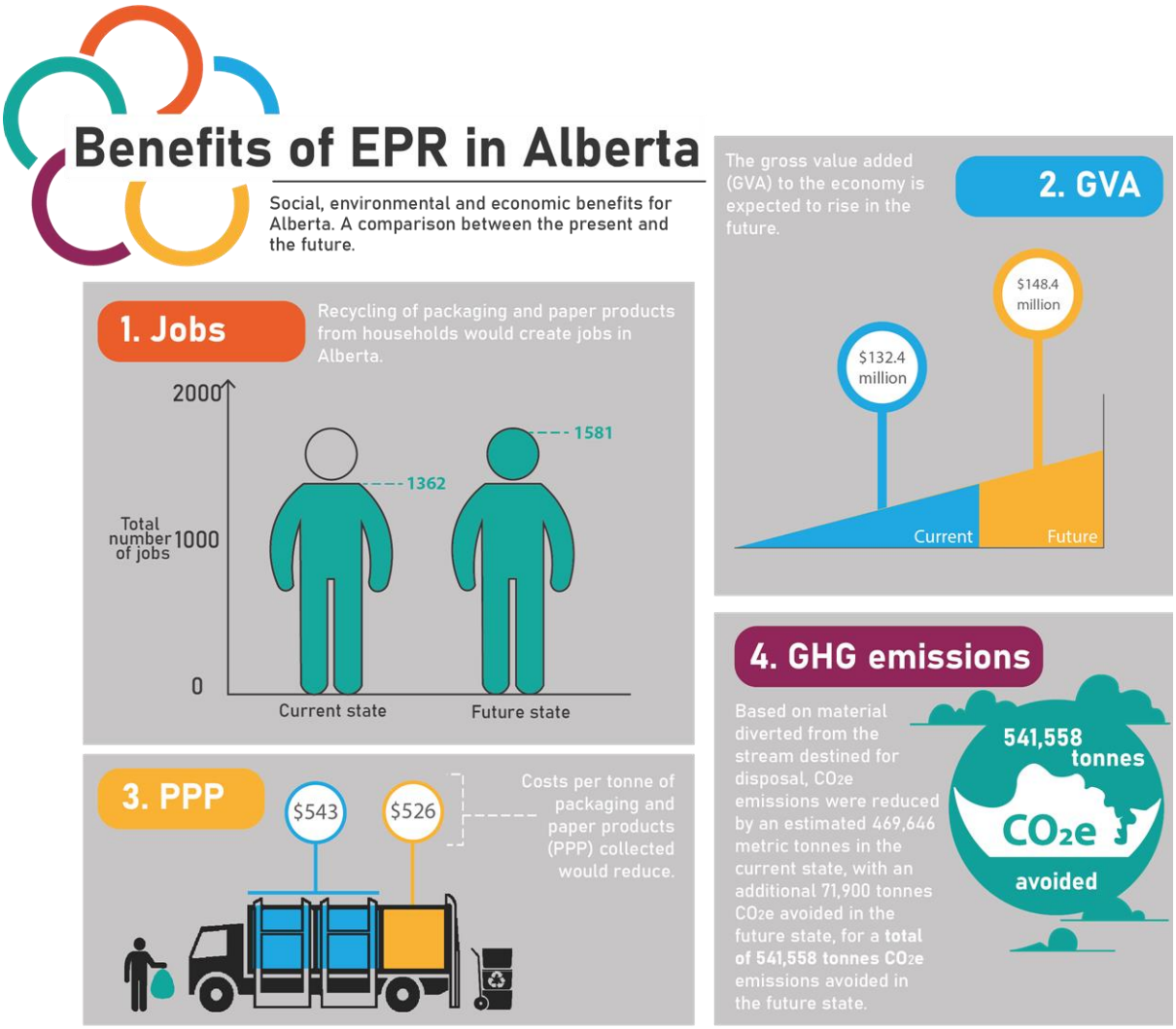
PPP recycling in Alberta in 2018 resulted in a reduction of an estimated 469,700 metric tonnes of CO_2e emissions,[15] with an additional 71,900 tonnes CO_2e predicted to be avoided in the future state, resulting in 541,600 tonnes CO_2e emissions total tonnes avoided.

[14] Projected costs are calculated according to current market conditions and do not include system efficiencies through more centralized provision of services. Calculating these potential efficiencies would require an assessment of current system efficiency, which was outside the scope of this study.

[15] Calculated using Environment Canada and Climate Change's GHG Model.

As described above, the transition to EPR in accordance with the vision will produce many benefits for Albertans; these are summarized in Figure E 4.

Figure E 4: Benefits of Future State Under EPR Summary[16]



Source: Eunomia calculations

[16] Projected costs are calculated according to current market conditions and do not include system efficiencies through more centralized provision of services. Calculating these potential efficiencies would require an assessment of current system efficiency, which was outside the scope of this study.

Table E 3 provides an overview of the changes in costs and benefits from the current to future state.

Table E 3: Change in Annual Costs and Benefits from Current State to Future State

Category	Current	Future	Change (%)
Cost per Tonne Collected	$543	$526	-3.0
Jobs (FTE)	1,362	1,581	+16.1
GVA	$132.4 million	$148.4 million	+12.1
CO_2e Emissions Reduced	469,700	541,600	+15.3
Total Tonnes Recycled	163,200	184,100	+12.8

Source: Eunomia calculations

Contents

List of Tables, Figures and Boxes

Glossary

Below are the definitions of terms as they are used throughout this report.

Aseptic Container – a tetrahedron-shaped plastic-coated paper carton, usually used to package liquids like milk and juice or processed food like vegetables and preserved fruits, often referred to by the brand name "Tetra Pak."

Circular Economy - an economy in which participants strive to (a) minimize the use of raw materials, (b) maximize the useful life of materials and other resources through resource recovery, and (c) minimize waste generated from products and packaging at end-of life.[17]

Depot – a staffed or unstaffed facility in which residents' drop-off their PPP material for recycling; may be referred to by several other terms across Alberta, including: recycling centre, eco-centre, ecostation, drop-off centre.

Expanded Polystyrene (EPS) - a rigid cellular plastic foam found in a multitude of shapes and applications, often referred to by the brand name "Styrofoam."

Extended Producer Responsibility (EPR) – a policy approach in which a producer's responsibility, physical and/or financial, for a product is extended to the post-consumer stage of a product's life cycle. EPR shifts responsibility upstream in the product life cycle to the producer and away from municipalities. As a policy approach it provides incentives to producers to incorporate environmental considerations in the design of their products. EPR also shifts the historical public sector tax-supported responsibility for some waste to the individual brand owner, manufacturer or first importer.

Free-riding – when one firm (or individual) benefits from the actions and efforts of another without paying or sharing the costs.[18]

High-density Polyethylene (HDPE) – a strong, durable, lightweight, and chemically resistant plastic material popular for a variety of applications, including milk jugs. Coded as plastic resin #2.

[17] https://www.ontario.ca/laws/statute/16r12#BK1

[18] Canadian Council of Ministers for the Environment. (2007). Analysis of the Free-Rider Issue in Extended Producer Responsibility Programs. <https://www.ccme.ca/files/Resources/waste/extended/free_riders_1.0_1380_e.pdf>

Industrial, Commercial, and Institutional (ICI) – a waste-generating sector. The ICI sector includes hospitals, hotels and motels, office buildings, educational institutions, and large manufacturing establishments.

Large Municipalities – for the purposes of this study: cities with populations of over 500,000.

Low-density Polyethylene (**LDPE) –** a soft, flexible, lightweight plastic material. It is often used for sandwich bags and cling wrap. Coded as plastic resin #4.

Material Recovery Facility (MRF) – an establishment primarily engaged in sorting mixed recyclable materials into distinct categories and preparing them for shipment.[19]

Medium Municipalities – for the purposes of this study: cities, towns and specialized municipalities with populations of between 10,000 and 500,000.

Multi-family (MF) Household – for the purposes of this study, MF households were classified according to census categories that include: apartment in a building that has five or more stories; apartment or flat in duplex; apartment in a building that has fewer than five stories.[20]

Organics - organic waste refers to biodegradable, compostable waste of plant or animal origin from residential or ICI sources. Examples include food scraps, grass clippings and garden waste and sometimes soiled paper products (e.g., tissue, paper towels), boxboard, and animal or human waste.[21]

Packaging and Paper Products (PPP) – packaging and paper materials designated by provincial regulation as PPP. This may include PPP generated by both the residential and ICI sectors (e.g., primary packaging, transport packaging, printed and non-printed paper). The current list of designated materials varies nationally.[22] This study is only concerned with residential PPP.

Polyethylene Terephthalate (PET) – a clear, strong, and lightweight plastic that is widely used for packaging foods and beverages, especially convenience-sized soft drinks, juices and water. Coded as plastic resin #1.

Polypropylene (PP) – a thermoplastic used in a variety of applications to include packaging for consumer products, like yogurt pots and margarine containers and many plastic bottle caps. Coded as plastic resin #5.

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[19] Government of Canada. Canadian Industry Statistics. http://www.opic.ic.gc.ca/app/scr/app/cis/summary-sommaire/56292?=undefined&wbdisable=true

[20] Based on 2016 Census categories, as reported on Statistics Canada.

[21] Giroux Environmental Consulting. (2014). State of Waste Management in Canada. https://www.ccme.ca/files/Resources/waste/wst_mgmt/State_Waste_Mgmt_in_Canada%20April%202015%20revised.pdf

[22] Abridged definition from Recycling Council of Alberta: https://recycle.ab.ca/about/public-policy/

Polystyrene (PS) – a transparent thermoplastic that is found as both a typical solid plastic as well as in the form of a rigid foam material. Often used for producing disposable cutlery and dinnerware and coded as plastic resin #6.

Polyvinyl Chloride (PVC) – a common thermoplastic used in construction and generally known for its hardness. Coded as plastic resin #3.

Primary Data – includes direct interviews, data from direct first-hand sources and other primary documents.

Processor – parties that provide services that may include: sorting, counting; weighing; measuring; controlling; surveying, processing and verifications. They may be responsible for scrap buying/selling, overseas shipping and brokering, and materials transformation.

Producer – a producer is an organization or company that is a resident, and a brand owner, first importer or franchisor that supplies designated PPP to consumers in a province where stewardship obligations have been regulated (unless the organization is exempted from these regulations)[23,24]. Producers finance PPP programs throughout Canada under EPR legislation. Many retailers and brand owners are designated producers in most provinces because they sell products into the province with packaging. The definition of "producer" generally includes de minimis thresholds to relieve small businesses from any EPR fee burden.

Producer Responsibility Organization (PRO) – the entity (usually a not-for-profit organization) designated by a producer or producers to act on their behalf to administer an EPR or product stewardship program. In Canada, a PRO may also be referred to as a "stewardship organization," an "industry funding organization" or a "delegated administrative organization."[25]

Recycled – for the purposes of this study, calculations are based on PPP collection data and provided contamination or residue rates. A more precise definition of recycling is recommended for the future in Section 3.1.1.

Other Municipality & Community Types - for the purposes of this study, this includes: special areas, municipal districts, regional waste authorities, improvement districts, First Nations, Metis settlements.

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[23]Canadian Stewardship Services Alliance. (2019). Helping Businesses Meet Their Packaging & Paper Product Recycling Obligations in Canada. http://guidebook.cssalliance.ca/wp-content/uploads/2019/03/CSSA-Guidebook_Updated-March-2019.pdf

[24] Recycle BC. (2019). Packaging and Paper Product Extended Producer Responsibility Plan – Revised June, 2019. http://recyclebc.ca/wp-content/uploads/2019/07/RecycleBCStewardshipPlan_16July2019.pdf

[25] Environment Canada (2019). Introduction to extended producer responsibility. <http://ec.gc.ca/gdd-mw/default.asp?lang=En&n=9D7CBB1C-1466-4A7D-98E5>

Secondary Data – involves primarily internet research, including: municipality websites, census information and other publicly-available sources.

Single-family (SF) Household – for the purposes of this study, SF households were classified according to census categories that include: single-detached house; semi-detached house; row house; other single-attached house.[26]

Small Municipalities – for the purposes of this study: towns, specialized municipalities, villages and summer villages with less than 10,000 residents.

[26] Based on 2016 Census categories, as reported by Statistics Canada.

1.0 Introduction and Overview of Approach

1.1 Introduction

Eunomia Research & Consulting (Eunomia), along with its sub-contractors Kelleher Environmental with Love Environment, S-Cubed Environmental and Morrison Hershfield, have been tasked by the Alberta Urban Municipalities Association (AUMA), the Cities of Edmonton and Calgary and the Canadian Stewardship Services Alliance (CSSA) to carry out an extended producer responsibility (EPR) study for packaging and paper products (PPP) to meet the following key objectives:

- Outline a vision for EPR for residential PPP in Alberta which includes high level assumptions about a future state for the purpose of informing and consulting with key stakeholders;
- Provide an overview of the current state of the residential PPP recycling system and supply chains and their related costs across the province of Alberta; and
- Detail the potential impacts of a future state EPR system, as described in the vision, including the potential benefits, challenges and risks to major stakeholders.

EPR is defined by the Canadian Council of Ministers of the Environment (CCME) as:

> *"a policy approach in which a producer's responsibility, physical and/or financial, for a product is extended to the post-consumer stage of a product's life cycle. EPR shifts responsibility upstream in the product life cycle to the producer and away from municipalities. As a policy approach it provides incentives to producers to incorporate environmental considerations in the design of their products. EPR also shifts the historical public sector tax-supported responsibility for some waste to the individual brand owner, manufacturer or first importer."*[27]

EPR is one way of facilitating Alberta's transition to a circular economy, where materials and products are used as long as possible and are recirculated into the economy through recycling, refurbishing or repurposing.[28]

This report is organized as follows:

[27] Canadian Council of Ministers of the Environment (October 2009) Canada-wide Action Plan for Extended Producer Responsibility. https://www.ccme.ca/files/current_priorities/waste/pn_1499_epr_cap_e.pdf

[28] Canadian Council of Ministers of the Environment (2019). Canada-Wide Action Plan on Zero Plastic Waste – Phase 1. https://www.ccme.ca/files/Resources/waste/plastics/1289_CCME%20Canada-wide%20Action%20Plan%20on%20Zero%20Plastic%20Waste_EN_June%2027-19.pdf

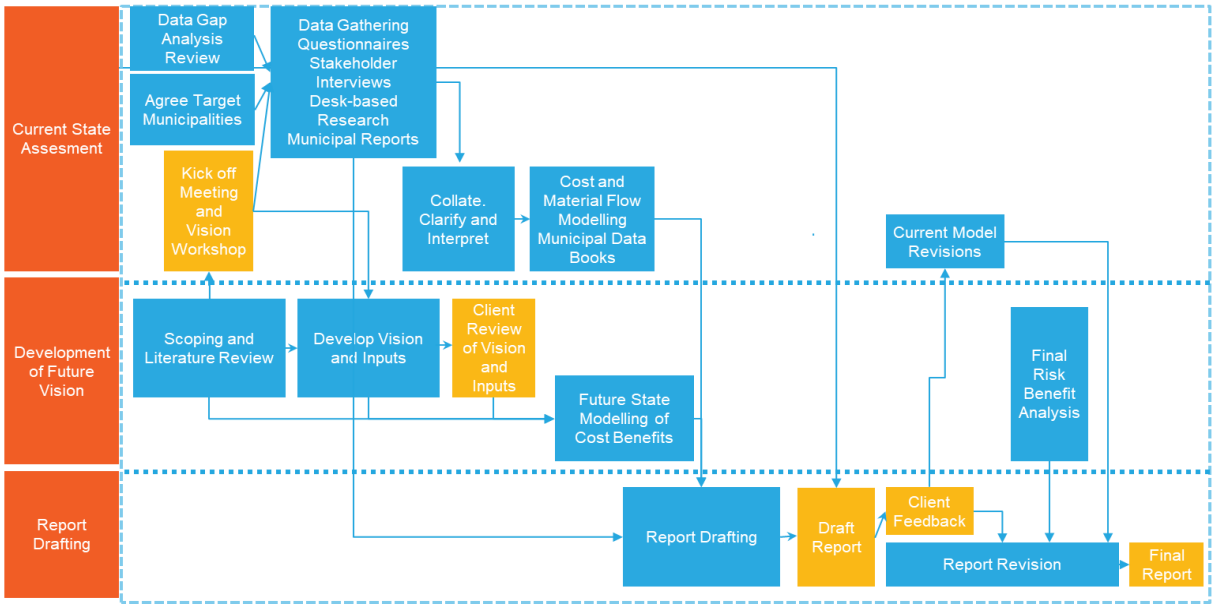
- Section 2.0 outlines the vision for the future state, and touches on the core roles and responsibilities of the different stakeholders and the key elements under EPR;
- Implementation considerations for EPR in Alberta are detailed in Section 3.0;
- Section 4.0 provides an in-depth analysis of the current state of recycling in Alberta. A province-wide overview is provided before the analysis for each municipality category is detailed. Each of these sections include a general discussion of the municipalities, their bylaws, collection services and accessibility across single-family (SF) households, multi-family (MF) households, and depots as well as a discussion of processing.
    - The provincial overview is provided in Section 4.2;
    - Large Municipalities in Section 4.3;
    - Medium Municipalities in Section 4.4;
    - Small Municipalities in Section 4.5; and
    - Other Municipality & Community Types in Section 4.6.
- Section 5.0 provides an assessment of the triple bottom line benefits, including number of jobs created, environmental benefits and a stakeholder impact assessment related to the future state vision and additional future considerations.

Eunomia consulted with the Alberta Collaborative Extended Producer Responsibility Study project team and governance committee in order to craft the vision around which the future state was modelled. The current state details the statistics for the present-day reality of recycling in Alberta in order to present a comparison for analysis of the necessary steps to achieve the future state of recycling, with a robust EPR system, in Alberta.

1.2 Overview of Approach

Figure 1-1 provides an overview of the approach taken to deliver the study objectives. The future vision was developed in collaboration with the project team at the same time as data was gathered and analyzed to determine the current state of residential recycling in Alberta. The future state vision and current state assessment were then used to estimate the triple bottom line benefits and comment on the impact of EPR on key stakeholders including municipalities and First Nation communities, the waste management industry, non-governmental organizations, producers, provincial regulators and consumers.

Figure 1-1: Study Methodology

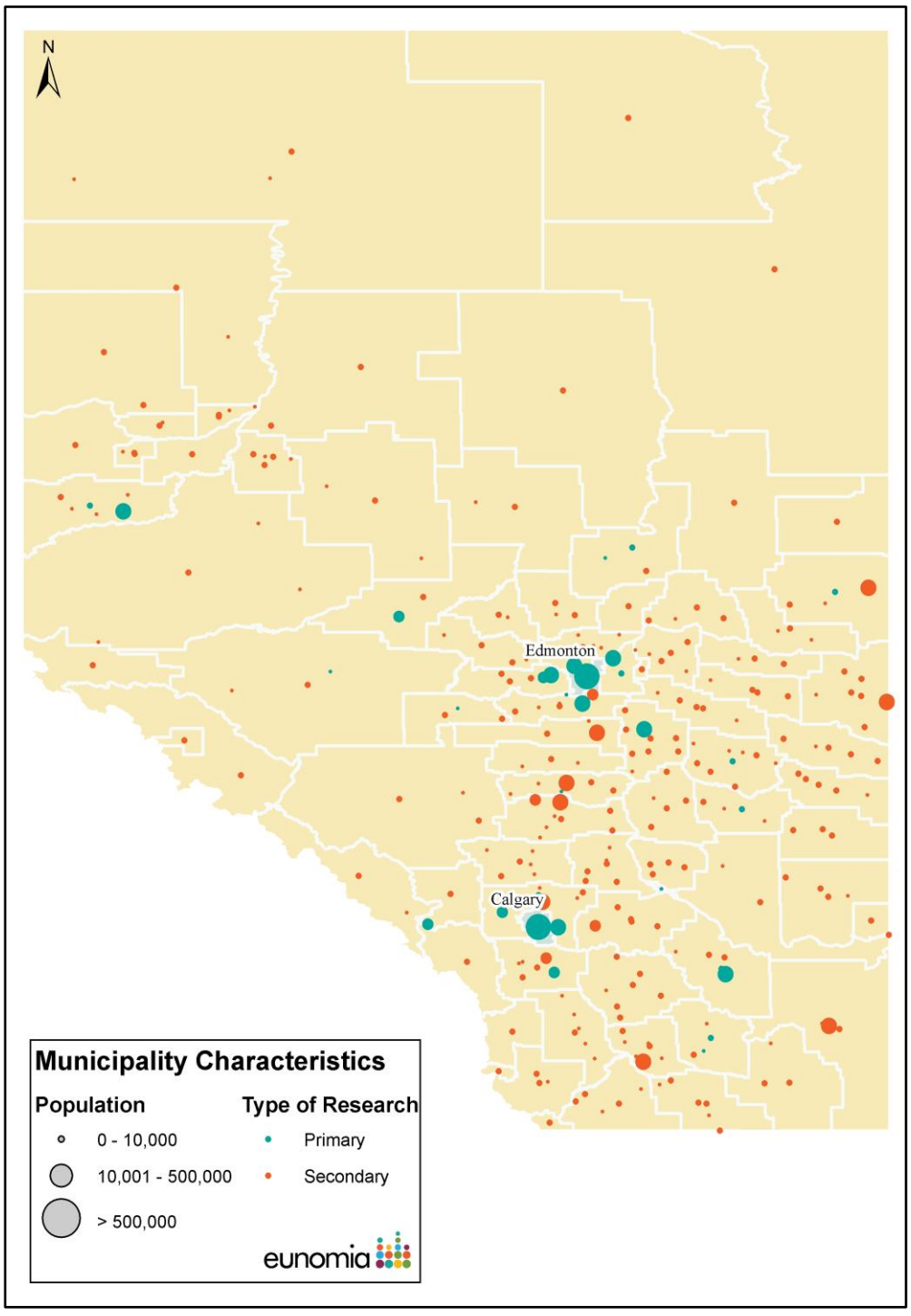


Source: Eunomia

In order to conduct the analysis, primary data was requested from almost 100 municipalities and received from 31 municipalities. Secondary data was collected from 101 additional municipalities. The primary survey data covered 69% of the Alberta population. The map in Figure 1-2 shows the communities from which data was gathered. In addition to the primary and secondary data gathered specifically for this study, data gathered through the *Quantifying the Economic Value of Alberta's Recycling Program* study was also integrated.[29] For environmental benefits, we used collection contamination rates as well as MRF contamination rates to account for losses of material before being recycled.

[29] Eunomia Research & Consulting Inc and Kelleher Environmental. (2019). Quantifying the Economic Value of Alberta's Recycling Programs. https://recycle.ab.ca/wp-content/uploads/2019/07/RCA_Economic_Analysis_Report_Final.pdf

Figure 1-2: Data Collection from Municipalities Across Alberta



Source: Eunomia

2.0 Future State Vision

EPR is one way of facilitating Alberta's transition to a circular economy, where materials and products are used as long as possible and are recirculated into the economy through recycling, refurbishing or repurposing.[30] The Canadian Council of Ministers of the Environment (CCME) defines EPR as:

> *"a policy approach in which a producer's responsibility, physical and financial, for a product is extended to the post-consumer stage of a product's life cycle. EPR shifts responsibility upstream in the product life cycle to the producer and away from municipalities. As a policy approach it provides incentives to producers to incorporate environmental considerations in the design of their products. EPR also shifts the historical public sector tax-supported responsibility for some waste to the individual brand owner, manufacturer or first importer."*[31]

To achieve such a system in Alberta, it is necessary to create an outcomes-based residential PPP EPR framework that:

1) uses audited data to enable insight that will help drive continuous innovation and improvement in packaging and system design, driving higher waste reduction and recycling rates, which are necessary for a circular economy
2) allows municipalities the flexibility to continue to provide residential PPP services and complementary to garbage and organics services;
3) provides producers with economic incentives and sufficient flexibility to establish an effective and efficient residential PPP reverse supply-chain;
4) provides regulators and producers with the flexibility to adapt to change over time without having to resort to prescriptive regulatory amendments, allowing for quick adaptation to market and environmental conditions; and
5) establishes strong governance and an oversight organization that has sufficient power to address non-compliance.

[30]Canadian Council of Ministers of the Environment. (2019). Canada-Wide Action Plan on Zero Plastic Waste – Phase 1. https://www.ccme.ca/files/Resources/waste/plastics/1289_CCME%20Canada-wide%20Action%20Plan%20on%20Zero%20Plastic%20Waste_EN_June%2027-19.pdf

[31] Canadian Council of Ministers of the Environment. (October 2009). Canada-Wide Action Plan for Extended Producer Responsibility.https://www.ccme.ca/files/current_priorities/waste/pn_1499_epr_cap_e.pdf

If implemented correctly, EPR is an effective mechanism to improve recycling rates, reduce litter, incentivize efficiency, and reduce costs for end-of-life management of residential PPP. An outcomes-based approach provides producers with flexibility on how to design and implement the system while encouraging innovation and continuous improvement in striving to meet prescribed performance objectives in the most cost effective and efficient manner possible.

2.1 Vision for EPR-based PPP Recycling in Alberta

Based on the feedback received by stakeholders during a visioning workshop held on July 30, 2019, along with information provided by project stakeholders following the visioning workshop (attendees and points of discussion provided in Appendix A.1.0), a vision for a made-in-Alberta EPR residential PPP recycling system has been identified.

A successful and effective residential PPP EPR system in the province of Alberta is one that:

- is easy for residents to use and understand;
- is convenient, consistent and equitable across the province;[32]
- provides municipalities with the option to be involved in the collection of PPP;
- sets outcome-based performance targets;
- transfers responsibility for collection, post-collection and processing to producers, thus enabling producers to take responsibility and control of the end-of-life management of the PPP that they supply into the marketplace and protect municipalities from material risk;
- is operated and financed by producers as a reverse supply-chain for the collection, management and reutilization of PPP in a circular economy;
- incorporates considerations for producers that supply quantities of PPP below an established threshold;
- ensures improved environmental outcomes and drives a circular economy including:
    - increased waste diversion;
    - increased recycling of PPP;
    - reduced contamination and increase in quality of PPP collected and processed;
    - potential reduction in packaging placed on the market;

[32] For instance, standardized PPP materials collected for recycling

    - potential improvement in packaging design if Alberta harmonizes with other Canadian EPR frameworks to allow for ease of recycling, and re-introduction of the recycled material into a circular economy model;
    - improved tracking and transparency regarding the end-fate of PPP materials; and
- adds value to the Alberta economy.

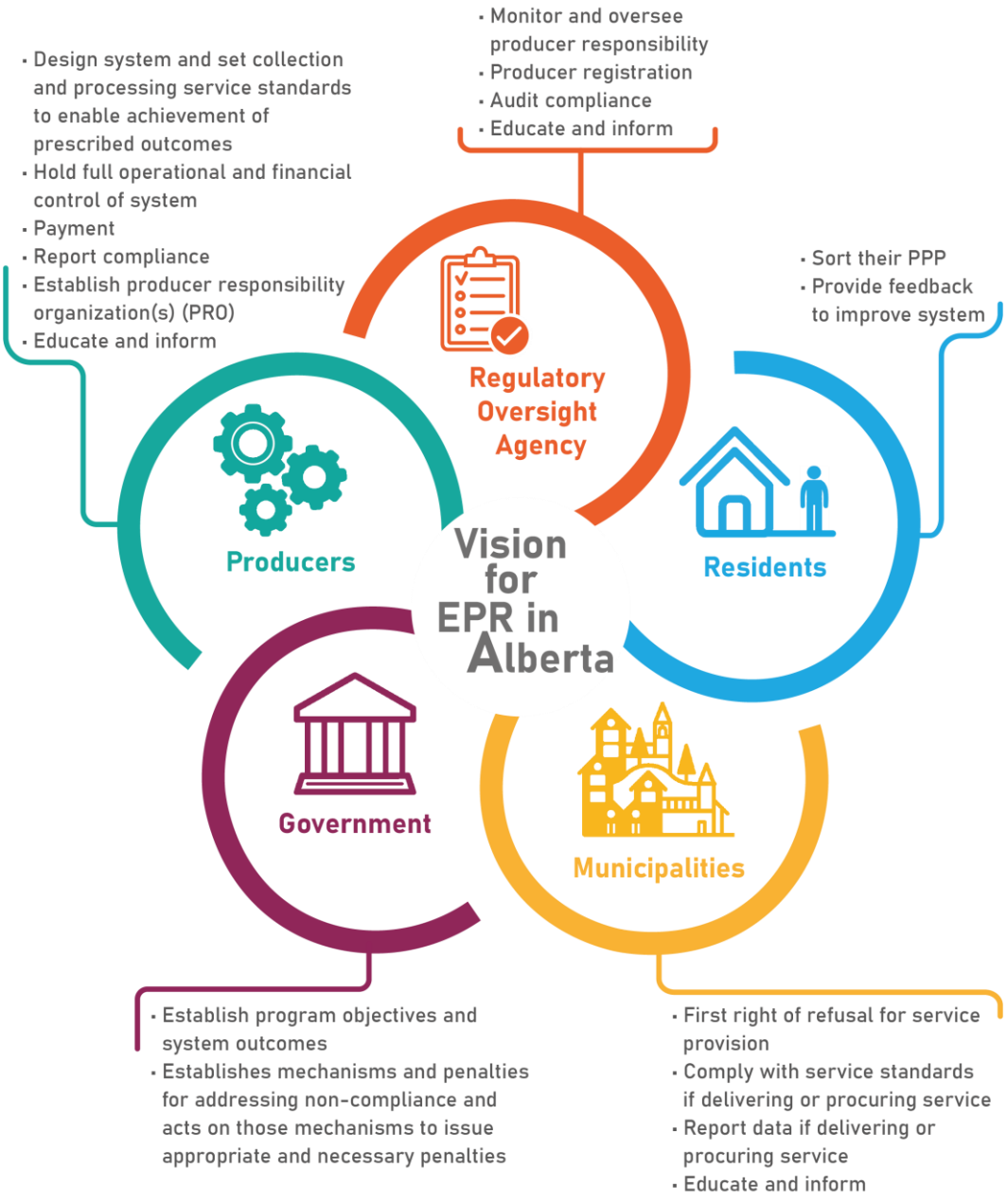
As Alberta considers EPR for residential PPP, it should take note of PPP programs in other provinces. British Columbia (BC) launched its PPP EPR program on May 19, 2014 with the first stewardship plan submitted to the Ministry of Environment in November 2012. Recycle BC's second stewardship plan was approved by the Ministry in June 2019. In Ontario, municipalities are currently in the process of liaising with the same producers that operate in Alberta on the transition of Ontario's Blue Box program from a system that is partially funded by producers and largely operated by municipalities, to a system that is fully funded by producers and which gives producers more responsibility.

2.2 Core Roles and Responsibilities of Key Stakeholders Under EPR

A residential PPP EPR framework will necessitate an allocation of roles and responsibilities between producers and municipalities and between producers themselves (primarily through their participation in a producer responsibility organization (PRO)[33]) and between government and their regulatory agent. This distribution of roles is presented graphically in Figure 2-1 and summarized in the following section, which describes the various factors that need to be considered when implementing an EPR system for PPP.

[33] Defined by Environment Canada and Climate Change as: usually a not-for-profit organization or an industry association, is the entity designated by a producer or producers to act on their behalf to administer an extended producer responsibility or product stewardship program. In Canada, a PRO may also be referred to as a "stewardship organization," an "industry funding organization" or a "delegated administrative organization."

Figure 2-1: Roles and Responsibilities of Stakeholders in Future State



Source: Eunomia

2.3 Key Elements of an EPR System for PPP

In line with the vision outlined in Section 2.1, the key elements of an EPR system for residential PPP in Alberta are expected to include:

1) Transparency and accountability to Albertans through data-driven reporting and performance measurement to help identify opportunities for increased diversion and recycling in the province;
2) A shift in the cost burden of residential PPP services away from municipalities and taxpayers towards producers who have the power to make decisions about the design and recyclability of packaging materials;
3) Producers of PPP that are fully responsible, both financially and operationally, for the management of the system;
4) Clear definitions for designated products and materials for which producers will take responsibility that are flexible enough to allow for the inclusion of new product and packaging formats as they enter the market;
5) A clear definition of "recycled" that ensures that reported diversion rates reflect what is actually recycled and used in the production of new products, and not just collected;
6) Provisions for continuous improvements to increase the quantity and quality of material recycled through high targets that increase progressively over time and are set alongside penalties for non-achievement; and
7) Provisions for producers that help secure better access to recycled materials so that they can meet their internal circular economy commitments and goals.

To ensure a smooth transition from the existing residential recycling system to the new EPR framework, implementation of the above elements should be carried out in a smart, equitable and planned manner.

3.0 Implementation Considerations for an EPR System for Residential PPP in Alberta

This section describes the various considerations that need to be taken into account when considering transition from the current residential recycling system for residential PPP to an EPR-based system. This section also discusses the roles and responsibilities for the five main stakeholder groups described (i.e., government, regulatory oversight agency, producers, residents, and municipalities), in the framework presented in Figure 2-1.

3.1 Government Role

3.1.1 Establish Program Objectives and System Outcomes

The government's role is to ensure that regulations clearly specify the prescribed outcomes for the program that must be met as well as the penalties that will be imposed if these outcomes are not met. Producers' role is financial and operational responsibility for the system, as well as sufficient flexibility to design the system to be efficient and meet the outcomes prescribed. Municipalities should be given the 'first right of refusal' opportunity to continue in a role delivering recycling collection services to avoid impacts on integrated waste collection services.

The primary desired outcomes of the residential PPP EPR program are to:

- Reduce the amount of PPP that is destined for disposal and support the development of a circular economy by supplying recycled PPP to manufacturers through a reverse supply chain;
- Ensure accessibility to PPP collection through curbside and/or depots for Alberta households; and
- Prevent free riders while incorporating considerations for producers that supply quantities of PPP below an established threshold.

Each of these outcomes is described in further detail below.

Reducing the Amount of PPP Destined for Disposal and Supporting the Development of a Circular Economy by Supplying Recycled PPP to Manufacturers through a Reverse Supply Chain

The most common approach to achieving this outcome is to set high targets that increase over time, accompanied by appropriate penalties to deter non-compliance and under-achievement.

This approach has been used in BC, which recently increased its packaging collection targets, as well as in the EU, which increased its recycling targets (which count only material actually sold back into the reverse supply chain, excluding residues).

When setting targets, there are three important factors to consider:

- The focus and level of the targets;
- The phasing of the targets; and
- The measurement of performance against the targets.

Focus and Level of Targets

It is imperative that targets are material-specific (e.g., different types of plastics, metals, etc.) and set at a level high enough to incentivize phasing out non-recyclable material from the packaging stream. As an example, an overall target of 30% for plastics is likely to result in the collection of only those types of plastics that are easy to recycle (such as bottles made from PET). Harder-to-recycle types, such as plastic films, would then not be addressed. This results in one material type's performance cross-subsidizing another and weakens the incentive for producers to use materials that are easier to recycle. Another example is PP and PS clamshells (such as those used for take-out food), for which there are fluctuating markets in Alberta. This situation is forcing many municipalities to landfill these materials. Under an EPR system with high targets for all material types, producers would be encouraged to either phase out the use of such material or develop markets for these materials in order to be in compliance. The objective should be to set performance standards that drive innovation in collection, processing and market development.

While targets need to be sufficiently granular to drive out non-recyclable material and increase overall recycling performance, care needs to be taken to ensure that this does not become overly burdensome for producers, which could lead to issues such as inaccurate reporting and unnecessary costs. Additionally, material-specific targets and penalties should be set high enough to mitigate the financial incentive not to recycle, which can occur when the costs of disposal are lower than the costs of recycling. This is a particular concern in areas with relatively low landfill fees, such as in Alberta. In these markets, complementary policy, such as disposal bans or taxes can be implemented. In the absence of stringently enforced performance standards (i.e., recycling targets, mandatory accessibility and collection standards), the incentive will be to simply send PPP to disposal. The initial focus should, therefore, be on setting high recycling and diversion targets, with sufficient enforcement and accountability to ensure compliance.

Phasing of Targets

The long-term objective is to ensure that all PPP material sold into the Alberta market is recyclable and that there is sufficient incentive to invest in the necessary recycling infrastructure. Where recycling in Alberta is not economically viable, the phasing out of certain packaging formats may gradually occur. Providing transparency on the trajectory of targets over time will enable producers to make informed packaging design and recycling infrastructure investment decisions.

Mechanism for Measurement of Performance Against Targets

Measuring progress against performance targets is critical to determining achievement of the program vision and subsequent goals. It is recommended that a PPP EPR program be assessed based on not only what is collected, but what is actually recycled, as it is only the material that gets recirculated into new products and packaging is important (from the perspective of a circular economy). Reduction and reuse of PPP reduce the overall burden to the environment, and the frequency of these methods should also be tracked.

There are other points of measurement that take into account, for example, the amount of material that exits the MRF.[34] This approach was used by the European Commission prior to the revision of the definition mentioned above. It should be realized, however, that these calculation methods do not reflect what is actually utilized in a product: the losses of material after sorting at MRFs and before the material is used in a recycling process can be in excess of 15% in the case of some materials, notably, plastics.[35] A regulation that includes such a rigorous recycling calculation methodology obviously requires stringent levels of accurate reporting across the whole recycling chain.[36] This is likely to be easier where materials are processed within Canada or the US. Processes for tracing the output of material that is passed on to the manufacturing of new products and packaging is likely to require time to establish appropriate processes, but this can be included during the transition.

Calculating the percentage of material recycled involves dividing the amount of material recycled at the point of measurement – the numerator (as discussed above) – by a denominator. In some cases, the denominator is the quantity of material sold into the specific region or country (and reported by obligated producers), and in others it is the quantity of material generated by households as measured by waste audits. A discussion of the points related to the difference in measurement methodologies is included in Appendix A.2.0.

Either way, the obligated producers who are responsible and report their tonnes accurately pay fees for the recycling system. The key with any EPR system is to make sure that all obligated producers are paying their fair share and that free-ridership should be minimized through rigorous enforcement.

Regardless of what forms the denominator, the most important factors are ensuring that the recycling calculation is based on accurate reporting and auditing of the data on which the

[34] According to Article 6(1) of Directive 94/62/EC, "If the output of the sorting plant is sent to effective recycling or recovery processes without significant losses, it is acceptable to consider this output to be the weight of the recovered or recycled packaging waste." However, given current contamination rates, this scenario seems unlikely, so a more stringent definition is recommended.

[35] Conversation with CITEO, France on 30/09/19

[36] It should be noted that in the European Union, the targets were established prior to the methodology. It is advisable that the two are developed in unison.

recycling calculation is based, that Alberta makes an informed decision on the appropriate methodology and that provinces move towards a harmonized approach across Canada. The arguments for using the quantity of material supplied or generated as the denominator need to be carefully thought through in the context of what can be included in the numerator. See sections below for further information on free-riding and de minimis thresholds.

Enforcement of Targets

Many Canadian product stewardship and EPR programs suffer from either a lack of legislated targets or targets that are unenforced. While the target level does not necessarily need to be defined within the legislation, the mechanism for determining and reviewing the targets should be regulated. These calculated targets should be mandatory with penalties for non-compliance. Governments should be ultimately responsible for ensuring compliance with regulation and that necessary steps are taken by parties to discharge their regulated obligation.

Alternative and Complementary Approaches to High Recycling Targets

Standards and targets around reusability, recyclability, and inclusion of recycled content can also be used to encourage design of products, so that only recyclable PPP with a viable market is produced and sold. However, these additional targets should work in tandem with material-specific recycling targets for PPP sold into the provincial marketplace. In respect to recycled content, the CCME is working to create national standards for recycled content thresholds as well as guidelines for government procurement recycling content guidance. For the purposes of facilitating consistency, any potential regulation that may include recycled content standards should be mindful of CCME's work and should ensure alignment with potential future federal policy.

Modulated fees can also help incentivize producers to switch to material types that are more easily recycled, or to develop infrastructure that supports the recycling of a widening range of materials. Fee modulation involves structuring producer fees based on the types of materials used in their products. Materials that are more difficult to recycle are subject to higher fees, which incentivizes producers to design packaging and products out of easier-to-recycle materials that have lower fees.

Reusability and recyclability standards and targets, recycled content requirements and modulated fees are in place in other jurisdictions in addition to specific recycling targets, which are needed in all cases. These additional approaches are more effective when applied at a national scale. Some or all should be considered in Alberta, both to move the conversation forward in Canada, while also pursuing measures to reach a circular economy with greater focus on waste prevention.

Scope of Designated Material

Material designated under the residential PPP EPR system must be clearly defined. A summary of the regulations and definitions of PPP in each Canadian EPR program and also the EU is provided in Appendix A.3.0.

The materials within the packaging and paper categories also need to be carefully defined. Part three of CSSA's National Reporting Guidebook[37] sets out a national material list and summarizes which materials are covered in each of the four Canadian provincial programs that it supports.[38] The range of material that is currently being collected curbside in Alberta by large municipalities is comparable (see Appendix A.4.0). Alberta's PPP program should align as closely as possible with the materials that are legally designated in other provinces with the intention of creating a harmonized EPR system in Canada.

In Canadian PPP EPR systems, newspaper producers are obligated to join the program. Although the financial arrangements differ in each province, newspaper producers generally contribute free advertising rather than contribute fees to the PPP programs. Alberta will need to address an arrangement with newspaper publishers, having regard to arrangements with governments in other provinces.

Two notable examples of the arrangements that other provinces have made with the newspaper industry are:

- In BC, the provincial government pays stewardship fees on behalf of newspapers to Recycle BC. The government contribution is offset by government advertising in member newspapers in the amount of $40/tonne of newsprint sold into the province.
- In Quebec, newspapers pay $3.8 million in advertising space and the remaining $5.3 million in fees. About $5 million is reimbursed by the provincial government. Fees are paid to Recycles-Médias and Recyc-Québec.

BC is currently consulting stakeholders on expanding the scope of designated material to packaging-like products (i.e., products resembling packaging but sold as a product, such as aluminum pie plates) as well as certain single-use plastic products such as plastic straws and cutlery.

EPR regulations should be written such that new packaging materials that enter the market can easily be incorporated into the list of designated materials so that the producers of these products can contribute to the costs of collection.

Generation Source of Obligated Material

While there is a trend in European EPR schemes to include ICI material in the PPP systems, it is recommended that Alberta's system begin by addressing residential PPP only in order to be

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[37] Canadian Stewardship Services Alliance. (2019). Part Three: National material list. https://guidebook.cssalliance.ca/wp-content/uploads/2019/01/2019-Part-3.pdf

[38] CSSA does not summarize the packaging and paper categories that are legally designated in Quebec. That information is provided by the program operator, Eco-Entreprises Quebec (EEQ) on its website.

consistent with existing programs in Canada. With that being said, there could be a requirement for producers to report on the quantity of PPP sold into the ICI sector, which would help establish a baseline and possible measures to address this waste in the future.

Additionally, a plan to address PPP material that ends up as litter and/or in the garbage stream should be considered, recognizing that this may be part of a phased or longer-term approach. The European Commission's *Single Use Plastic Directive* requires producers to cover the full costs of the relevant packaging at the end-of-life including that related to litter clean-up. Article 9-1, (k) of the European Commission's *Waste Framework Directive* requires Member States to identify products that are the main sources of littering, notably in natural and marine environments, and take appropriate measures to prevent and reduce litter from such products; where Member States decide to implement this obligation through market restrictions, they shall ensure that such restrictions are proportionate and non-discriminatory (see A.1.0 for further information).

Ensuring Accessibility to PPP Collection for Alberta Households

An "accessible" recycling system is typically defined as one where:

- Alberta households are able to recycle the same set of materials;
- It is at least as convenient to recycle materials as it is to dispose of them as garbage; and
- In situations where curbside services are not practicable, standards are set with respect to the longest travel distances or travel times to recycling locations such as drop-off depots, and/or the density of depot sites.

An example of a performance standard related to accessibility can be seen in BC. BC's *Recycling Regulation* mandates "reasonable and free consumer access to collection facilities or collection services,"[39] which has led to 98% of the BC population being within a 30- and 45-minute drive of a depot for urban residents and rural residents, respectively.[40] Ontario's *Tire Regulation* offers another example of an accessibility standard; it specifies that all sites that sell tires must accept them, ensuring equal access to proper disposal facilities for all residents.[41]

A further option for ensuring accessibility is for producers to be required to deliver streetscape recycling. Eligible areas to be serviced could be defined based on land use designations, including residential and retail, with exclusions for ICI-only areas.

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[39] http://www.bclaws.ca/Recon/document/ID/freeside/449_2004

[40] Recycle BC. (2019). Packaging and Paper Product Extended Producer Responsibility Plan. Revised June 2019. http://recyclebc.ca/wp-content/uploads/2019/07/RecycleBCStewardshipPlan_16July2019.pdf

[41] https://www.ontario.ca/laws/regulation/R18225

Alberta should strive for the greatest consistency and convenience for all its residents and define a standard(s). Further information on accessibility standards and language in other Canadian provinces is provided in Appendix A.3.0.

Preventing Free-riders While Considering Small Businesses

EPR passes the costs of recycling PPP to the producers of that material. Governments often recognize that small, local businesses should not be unduly burdened by administrative or financial obligations, and that free-riders (companies who are obligated, but don't pay their fair share) can increase costs for all others involved in the system. EPR programs often consider small businesses by setting a de minimis threshold below which producers are excluded from contributing to the cost of the system, however they may be required to report data, such as quantity of material sold into the market.

A de minimis provision can be based either on a producer's turnover or the quantity of packaging that they place on the market. In Ontario, for example, there are two de minimis thresholds, one that is weight-based and one that is based on gross revenues. Producers do not need to register with Stewardship Ontario if their gross annual Ontario sales are less than $2M. Producers with Ontario gross sales over $2M, but with total reported PPP quantities of less than 15 tonnes, must report their material to Stewardship Ontario, but are exempt from paying fees.

In BC, businesses with revenue less than $1M are exempt, as are businesses that supply less than one tonne of PPP to the BC marketplace. Also exempt are businesses that are a single point of retail (i.e., businesses that only operate one retail location and that do not supply products on-line, or as part of a chain or franchise[42]) and charitable organizations registered under the *Income Tax Act* (Canada). A summary of de minimis provisions and thresholds in Ontario, BC, Saskatchewan and Manitoba can be found in CSSA's *Guidebook for Stewards*.[43]

Notwithstanding the above, regulation needs to ensure that all companies that supply residential PPP into Alberta are identified and that those companies contribute to paying for the cost of the system. This requires clearly identifying which producers are obligated under the program. In BC, the *Recycling Regulation* defines a producer as:

"(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

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[42] *Ibid.*

[43] https://guidebook.cssalliance.ca/part-one/1-0-introduction/1-11-what-is-a-small-business-policy/

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." [44]

Programs delivered against a clear definition of "producer" are better equipped to deter free-riders, as members have a better understanding of who operates in their sector.[45] 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 Alberta[46]), are obligated to participate.

Providing Producer Compliance Oversight

The government may appoint a third-party agency to provide oversight and monitor progress against targets. The potential role of such an organization is described in Section 3.2. This oversight can also be done by a government agency in lieu of a third-party.

3.1.2 Establish and Use Mechanisms and Penalties for Addressing Non-compliance

There are several ways in which producers can be non-compliant, thus reducing the overall effectiveness of the system. These include:

- Inaccurate or under reporting of material sold in the market (by individual producers or PROs);
- Failing to register and avoiding paying their share of the system (i.e., free-riders) (by producers or through a PRO); and
- Failing to meet performance standards and targets.

Companies may not comply with the regulations if the risk of going to court or the penalty incurred is less than the benefits gained by free-riding the system. To help ensure full compliance and minimize the likelihood of individual producers trying to subvert their obligations, penalties should be established in regulation. For example, penalties should be incurred when targets are missed and they should be commensurate with the scale of the

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[44] http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/449_2004

[45] BC defines producers in Appendix D of Recycle BC's Packaging and Paper Product Extended Producer Responsibility Plan, June 2019 (https://recyclebc.ca/stewards/regulation_and_stewardship_plan/)

[46] Noted that Canada Post can only be federally regulated.

failure in order to ensure that the regulation is binding and effective, rather than symbolic. The regulatory oversight agency, discussed in Section 3.2, should be granted authority to issue administrative penalties, however investigating and ensuring non-compliance with regulation is the role of government, as is prosecuting those producers that do not comply with regulation. For example, if a PRO fails to achieve targets for one material, the regulatory oversight agency should take steps to ensure that necessary steps are taken by producers to meet targets. However, if a producer avoids joining a PRO or under-reports its PPP (i.e., acts as a free-rider), government should ensure individual producers are made to comply.

3.2 Regulatory Oversight Agency

3.2.1 Monitor and Oversee Producer Responsibility

Alberta currently has no centralized system through which data on collection and recycling can be reported. Therefore, the first priority for an EPR program in Alberta will be to establish a data management and reporting system, through which producers can submit data confidentially and where there can be transparency on the quantity of material collected, processed and recycled by material type in order to demonstrate that targets have been met.

The regulatory oversight agency will need to establish processes to verify the data provided by producers. The data management system should also ensure that producers are held accountable for their supply-chains (i.e., operators, collectors, transporters, recyclers and processors of end-of-life products/materials) and that all data provided is accurate under the standards established through the regulation, as laid out in the vision.

An example of an oversight agency that performs this type of regulatory compliance role is Ontario's Resource Productivity and Recovery Authority (RPRA), a description of which is available in Appendix A.5.0.

3.2.2 Producer Registration

Producers (and/or the PROs fulfilling their obligations on their behalf) will be required to register with the regulatory agency and provide data to demonstrate what their obligations will be under the program (e.g., to confirm if they fall under the de minimis threshold). Producers will also be required to regularly provide information regarding what quantity and types of PPP they sell into Alberta and the quantity of PPP collected and recycled.

3.2.3 Audit Compliance

Effective EPR requires accurate reporting of the quantity of material sold into the market. The regulatory oversight agency must put in place processes to periodically audit producer data submitted annually at a sufficient frequency to deter and capture fraudulent reporting.

The regulatory oversight agency should also carry out periodic audits of the composition and quantity of PPP generated from the residential sector in both the garbage and recycling streams, to assist in determining the total quantity of residential PPP generated.

3.2.4 Educate and Inform

The regulatory oversight agency should be a resource for residents to gain information about recycling under the EPR system, including the roles and responsibilities of different actors and the performance of the system against the requirements set in the regulation. However, the main responsibility for education lies with the producers and/or the PRO(s) (see Sections 3.3.6 and 3.4.4).

3.3 Producers

3.3.1 Design System to Enable Achievement of Prescribed Outcomes

In order to meet the program objectives and outcomes set out in regulation, producers have several options they can choose from, including: investing in collection systems and technologies to meet those targets; reducing the amount of packaging they place on the market; or redesigning products and packaging to be easier to collect and recycle. Producers can also choose to implement a combination of all three actions, as long as system outcomes are met. These will be subject to audit and enforcement.

3.3.2 Financial and Operational Responsibility

The core component of EPR is the financial and operational responsibility for the management of PPP at end-of-life by the producers of PPP. Although the 'responsibility' aspect of EPR is occasionally interpreted as solely financial, it has become clear that operational responsibility must go hand-in-hand with financial responsibility in order for an EPR system to function as intended and deliver high performance.

In the context of EPR, operational responsibility means the authority to fully design and operate the PPP recycling system (from collection to processing to marketing of the material) in a manner that achieves the outcomes specified by the provincial government. It is up to the producers to decide how the accessibility standards, collection standards, and recycling targets will be met. While Alberta's EPR program for PPP should give producers full operational responsibility for end-of-life management of PPP, it should provide municipalities with the option to continue to have a role in PPP collection under established service standards.

Ontario recently held mediated discussions between producers and municipalities regarding the transition of Ontario's Blue Box to full EPR – managed and financed by producers. In these discussions, producers indicated that they will only agree to an implementation of EPR that provides them with determinacy in the operation of the PPP collection and management systems. Specifically, the mediator's report notes that:

"Producers accept that taking on more responsibility means they will pay more to recycle their printed paper and packaging. Producers support this shift, however, because it gives them full control, from design and production all the way through to collection and recycling.

Producers are willing to take on new responsibilities and costs because this full control is part of a long-term strategy that allows them to innovate, compete, and reduce costs. They want producer responsibility applied broadly and fairly, to create a level playing-field where innovators are rewarded for their efficiencies and free-riders are penalized for not following the rules.

Making producers responsible for blue box materials can help drive changes in packaging design, use and recycling. When producers are responsible for collection, sorting, and diversion, they have the financial incentive to make their products as efficient to manage as possible." [47]

Collection

Collection of PPP should be carried out in a way that is in line with the vision (described in Section 2.1) and that adheres to service standards, as developed by producers to achieve the regulated outcomes.

Municipalities should have the first right of refusal to provide recycling collection services. If they assume this right, they have two options:

1) Provide the services themselves; or
2) Contract with a third-party commercial provider.

In both cases, the municipality needs to provide recycling collection services consistent with service standards and contract terms (which include required collection frequencies, standard list of collected materials, set out requirements, etc.) developed in consultation with producers in order to be compensated. Contract terms between municipalities and producers should be negotiated in an open, transparent and fair manner.

Under the second option, municipalities that procure garbage, organics and recycling under one contract can continue to do so, so that the financial and operational benefits of operating services alongside each other are not impacted, as could also be true for municipalities providing their own services.

[47] Ontario government. (2019) "Renewing the Blue Box: Final report on the blue box mediation process" < https://www.ontario.ca/page/renewing-blue-box-final-report-blue-box-mediation-process>

If municipalities do not want to provide collection services, the producers, acting individually or through a PRO would contract with a commercial provider to provide PPP collection services in the municipality.

Post-collection Management

When producers are in control of the processing and marketing of PPP, they benefit from economies of scale to drive innovation and maximize yield of recycled materials. Producers need access to various packaging materials to make those materials available for use in their own circular economy systems and meet their recycled content goals.

In a future EPR system for PPP, producers will issue competitive tenders for post-collection services to consolidate, transfer and process materials collected in Alberta into recycled commodities. Based on information in Section 4.2.2, it is clear that considerable infrastructure for post-collection treatment already exists in municipalities across Alberta. It is possible that these might be contracted to the PRO. In these cases, the producers will bear the risk and retain the revenue from material sales on the market.

3.3.3 Compensation

As long as municipalities and commercial contractors comply with their contract, compensation will be offered by the producers (likely through the PRO(s)). The mechanism or process for determining compensation should be outlined, potentially in regulation, to the extent that it is not overly prescriptive, but provides transparency to municipalities.

3.3.4 Report Compliance

From the perspective of an obligated producer, demonstrating compliance with EPR regulations is often done through a PRO through regular reports to the regulatory oversight agency (further details below).

In BC, producers have established data reporting requirements as part of their commercial relationships with collectors and processors. In order to get paid, the collectors and processors must report their data to Recycle BC. Recycle BC also has an audit facility where it sends up to 140 random loads of PPP each month to undergo composition and contamination audits.

3.3.5 Producer Responsibility Organization (PRO)

The EPR regulation may allow for one or more PROs. PROs can be the legal route through which individual producers discharge their obligations. Alternatively, where regulations require individual producer responsibility such as is the case in Ontario under the *Resource Recovery and Circular Economy Act,* producers may still operate through a PRO but will be responsible for reporting individual compliance. Fees collected from producers are used by the PRO(s) to discharge producers' operational and financial requirements under the EPR system.

If there are multiple PROs, then they must coordinate to provide a common collection system, where the costs are split proportionately. Collection contracts will likely be made through the largest PRO or through a clearinghouse that coordinates costs and operational responsibilities.

3.3.6 Educate and Inform

Ensuring that residents are adequately informed and engaged will produce the best quality recycled product with the least amount of contamination. As the operators of the EPR system for PPP, producers will have the greatest insight into the specifics of the new system, and as such, will have a key role to play in educating the public about how it works and the extent of changes to current programs and services. The PRO may produce educational materials to achieve this goal and/or producers may provide funding to municipalities for outreach and education to residents, as in BC.[48]

3.4 Municipalities

3.4.1 First Right of Refusal

As detailed above, municipalities should be given the option to act as the collection service provider so as to ensure consistency between services, minimize service impact, and reduce the potential for stranded collection assets.

3.4.2 Comply with Service Standards

If a municipality decides to continue providing PPP collection services (either directly or through a contracted service provider), they need to do so in accordance with the service standards developed in consultation with producers in order to receive funding from producers.

3.4.3 Report Data

Municipalities that choose to be service providers must ensure that they can report on the material they collect and provide accurate data to the producers or PRO(s) (as set out in service standards), who will then report to the regulatory oversight agency. Data quality will be key in calculating the recycling rate.

3.4.4 Educate and Inform

As the first line of communication with residents, municipalities will provide an invaluable resource in the transition to and success of the EPR system for residential PPP. This will include providing information on potential changes in frequency of services, scope of materials

[48] Recycle BC. (2019). What is Extended Producer Responsibility? https://www.rcbc.ca/resources/faqs/epr1

collected, and services provided. Municipalities will receive support from the producers or PRO to educate their residents.

3.5 Residents

Residents are the first step in creating a successful recycling system. Residents are expected to correctly sort their residential PPP and prepare it for collection – either by placing it on the curbside, putting it into the appropriate collection container or bringing it to depots.

Residents should also provide feedback on the services offered to them in order to drive continuous improvement in the EPR system.

4.0 Current State Assessment

In order to assess the impact of transitioning to a future state with EPR, it is important to understand what services Albertans are currently receiving and what the cost of those services are.

This section begins with an overview of the approaches used to collect, collate and verify primary data gathered from municipalities and secondary data obtained through research on current service provision and costs. An overview of the findings from a provincial perspective with further detail provided for large, medium and small municipalities as well as other municipality and community types and First Nations, where data was available, is then provided.

4.1 Data Collection, Verification and Modelling

In order to determine the current state of residential recycling, a data request, contained in Appendix A.6.0, was issued to almost 100 municipalities. Of these, a total of 31 provided substantial data responses. The data request asked for detailed information on how PPP is collected (curbside, depot or both), the type and quantity of PPP collected, how and where it is processed, and the costs associated with PPP collection, processing, administration and education.

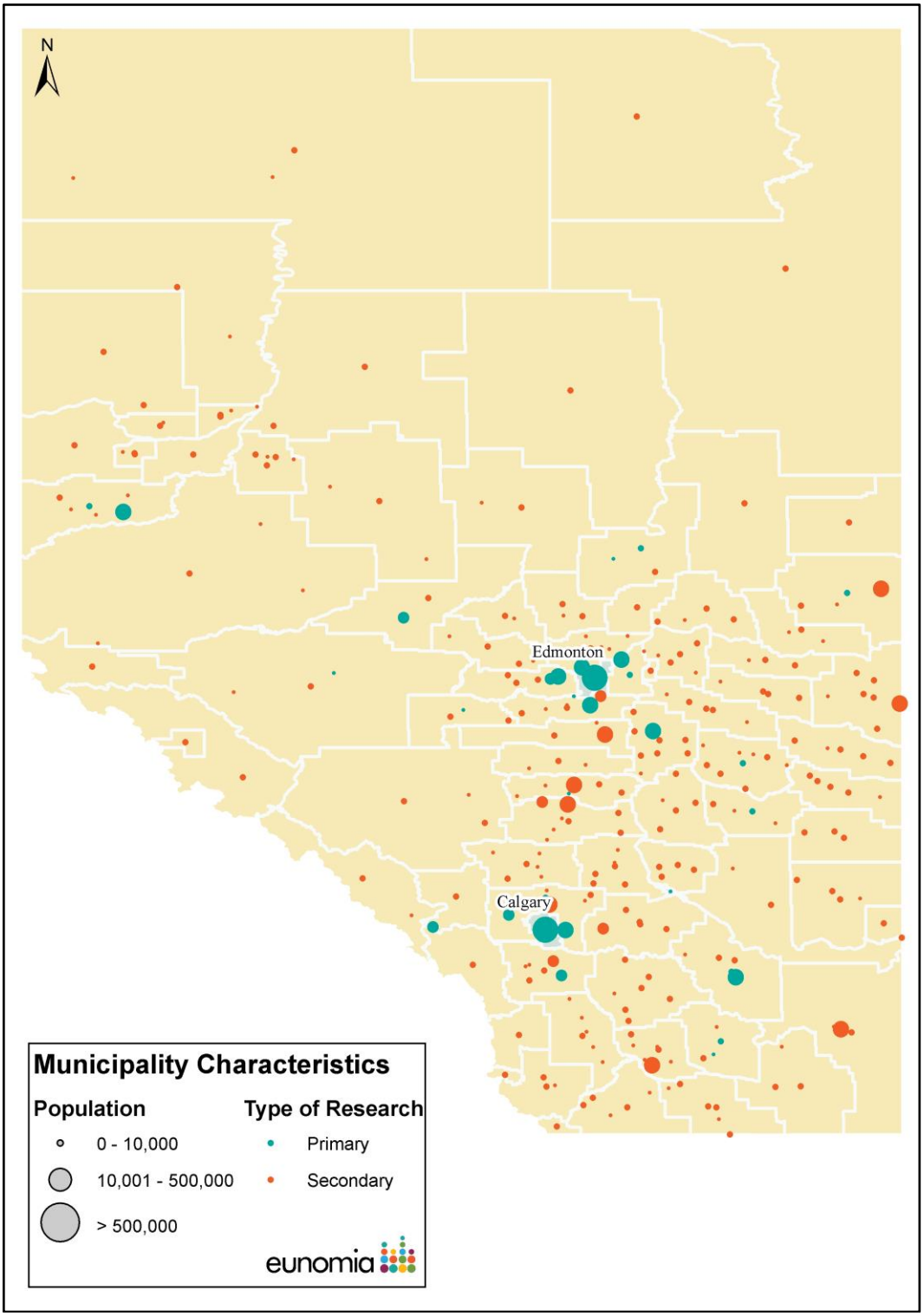
The primary data gathered from the 31 responding municipalities was supplemented with secondary data from a further 101 municipalities. Figure 4-1 shows the geographical areas for which primary and secondary data was received.

In addition to the data gathered specifically for this study, data gathered through the *Quantifying the Economic Value of Alberta's Recycling Program* study[49] was also incorporated into the service and cost models.

Data anomalies and inconsistencies were verified with municipalities in order to remove outlier data points. Appendix A.7.0 contains further details on how the available data were extrapolated and the assumptions used to provide a province-wide picture of PPP recycling services and costs.

[49] Eunomia Research & Consulting Inc and Kelleher Environmental. (2019). Quantifying the Economic Value of Alberta's Recycling Programs. https://recycle.ab.ca/wp-content/uploads/2019/07/RCA_Economic_Analysis_Report_Final.pdf

Figure 4-1: Sources of Primary and Secondary Data



Source: Eunomia

4.1.1 Determining Tonnes

Complete tonnage data was provided by large municipalities for this study, while the province-wide tonnes collected in medium, small and other municipality and community types was calculated to account for the municipalities where data was not provided. To calculate those tonnage figures, Eunomia used the service coverage proportion of each of the municipality sizes from the sample (i.e., how many households in medium municipalities from our sample had access to curbside recycling services) and then applied those coverage proportions to the number of households estimated to be located in each municipality category. Eunomia then used the tonnes collected per household from the sample for SF curbside, MF collection and depot collection, and multiplied that figure by the estimate of how many households had access to each of those services. This revealed the estimate for total number of tonnes collected in the province by each municipality category.

The tonnes recycled were calculated based on outbound tonnes leaving the MRF using levels of contamination reported by the study group. These numbers will be less if, as recommended in Section 2.0, the calculation of what is recycled includes only that material which is made into a product. As an example, changing the point of measurement to the end processor would reduce the quantity of tonnes recycled, in some cases significantly (e.g., for PET, it is estimated that changing the point of measurement would reduce the tonnes recycled by 17%)[50].

4.1.2 Determining Costs and Jobs

It is estimated that 1,362 FTE jobs are created across the whole value chain from point of collection to where the recycled material is used to manufacture a new product. This study tried to determine the number of people employed in the collection, transfer, transportation and sorting of PPP material in Alberta. One of the main challenges in doing this is how costs are allocated for people and equipment that are used to deliver both PPP and garbage services. While this can be measured through activity-based costing (ABC) studies, the data request specifically asked municipalities to provide an indication of the percentage of time and people that were used to deliver the services. In the case of depots, which are used to collect a range of materials, some of the data from the Recycling Council of Alberta study was utilized to help apportion costs.

4.1.3 Determining Landfill Savings

Costs vary by landfill site and typically range from $75 to $120 per tonne. The typical per tonne disposal cost data was obtained from Morrison Hershfield and municipalities for existing landfill sites across Alberta. Contamination rates were then applied to the number of tonnes collected

[50] Conversation with CITEO, France on 30/09/19

to determine the tonnes recycled figure. This figure was then used to calculate the total landfill savings to municipalities by multiplying the respective costs by the tonnes recycled.

4.1.4 Determining GHG Emission Savings

Environment and Climate Change Canada (ECCC)'s GHG Calculator for Waste Management[51] was used to model the GHG equivalent savings from the recycling services. It was determined that around 197,600 tonnes of PPP material were collected for recycling in Alberta in 2018. However, noting that contamination is removed by material processers after leaving the MRF, a conservative estimate of approximately 132,800[52] tonnes of secondary material was assumed to replace virgin material in the production of new products. This number was used to calculate resulting GHG savings, after accounting for collection contamination as well as MRF efficiencies. ECCC's GHG model assumes a national average level of landfill gas capture.[53] Landfill data provided by Morrison Hershfield, however, suggested that there are limited landfill gas recovery projects at many Alberta landfills. The level of landfill gas recovery in Alberta means that the GHG savings may be higher than estimated.

4.1.5 Municipality and Household Types

Across Alberta municipalities, there are many variations in how services are delivered, from curbside pick-up of garbage, organics and recycling, to neighborhood recycling and garbage bins, to depot-only access for garbage and a limited range of recyclables. In short, an Albertan's access to recycling is dependent on where they live. Approximately 80% of Albertans live in urban centers.[54] The percentage of households in each municipality type used in this study is shown in Figure 4-2.

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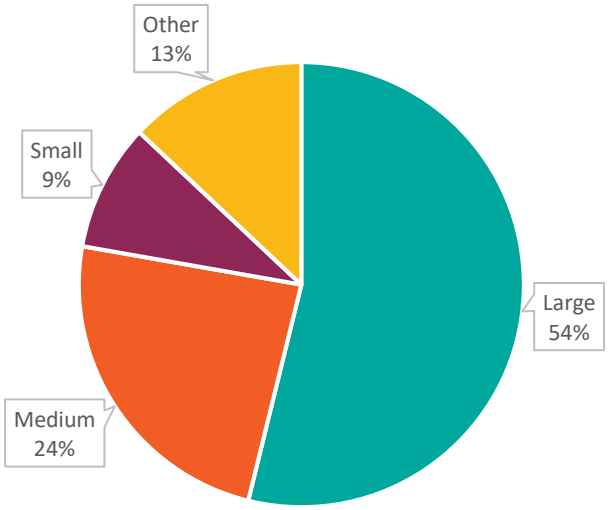
[51] https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/municipal-solid/greenhouse-gases/calculator.html

[52] 18% of tonnes recycled (163,200) is assumed to be removed during secondary processing based on data from the Recycling Council of Alberta report as well as discussions with CITEO. Eunomia Research & Consulting Inc and Kelleher Environmental, Quantifying the Economic Value of Alberta's Recycling Programs, June 17, 2019 (https://recycle.ab.ca/wp-content/uploads/2019/07/RCA_Economic_Analysis_Report_Final.pdf).

[53] 63% of landfilled waste is assumed to be disposed in landfills without gas recovery.

[54] Small, medium, and large cities defined as those listed in 2018 Alberta Municipal Affairs Population List (http://www.municipalaffairs.gov.ab.ca/documents/2018_MAPL_web.pdf)

Figure 4-2: Breakdowns of Municipalities by Type



Source: Census Profile, 2016 Census, Statistics Canada, Eunomia calculations

The figure shows that 54% of Albertans live in large municipalities; 24% live in medium municipalities; and 9% live in small municipalities. The remaining 13% of Alberta's population live in other municipality and community types.[55]

Access to recycling services is also dependent on the type of household. SF and MF households receive differing levels of service in different municipality types. Furthermore, the classification of a household as SF or MF is different according to each municipality's definition, as described further in Appendix A.8.0. For the purposes of this study, MF households were determined using the census categories and include: apartment in a building that has five or more stories; apartment or flat in duplex; apartment in a building that has fewer than five stories.[56]

Section 4.2 provides a province-wide picture of recycling in Alberta, with further detail provided in Sections 4.3 through 4.6 for different municipality types.

[55] For the purposes of this study, this includes: special areas, municipal districts, regional waste authorities, improvement districts, First Nations, Metis settlements.

[56] Based on 2016 Census categories, as reported by Statistics Canada.

4.2 Current State Assessment: Province

4.2.1 Collection Services and Accessibility

Collection of PPP materials in Alberta is currently handled on a municipality-by-municipality or regional basis. In order to implement a province-wide EPR system, the particulars of collection in each municipality will need to be understood in order to ensure a smooth transition.

Curbside and Depot Collection Services

Single-family vs. Multi-family – Large, Medium and Small Municipalities

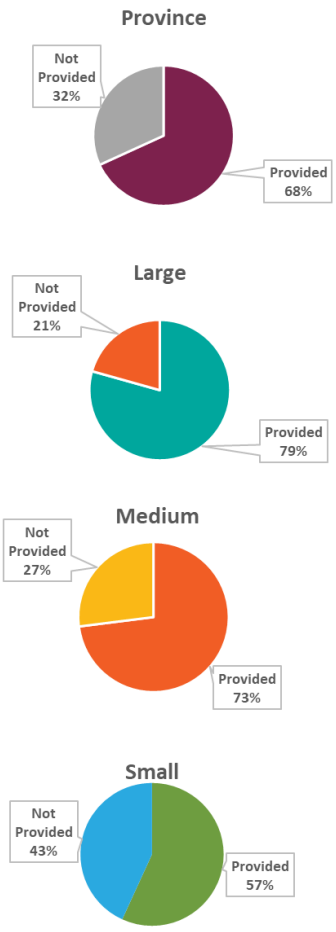
The percentage of households with access to curbside PPP services was ascertained through both primary data (reported by the municipalities themselves) and secondary data (found in reports and websites).

The available data indicated that across all households, 68% of Alberta households have a collection service provided or managed by their municipality with the remaining 32% hiring their own, private services, or relying on depot. In large municipalities, 79% of households have collection services provided or managed by their municipality. In medium municipalities it is 73%. This number drops to 57% for small municipalities.

From the data collected, it was extrapolated that a higher proportion, approximately 74%, of SF households across Alberta have recycling collection services. Of those SF households with curbside garbage collection services, approximately 7% do not have curbside recycling services.

Where MF properties are receiving PPP collection services, 43% are provided directly by the municipality, with the remainder

Figure 4-3: Percentage of Households Across Municipality Types that have Access to Collection Services Provided or Managed by Municipality



Source: Eunomia calculations

left to hire private contractors to receive this service.[57] SF curbside and MF collection services differ across municipalities. Collection frequency, materials collected, types of collection containers used, and service provider (whether in-house by the municipality or contracted to a private company) vary from one community to another. The differences in these services, as they relate to municipality type, are described in the sections below.

4.2.2 PPP Processing

After collection, PPP is processed, to varying degrees, at facilities that are owned and operated by either municipalities or commercial waste management companies. Processing of PPP in Alberta is linked to how materials are collected and, in most cases, can be split into the following categories:

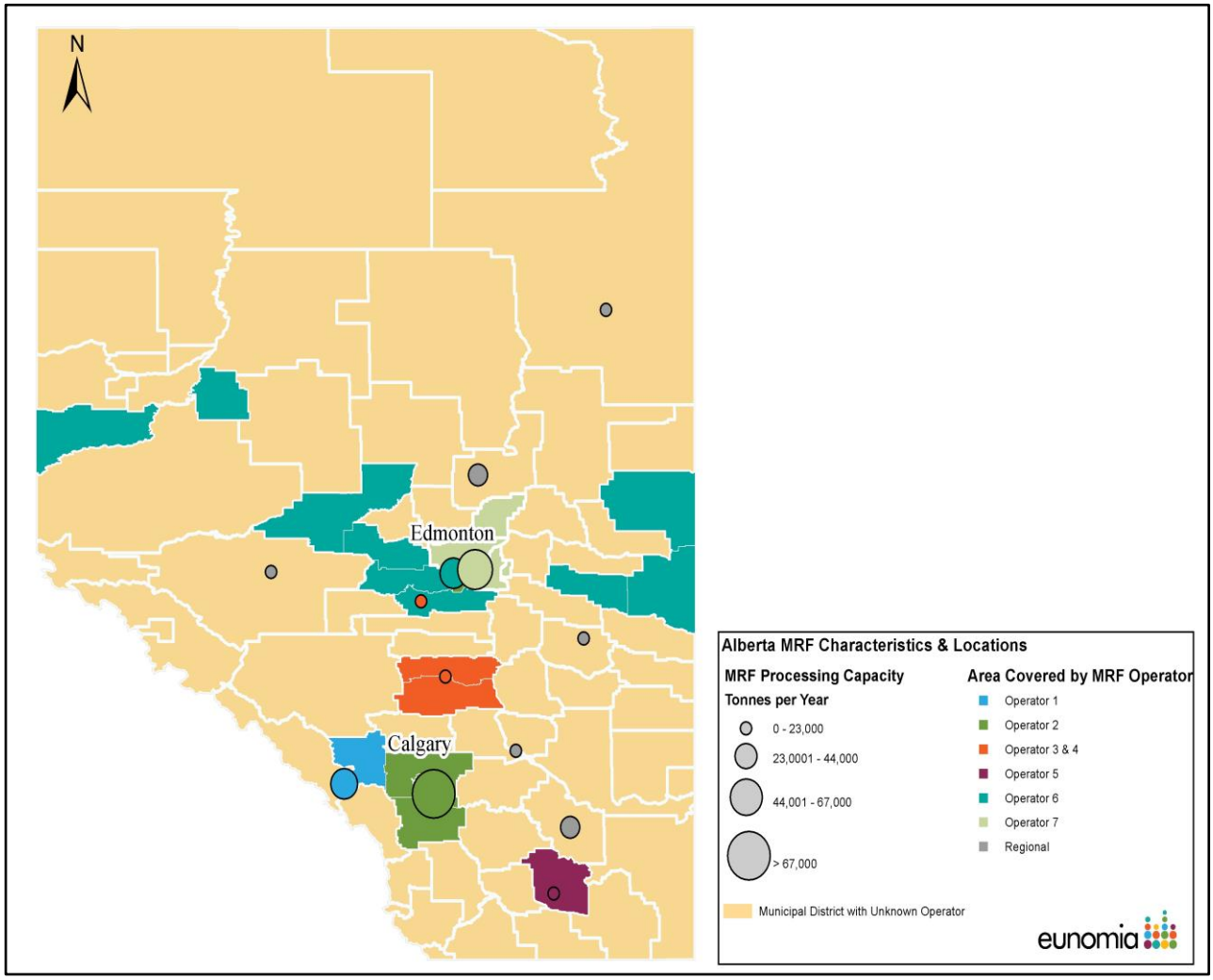
- Material recovery facilities (MRFs) that process single-stream recycling with varying levels of automation;
- MRFs that separate plastics and metal containers collected through dual- or multi-stream systems at the curbside or depot (this will have a simple processing line plus baling facilities); and
- Baling facilities, predominantly operated at depots for source segregated recyclables.

The large municipalities have single-stream MRFs that operate within their boundaries. Single-stream MRFs outside the large cities usually serve multiple municipalities. Multi-stream MRFs accept material that is already well-sorted from those municipalities with more than one recycling collection stream, so these facilities need less sorting equipment. At the baling facilities, materials are bulked and/or baled before being transported to the processor or shipped overseas.

[57] There may be MF properties that contract with the private sector for recycling collection services, but this could not be quantified so data only relates to services to MF arranged through municipalities.

illustrates the distribution of processing facilities across Alberta. A summary of the processing capacity in Alberta by facility is provided in Appendix A.9.0.

Figure 4-4: Location of Processing Facilities Across Alberta



Source: Survey responses and Eunomia research

Single-stream MRFs are predominantly owned by the private sector. Smaller facilities with simple working lines for plastics and cans and baling equipment are operated by the public sector. There has been one new single-stream MRF built in the last five years. All of the existing facilities appear to have the ability to increase throughput, should the future state require additional processing capacity.

Many more rural areas have depot-only recycling. The benefit of these facilities is that most materials are separated into multiple streams by depot users, reducing the processing requirements. Since the materials are sorted well, especially at staffed depots, baling is the predominant post-collection treatment.

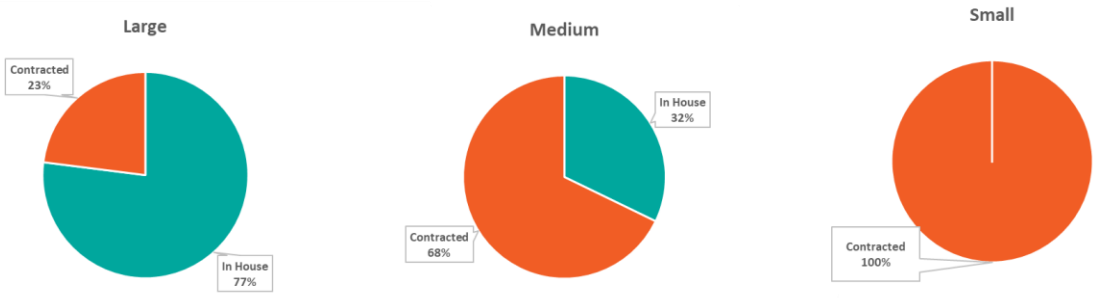
4.2.3 Contract Arrangements

Collection Contracts

An understanding of existing contracts will be important when planning the transition to the future state. Long contract lengths with MRFs may delay regional solutions that provide for cost and technological efficiencies and improvements that produce higher quality outputs for the reverse supply chain.

Figure 4-5 details the percentage of recycling collection services provided in-house by municipalities versus those provided by the private sector. This information was collected through survey responses for large, medium and small municipalities. Data was unavailable for other municipality & community types, as no respondents in that group provide collection services. Service provision outside of the two largest municipalities is predominately provided by the private sector. Appendix A.10.0 details the names of current private sector service providers identified through the primary data responses.

Figure 4-5: Breakdown of In-House and Contracted Curbside Services for SF Households in Large, Medium and Small Municipalities in 2018



Source: Eunomia primary and secondary research

PPP contracted collection services are priced in two main ways:

- Cost per household for collection plus processing costs, where the processing costs are incorporated into total costs by the contractor; or

- Cost per household for collection plus a per tonne processing fee.

The Chinese National Sword policy has placed strict quality requirements on recyclable imports since early 2018 and has made it difficult to find markets for many recyclable materials. This has resulted in the second pricing option being more prevalent. This arrangement allows private sector processors to transfer the material risk back to the municipalities, however, it creates a level of budget uncertainty.

Collection contracts for PPP services between medium- and small-sized municipalities and commercial waste collection contractors can also include collection of garbage and organics. Contracting services in this way is likely to provide financial and service efficiencies and benefits, as collection frequency can be altered and the same trucks can be used to collect two material streams. Some municipalities do not separate the costs of garbage and recycling in their budgets; greater transparency will be required in the transition to the future state.

There are many different contract structures and clauses relevant to EPR. Examples of key contract clauses from the study group are provided in Appendix A.13.0. A full review of contracts will be required during the transition to EPR, but in the short term, municipalities can consider how new contracts can be written to accommodate a future state under EPR.

Contract Length

According to survey responses, collection contract lengths are typically between three and five years.

Processing Contracts

As detailed in Section 3.0, under the future state, producers will want to design a system that can achieve regulated targets and that will drive the PPP reverse supply chain in the most cost-effective way. Material processing will be key to this effort and, as such, an understanding of existing processing infrastructure and contracting will be vital during both the transition to EPR and in its delivery.

Contract Length and Revenue Share

Of the reviewed contracts from the study group, the farthest end date for a processing facility was 2024.

Where specific contracts are in place for processing only, the municipality pays a cost for the processing of the material. However, in large municipalities there are revenue-share agreements, where the municipalities receive up to 90-100% of the revenue from the sale of the recycled material. In medium and small municipalities, revenue-sharing agreements are unusual. Processing contracts generally are based on a per tonne processing cost.

Residue Rates

Recyclable materials which are collected from households have varying contamination or residue rates, meaning some of the materials collected are not suitable for sale to end markets

and contaminate the loads of paper, plastics and metals being sold to markets. These materials are removed through processing and are referred to as residue rates or contamination rates. The rate varies from under 10% for multi stream systems to 20% or higher for single stream systems.

Residue rates were reported as being higher for PPP collected from MF households. There are many challenges with implementing recycling programs in MF developments and with keeping contamination levels down. Building configuration, location of bins, sufficiency of containers, signage and education alongside a higher turnover of residents and providing sufficient convenience are a few examples of such challenges.[58]

Limited information was received from the study group on acceptable contamination levels for material entering MRFs. Where information was received, there was limited consistency. Some contracts specify maximum levels of contamination that the contractor will tolerate from the municipality with the cost of disposal for additional contamination covered by the municipality. Other contracts have no limit on contamination.

Facility Upgrades

The extent to which the processor picks up the cost of any additional upgrades to the processing facility varies by contract. For example, in cases where regional waste authorities handle the processing contract for several small municipalities, sometimes individual municipalities purchase or lease equipment (such as containers or balers) or cover some of the costs.

4.2.4 Bylaws

Bylaws are the mechanism through which services are defined. How descriptive the bylaws are is generally correlated with the scale of services provided, which in many cases corresponds to the municipality size. Compared to large municipalities, small municipalities offer a smaller range of services on average and have less prescriptive bylaws. More detail on bylaws across municipalities is found in Appendix A.8.0. The *Municipal Government Act* (MGA) provides authority to municipal Councils to decide, by resolution or bylaw, how services (including waste management services) will be provided. Service delivery, however, may be impacted by regulatory requirements of other legislation, allowing for provincial legislation that compels municipalities to alter bylaws in order to comply with a new producer-managed EPR system. The MGA was officially consolidated from other governing legislation in 1994 and is currently under review for an update.[59]

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[58] https://prc.org/app/uploads/2016/11/Multis-White-Paper-Draft-4.pdf

[59] Alberta provincial government (1994) *Municipal Government* Act. <https://mgareview.alberta.ca/about/>

4.2.5 Social, Environmental and Economic Impact of Recycling in Alberta in 2018

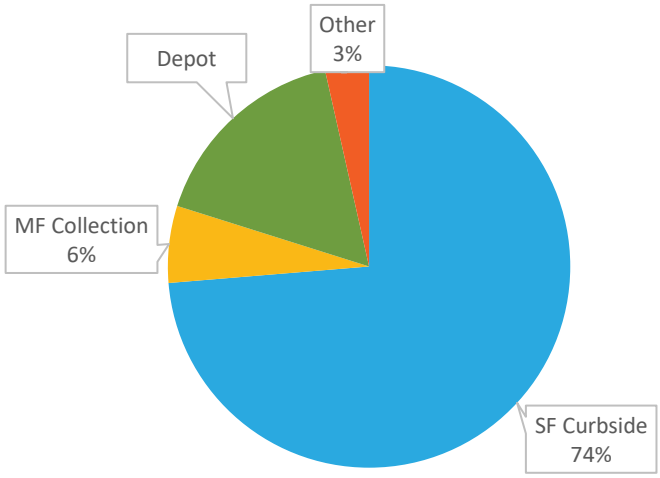
This section presents the social, environmental and economic impacts of the current recycling services in terms of the following metrics:

- quantity of material collected and being recycled (net of contamination);
- avoided GHG emissions associated with diverting PPP destined for disposal;
- cost of PPP collection and processing services;
- saved disposal costs; and
- direct, indirect and induced jobs created.

4.2.6 Tonnage Collected and Recycled

Approximately 197,600 tonnes of PPP materials are collected from residential sources for recycling each year in Alberta. Figure 4-6 presents the percentage of residential PPP estimated to be collected from different sources.

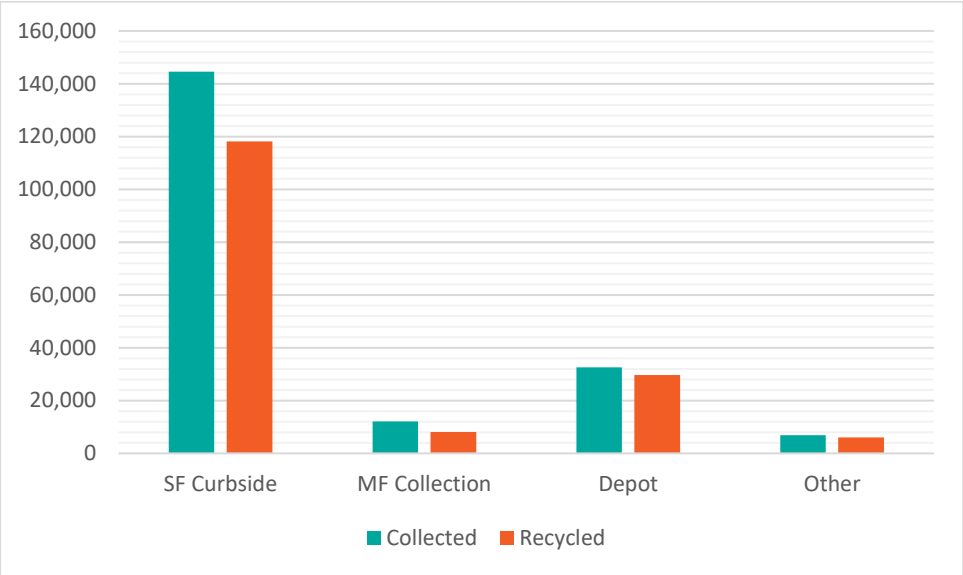
Figure 4-6: Tonnes of PPP Collected in Alberta by Source in 2018



Source: Survey Responses and Eunomia calculations

As shown in Figure 4-7, the tonnes collected per household varies significantly by source. On average, SF properties set out 160 kg/hh/year for curbside collection, versus 21 kg/hh/year for households that only have access to a depot. The higher collection rate for SF households is related to the convenience of curbside collection compared to other collection methods.

Figure 4-7: Tonnes of PPP Collected and Recycled per Household by Source in 2018[60]



Source: Survey responses and Eunomia calculations

As illustrated above, SF curbside collects more than twice as much material per household than MF collection or depots. However, depots on average have the lowest levels of contamination, likely due to the separation requirements and better oversight at those depots that are staffed. Appendix A.7.0 provides more information on the amount of material collected by municipality type and method of collection.

4.2.7 Cost of Service Provision

The total cost of collecting and processing 197,600 tonnes of PPP in Alberta is estimated to be approximately $107.0 million.[61] Table 4-1 provides a breakdown of cost by municipality type. A more detailed breakdown of costs is provided in Sections 4.3.5, and Appendix A.7.0, including a comparison on a cost per tonne basis of contracted vs. in-house service provision.

Table 4-1: Total Costs of PPP Collection and Processing by Municipality Type in 2018

Municipality Type	Total ($ million)
Large Municipalities	48.9

[60] Other includes PPP costs for eco-centres and semi-annual big bin recycling events.

[61] Does not include additional tonnes or costs outside of services provided or arranged by municipalities.

Municipality Type	Total ($ million)
Medium Municipalities	31.7
Small Municipalities	15.1
Other Municipality & Community Types	11.3
Total	107.0

Source: Survey responses and Eunomia calculations.

The current cost per tonne collected is $543.

4.2.8 Avoided Disposal Costs

Disposal costs across Alberta range from $75 per tonne to $120 per tonne.[62] Table 4-2 presents average estimated costs avoided in 2018 from PPP material that was recycled and therefore diverted from disposal. Avoided disposal costs are approximately $17.2 million/year.

Table 4-2: Estimated Annual Avoided Disposal Costs in 2018

Municipality Type	Tonnes Diverted from Disposal	Typical Disposal Cost per Tonne ($)	Total Cost ($ million)
Large Municipalities	97,000	113	20.6
Medium Municipalities	40,200	75	7.1
Small Municipalities	17,200	102	3.5
Other Municipality & Community Types	8,800	102	1.8
Total	163,200	N/A	33.0

Source: Eunomia calculations.

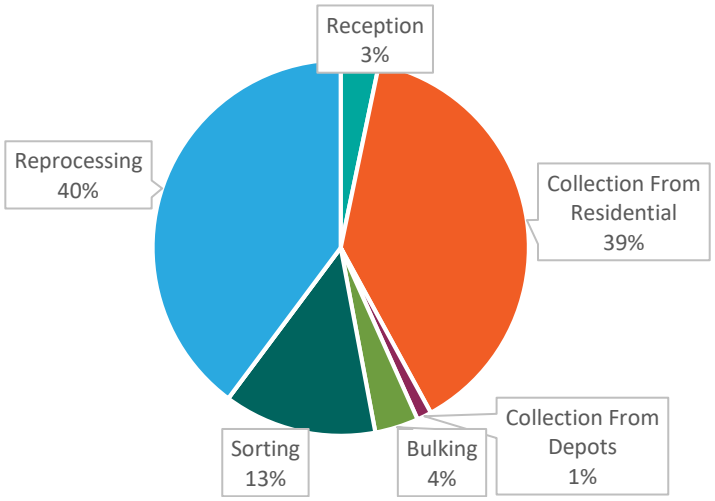
[62] Disposal costs provided by Morrison Hershfield, Alberta office staff.

4.2.9 Jobs

The total number of FTE direct, indirect and induced jobs created by the PPP recycling sector in Alberta in 2018 was approximately 1,362. The number of direct jobs in the current state is about 775 FTE. This total was developed through responses received from the survey on employment levels at their municipalities as well as conversations with processors and others in the recycling industry.

Figure 4-9 provides a breakdown of the direct jobs associated with the recycling sector. Indirect and induced jobs are calculated based on this number and the assumptions detailed in Appendix A.7.0.

Figure 4-8: Breakdown of Direct Jobs Across Functions in Current State in 2018



Source: Eunomia data collection and calculations

4.2.10 Gross Value Added

The Gross Value Added (GVA) measures the value of goods or services added in a sector of the economy. The model created for this study uses the income approach to measuring GVA. The income approach sums up all of the income earned by individuals or businesses involved in the production of goods and services. The main components of income-based GVA are:

- compensation of employees;
- gross operating surplus (includes gross trading profit and surplus, mixed income, non-market capital consumption, rental income, less holding gains); and
- taxes (less subsidies) on production (but not on products).

Income-based GVA is a common approach to measuring the contribution of a sector to the overall GDP of a region. The GVA to Alberta's economy in 2018 from the recycling system was an estimated $132.4 million.

4.2.11 Environmental Benefits

Appendix A.7.0 outlines the approach used to calculate the environmental benefits resulting only from diverting material from landfill. Based on the tonnage of material recycled (not collected), and therefore diverted from disposal, in Alberta, the reduced CO_2e emissions for the current state were 469,700 metric tonnes.[63]

4.2.12 Current State Benefits Summary

A summary of the benefits resulting from Alberta's existing recycling system, as described above, is provided in Table 4-3.

Table 4-3: Summary of Benefits of Recycling System in Current State

Category	Value
Jobs (FTE)	1,362
GVA ($)	132.4 million
CO_2e Emissions Reduced (Tonnes)	469,700
Total Tonnes Collected	197,600
Total Tonnes Recycled	163,200

Source: Eunomia calculations

4.3 Current State Assessment: Large Municipalities

4.3.1 General

Fifty-two percent of Alberta's population resides in the province's two largest cities: Calgary and Edmonton. These two cities make up the large municipality category in this assessment. Within these municipalities, 60% of residents and 40% of residents live in SF and MF properties, respectively.

Services provided to MF households differs between large municipalities; one large municipality carries out or arranges for the collection of PPP from MF households, while the other mandates

[63] Calculated using the US EPA WARM Model V15.

it through its local bylaw. Due to local bylaws in Calgary, some MF households receive collection services from the private sector. However, data on service coverage or costs for MF households serviced by private haulers was not available for this study. Some assumptions were made on coverage and therefore the costs of incremental MF service. This leads to a potential slight over-estimate of the costs of the future state but is considered the best approach at this time.

4.3.2 Collection Services and Accessibility

Single-family Curbside Collection

One hundred percent of the SF properties in the large cities are provided with curbside collection of PPP. Of those, 80% of SF households have services provided in-house by the municipality with the other 20% serviced by a private sector contractor procured by the municipality.

In both large municipalities, PPP collection from SF households is single-stream with materials being collected weekly in either 240L carts or single-use bags placed directly at the curb.

Multi-family Collection

There are approximately 363,600 MF households in Alberta's two largest cities. Forty-eight percent of these have recycling collection equivalent to their garbage collection service, provided by or arranged by the municipality.[64] Material is collected in single-stream bins. Other MF properties may hire collection services from private contractors, as required by bylaws, but data on the percent of households that comply with this requirement were unavailable.

Depots

The large cities both have recycling depots in addition to curbside collection for recyclables. One municipality has recycling centres across the city that collect the same materials as the curbside collection, but in segregated material streams. The recycling centres are unstaffed and open 24/7. The other municipality has recycling centres that consist of a series of bins set in strategic locations across the city. These centres are also unstaffed and accept all recyclables in a single stream. Between the two large municipalities, there is one depot for every 19,000 households.

Large-scale commercial users are discouraged from disposing of recyclables at recycling centres, but since they are unstaffed, this cannot be guaranteed. The cost of operating these unstaffed recycling centres is included in our cost of service calculations, however it is likely

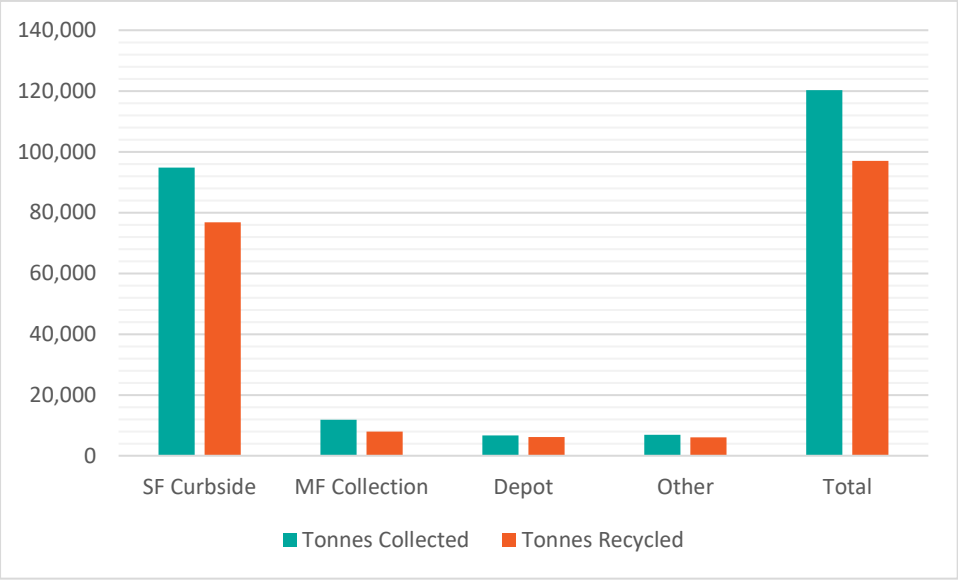
[64] Some MF properties may arrange and pay for their own recycling collection with private contractors; these collections were not quantified in this study.

that these depots are collecting some ICI material, which will have to be addressed in future discussions.

4.3.3 Tonnes Collected and Recycled

A total of 120,300 tonnes of PPP is collected for recycling annually in Alberta's two large cities through services provided or managed by municipalities. Seventy-nine percent of this comes from curbside collection from SF residences. The breakdown of the total tonnage is shown in Figure 4-9. The average contamination rate is approximately 19% with the highest rate being observed in MF collection (33%) and the lowest in depots (8%).

Figure 4-9: Total Tonnes of PPP Collected and Recycled in Large Alberta Municipalities in 2018



Source: Survey responses and Eunomia calculations

The total tonnes of PPP collected from SF households is greater than from MF households. Depots in the large cities collect much less PPP per household than the curbside collection programs, as seen in Table 4-5.

Table 4-4 shows that on average about 173 kg/hh/year of recyclables are collected from SF households in large Alberta municipalities. After processing, with residue losses, about 140 kg/hh/year of material is actually recycled. MF collection was less than half of the SF curbside, at 67 kg/hh/year collected and depot was an average of 7 kg/hh/year collected.

Table 4-4: Kilograms of PPP Collected and Recycled per Household in Large Alberta Municipalities in 2018

Category	Kg per Household Collected	Kg per Household Recycled
SF Curbside*	173	140

Category	Kg per Household Collected	Kg per Household Recycled
MF Collection*	67	45
Depots[65]**	7	6
Other[66]**	17	15
Average**	132	107

*Source: Survey responses and Eunomia calculations. * Average where service provided* **Weighted average across all households

4.3.4 Composition

In large municipalities, the data from survey responses on waste composition indicated that the largest component of the recycling stream by weight was paper, followed closely by cardboard. Together, these materials accounted for nearly 70% of the material recycled by weight. Contamination rates averaged approximately 19%. Composition details from the limited number of responses can be found in Appendix A.11.0.

4.3.5 Costs

Data received from the two large cities for both contracted and in-house PPP services (collection and processing) was used to calculate a total cost for PPP services as well as a cost per household.

Municipality Cost of Service

The total costs of providing PPP services in the large municipalities are shown in Table 4-5. This includes costs for both in-house and contracted services.

Table 4-5: Total Costs of Managing PPP in Large Municipalities in 2018

Category	Total ($)
Collection Costs	29,305,300
Processing Costs	17,784,300

[65] A 50% discount was assumed to account for potential ICI material, predominately cardboard. No data was available to determine actual percentages of ICI vs. residential, but based on knowledge of typical tonnages per household.

[66] Includes PPP costs for eco-centres and semi-annual big bin recycling events.

Category	Total ($)
Other Costs[67]	8,729,000
Revenue	(6,829,000)
Total Cost	48,989,600
Cost per tonne of PPP collected for recycling	407
Cost per tonne of PPP recycled	505

Source: Survey responses and Eunomia calculations

As indicated in Table 4-6, costs per MF collection at $29/hh/year are significantly less than costs for SF curbside recycling at $75/hh/year. This is due to the fact that for MF residences the ratio of collection points to number of households is much lower.

Table 4-6: Cost per Household per Year in Large Municipalities by Collection Method in 2018 (Includes Collection, Processing and Transportation)

Collection Method	Cost per Household ($)
SF Curbside*	75
MF Collection*	29
Depot & Other[68]***	11

*Source: Survey Responses and Eunomia Calculations. * Average where service provided* **Weighted average across all households

4.4 Current State Assessment: Medium Municipalities

4.4.1 General

Twenty-four percent of Alberta's population resides in medium-sized municipalities, those with populations between 10,000 and 500,000. Of these residents, 86% live in SF households and 14% live in MF households.[69]

[67] Includes administration, and support functions, education (where in place) and transport after collection.

[68] Includes PPP costs for eco-centres and semi-annual big bin recycling events.

[69] Statistics Canada census data 2018.

Eighty-four percent of SF households in the medium municipalities are provided with curbside collection of PPP, but only 7% of MF households receive the same service (as provided by the municipality or its contractor).[70]

In medium municipalities that provide curbside PPP services, collection varies from weekly or biweekly and can be via bin, cart or bag.

4.4.2 Collection Services and Accessibility

Single-family Curbside Collection

Of the medium municipalities in the study group that offered SF curbside collection, 68% contract services through the private sector, while only 32% provide services in-house.

PPP collection frequency varies among medium municipalities. Most of the study group collected both garbage and recyclables on a weekly basis, but there are notable exceptions to this trend.

One municipality collects organics on a weekly basis, but alternates weeks for garbage and recyclables. In another municipality, residents have one weekly collection, but the stream alternates between garbage, recycling and organics.

PPP material collection is most often single-stream, with only 20% of responding municipalities reporting multi- or dual-stream collection.

Multi-family Collection

For medium municipalities, there was little data specific to MF collection; only municipalities that contract the service provided total contract cost. One medium municipality specified that it provides garbage, organics and recycling collections to all residential properties, regardless of whether they are SF or MF. No additional information related to MF collection was provided by other study group members. For this reason, cost data is not provided for MF recycling specifically for medium municipalities.

Depots

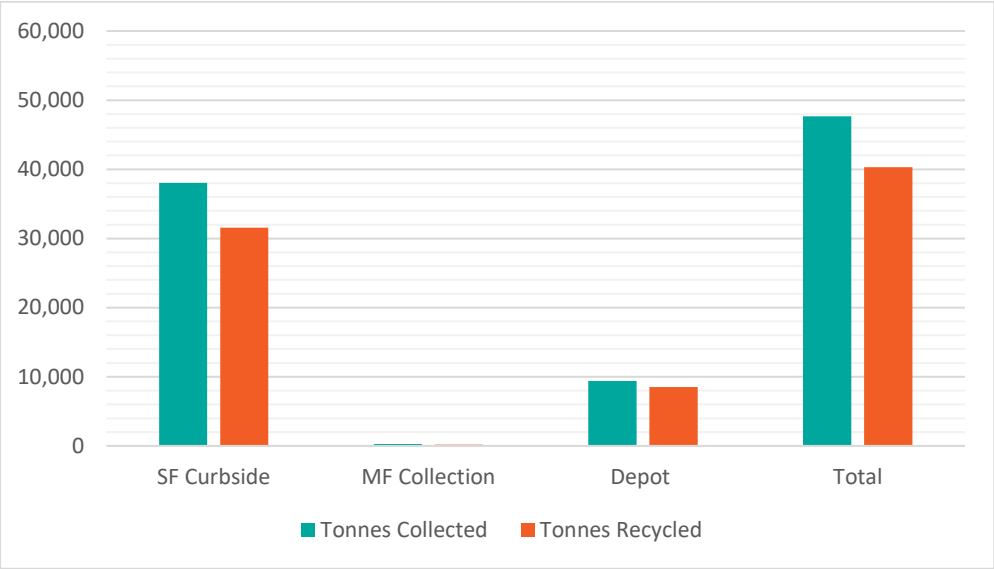
Sixteen percent of medium municipalities in the study had depot-only collection services. Depots in medium cities and towns are often used to supplement curbside programs.

[70] Some MF properties that are not provided services by the municipalities may choose to hire their own contractors for recycling service, but this data was unavailable.

4.4.3 Tonnes Collected and Recycled

A total of about 47,700 tonnes of PPP was collected for recycling and 40,300 tonnes were recycled from medium municipalities in 2018, as seen in Figure 4-10 .The average contamination rate of municipalities that provided data is approximately 16%, which is lower than that of the large municipalities.

Figure 4-10: Tonnes of PPP Collected and Recycled in Medium Municipalities in 2018



Source: Survey responses and Eunomia calculations

In the medium municipalities, the kilograms of PPP collected per household is similar to that in large municipalities (see Table 4-7 below). Note that the kilograms collected and recycled per household for MF households were extrapolated from the large municipalities since there was no data provided specific to MF tonnages for medium municipalities.

Table 4-7: Kilograms of PPP Collected and Recycled per Household in Medium Municipalities in 2018

Category	Kg per Household Collected	Kg per Household Recycled
SF Curbside*	139	115
MF Collection*	67	45
Depots**	25	22
Average**	125	106

*Source: Survey responses and Eunomia calculations. * Average where service provided* **Weighted average across all households.

4.4.4 Composition

In medium municipalities, paper was the largest portion of the recycling stream, at 51%. Cardboard was much less than in large municipalities, at only 12%. Plastic bags and film accounted for 6% of the recycling stream, compared to only 1% in large municipalities. Composition details can be found in Appendix A.11.0.

4.4.5 Costs

Municipality Cost of Service

The total costs of providing services in the medium municipalities are approximately $31.7 million, as shown in Table 4-8. A breakdown of costs by collection, processing and the other category is provided, along with the cost per tonne collected and cost per tonne recycled. Table 4-9 provides a breakdown of the per household cost.

Table 4-8: Total Costs of Managing PPP in Medium Municipalities in 2018

Category	Total ($)
Collection Costs	23,993,400
Processing Costs	4,578,000
Other Costs[71]	4,887,600
Revenue	(1,749,700)
Total Cost	31,709,300
Cost per tonne of PPP collected for recycling	665
Cost per tonne of PPP recycled	787

Source: Survey responses and Eunomia calculations

Table 4-9: Cost per Household per Year by Collection Method for Medium Municipalities in 2018 (Includes Collection, Processing and Transportation)

Collection Method	Cost per Household ($)
SF Curbside*	71

[71] Includes administration and transport after collection.

MF Collection*	30
Depot & Other[72]**	35

*Source: Survey responses and Eunomia calculations. * Average where service provided* **Weighted average across all households

4.5 Current State Assessment: Small Municipalities

4.5.1 General

Approximately 9% of Alberta's population is found in small municipalities. About 96% of residents in these small municipalities live in SF households, while the remaining 4% live in MF households. These municipalities have less access to PPP recycling services than either the large or medium municipalities.

There is little consistency in the services provided to small municipalities. Average contamination in small municipalities is 13%. If provided, curbside PPP collection varies from weekly to once every three weeks and can be collected using bins, carts or bags.

4.5.2 Collection Services and Accessibility

Single-family Curbside Collection

All municipalities that responded to the surveys used a private sector contractor to provide SF collection services. In most cases, recycling collection was performed alongside garbage collection and, in some cases, organics. The majority (85%) of the study municipalities used single-stream collection for all recyclables, while only about 15% used multi-stream collection.

Multi-family Collection

As with medium municipalities, there is little data regarding which small municipalities provide both MF and SF curbside PPP collection. The percentage of MF households in small municipalities is very small, so including MF residences in collections or evaluating them on a case-by-case basis is likely. Therefore, there are no separate costs for MF collections provided for small municipalities.

Depots

There are many more small municipalities that have depot-only collections for PPP than in large or medium municipalities. Many of these municipalities do not provide curbside garbage collection, so residents use the depots to dispose of any residential waste.

[72] Includes PPP costs for eco-centres and semi-annual big bin recycling events.

These depots come in many configurations. One municipal district has 90 bins in “mini-depots” across its jurisdiction. Another municipality has “ecostation” bins around the town in addition to one staffed recycling depot. Both of these types of locations collect PPP materials. The depots also accept hazardous items and bulky items.

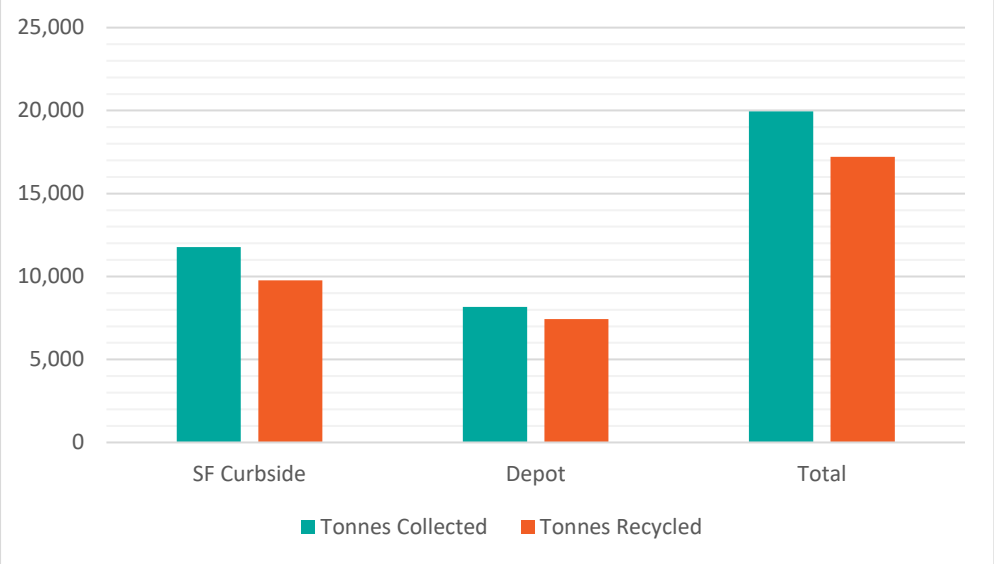
The list of recyclables accepted varies at these depots, if any PPP is separated for recycling at all. One municipal district only accepts PPP separately from garbage at 11 of the 31 small neighbourhood drop-off sites. A different municipality has two depots that accept recycling, but one accepts only cardboard and the other takes additional PPP materials.

Mobile recycling sites are another collection method used in small municipalities. Residents take their PPP to containers that are located at advertised locations on set days of the week.

4.5.3 Tonnes Collected and Recycled

A total of about 19,900 tonnes of PPP is collected for recycling in small municipalities and 17,200 tonnes are recycled, as shown in Figure 4-11. Of this, SF curbside collection again captured the most tonnes for recycling. No data was provided for MF.

Figure 4-11: Total Tonnes of PPP Collected and Recycled in Small Municipalities in 2018



Sources: Survey responses and Eunomia calculations

Table 4-10 details the kilograms per household collected and recycled in small municipalities. As in the other municipality sizes, the kilograms per household collected is much greater when curbside recycling is provided.

Table 4-10: Kilograms of PPP Collected and Recycled per Household in Small Municipalities in 2018

Category	Kg per Household Collected	Kg per Household Recycled
SF Curbside*	141	117
MF Collection	N/A	N/A
Depots[73]**	55	50
Average**	135	117

*Source: Survey responses and Eunomia calculations. * Average where service provided* **Weighted average across all households

4.5.4 Composition

Like in medium municipalities, paper was by far the largest portion of the recycling stream in small municipalities. When cardboard is included, paper accounted for 63% of the recycling stream in the study group municipalities. Composition details can be found in Appendix A.11.0.

4.5.5 Costs

Municipality Cost of Service

The total costs of providing PPP services in small municipalities is $15.1 million, as shown in Table 4-11. The cost per household is provided in Table 4-12.

Table 4-11: Total Costs of Managing PPP in Small Municipalities in 2018

Category	Total ($)
Collection Costs	10,906,800
Processing Costs	2,852,500
Other Costs[74]	2,020,200
Revenue	(676,200)

[73] A 50% discount was assumed to account for potential ICI material, predominately cardboard. No data was available to determine actual percentages of ICI vs. residential, but based on knowledge of typical tonnages per household.

[74] Includes administration and transport after collection.

Total Cost	15,103,300
Cost per tonne of PPP collected for recycling	757
Cost per tonne of PPP recycled	878

Source: Survey responses and Eunomia calculations.

Table 4-12: Cost per Household per Year by Collection Method in Small Municipalities in 2018 (Includes Collection, Processing and Transportation)

Collection Method	Cost per Household ($)
SF Curbside*	84
Depot**	51

*Source: Survey responses and Eunomia calculations. * Average where service provided* **Weighted average across all households

Table 4-12 shows that the cost/hh for SF curbside is higher in small communities compared to medium sized and large municipalities. Some of this difference can be explained by economies of scale, distance to markets, and the lower number of properties that can be collected by each route when there are longer distances between properties.

4.6 Current State Assessment: Other Municipality and Community Types[75]

4.6.1 General

About 13% of Alberta's population lives in municipalities classified in the "other municipality and community types" category. There were seven other municipalities in the study group, all of which only provide depot services for PPP collection. This trend is likely representative of the majority of these municipalities, though limited conclusions can be drawn from such a small sample size. Due to the cost constraints associated with collecting materials across large geographic areas and low population densities in most of these municipality and community types, households in the other category are unlikely to have curbside services for either garbage or recyclables and must rely on depot services to dispose of residential waste.

Two First Nations provided limited data on their garbage and PPP recycling services. Both run depots that collect paper and cardboard for recycling; they do not provide curbside recycling

[75] Includes: special areas, municipal districts, regional waste authorities, improvement districts, First Nations and Metis settlements.

services. The depots mainly collect electronics and other materials that are part of the Alberta Recycling Management Authority stewardship programs. Cost and tonnage information was unavailable.

About 99% of people living in other municipality and community types in Alberta live in SF households. In the transition to EPR, the geography and density of these municipalities will determine whether curbside services are feasible in the future.

There are many different service configurations for other municipality and community types in Alberta, including:

- stationary depots, both staffed and unstaffed;
- mobile depots that visit communities on fixed days of the week at fixed times; and
- neighbourhood drop-off facilities, which are generally unstaffed.

An estimated 9,700 tonnes of PPP was collected for recycling in other municipality and community types, and 8,800 tonnes recycled, as shown in Figure 4-12. No composition data was provided for other municipality and community types.

Figure 4-12: Tonnes Collected and Recycled in Other Municipality and Community Types in Alberta in 2018

Source: Eunomia Calculations.

4.6.2 Costs

Municipality Cost of Service

The total costs of providing PPP services in the other municipality and community types that provided data is $11.3 million as shown in Table 4-13. Due to the far distances between

households, collection costs are relatively high, leading to a higher cost per tonne collected and recycled.

Table 4-13: Total Costs of Managing PPP in Other Municipality and Community Types in 2018

Category	Total ($)
Collection Costs	7,064,500
Processing Costs	1,385,800
Other Costs[76]	3,764,000
Revenue	(949,400)
Total Cost	11,264,900
Cost per tonne of PPP collected for recycling	1,160
Cost per tonne of PPP recycled	1,277

Source: Eunomia Calculations.

The net cost per household in other municipality and community types is $54 for depot-only services.

[76] Includes administration and transport after collection.

5.0 Triple Bottom Line Future State Assessment

In order to carry out the triple bottom line assessment of a future state under EPR for residential PPP in Alberta, assumptions have been made to determine the parameters of the modelling. These were touched upon in the previous section and are summarized in Appendix A.7.0. The approach to estimating future tonnages and costs has been based on a scaling up of current costs based on the following assumptions:

1) All SF households in large municipalities will retain curbside collection services;
2) All MF households in large municipalities will be guaranteed collection services through the EPR system;
3) All SF households in medium and small municipalities that already have a curbside garbage service will have curbside recycling service;
4) All MF households in medium and small municipalities with municipality-managed garbage service will receive PPP recycling collection service; and
5) All depots and curbside collections in large, medium, small and other municipality and community types will be able to recycle the same range of material.

Efficiencies are expected in the future EPR system as a result of uniform contracts and service standards, a standardized list of materials collected throughout the province, and standardized approach to program promotion and education. These in turn are expected to result in increased capture of recyclables and reduced levels of contamination. Collection and processing benefits resulting from greater uniformity are also expected over time.

The triple bottom line benefits detailed in this section are indicative of what could be realized when the services have fully transitioned to the future state and may take a number of years to materialize.

Further discussion on the architecture of the future system will be required to either develop a model from the bottom up to identify the triple bottom line in more detail, or to determine the efficiency assumptions to be applied.

The costs presented in this section are likely to be at the upper limit of what should be expected, as no assumptions have been made as to likely savings from economies of scale. In order to determine potential future service efficiencies, an assessment of current service efficiency needs to be completed; this was outside the scope of this study.

5.1 Benefits

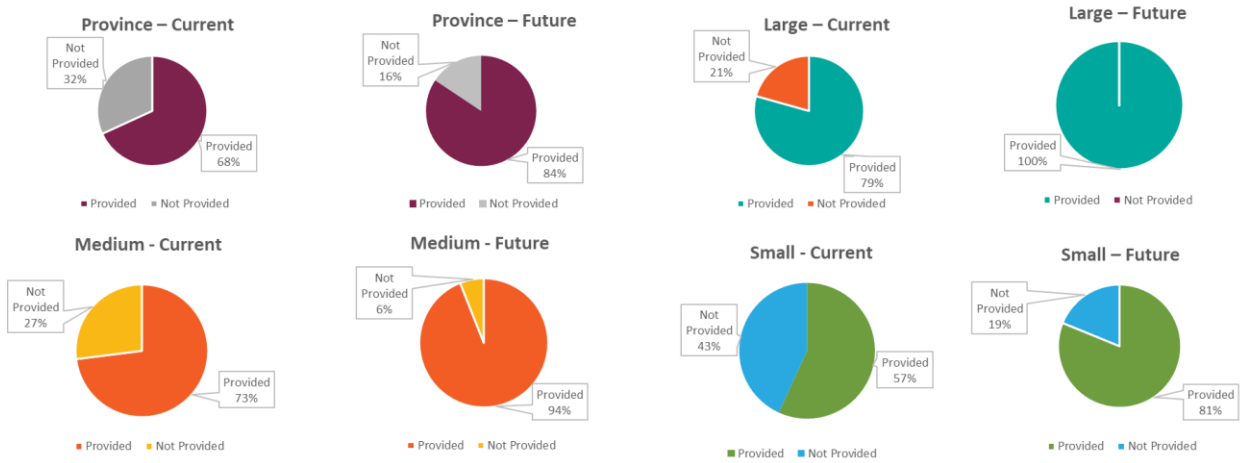
5.1.1 Collection Services and Accessibility

As described in the vision, once EPR is fully implemented, all MF households should receive equivalent services to SF households. This means that if SF households receive curbside collection services, then MF households will receive a similar level of service. This will lead to an additional 18% of households guaranteed coverage by the EPR PPP collection system.

The future state increases the number of SF and MF having a curbside or equivalent collection from 66% to 84% of households. One hundred percent of households in large municipalities, 90% of households in medium municipalities, and 90% of households in small municipalities will have a curbside or equivalent service under the future state. Other municipality and community types will continue to use depot services, though these may be expanded.

Figure 5-1 provides an illustration of the coverage of SF curbside and MF collection households in the current state that are provided service by the municipality directly or through their contractor. The corresponding future state diagrams illustrate the percentage of households that will be covered under EPR.

Figure 5-1: SF and MF Households with Curbside/Collection Service Coverage Provided or Managed by Municipalities in the Current State vs. Future State

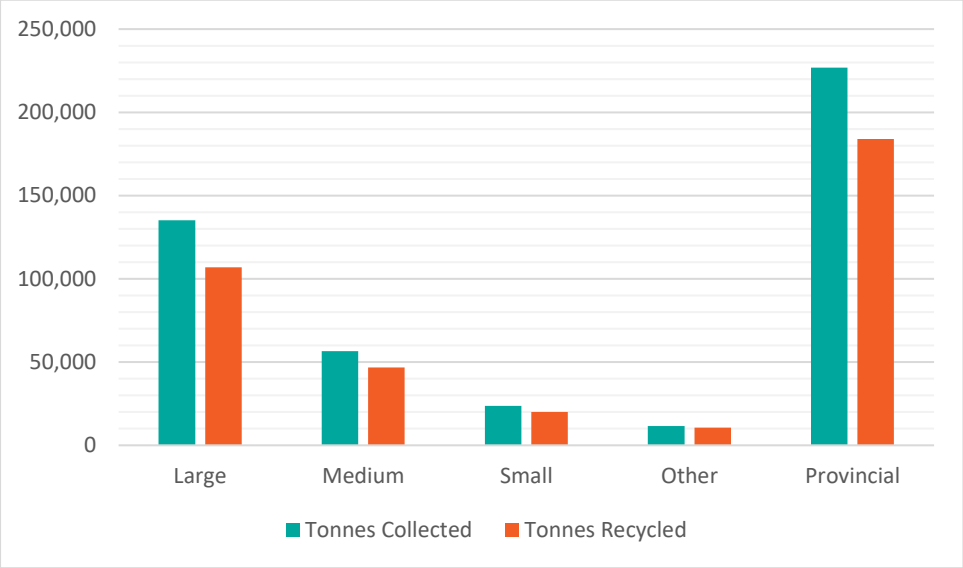


Source: Eunomia calculations

5.1.2 Tonnes Collected and Recycled

In the future state scenario, it is estimated that there would be an additional 29,300 tonnes of PPP collected for recycling,[77] of which approximately 20,900 tonnes (equivalent to the weight of about 52,000 elk!) would be recycled, and would bring the total tonnes of PPP recycled up to 184,100 tonnes. Figure 5-2 shows the tonnes collected and recycled across the various municipality types.

Figure 5-2: Annual Projected Tonnes Collected and Recycled in the Future State by Municipality Type and Province-wide



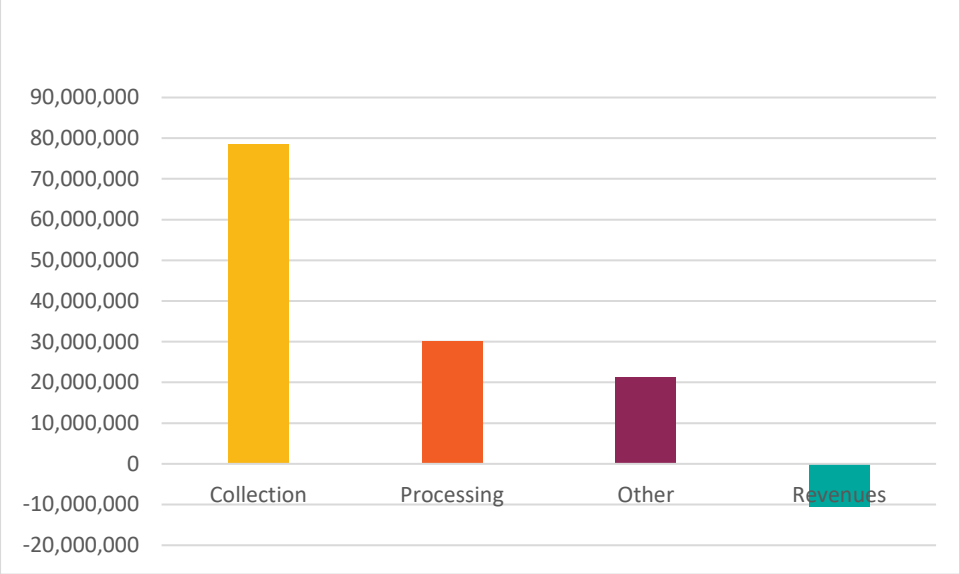
Source: Eunomia calculations

5.1.3 Costs of Service Provision

The estimated costs for recycling approximately 184,100 tonnes of residential PPP in Alberta in the future state is estimated at $119.3 million. The breakdown of these costs, by categories is provided in Figure 5-3. The costs per tonne in the current and future states is provided in Table 5-1.

[77] Due to local bylaws in Calgary, some MF households receive collection services from the private sector. However, data on service coverage or costs for MF households serviced by private haulers was not available for this study. Some of this additional tonnage may currently be getting recycled through privately contracted waste services.

Figure 5-3: Future State Projected Annual Costs of PPP Collection and Recycling[78]



Source: Eunomia calculations

Table 5-1: Cost Per Tonne of PPP Collected in Current and Future State[79]

Municipality Type	Current Cost per Tonne ($)	Future Cost per Tonne ($)
Large Municipalities	407	393
Medium Municipalities	665	632
Small Municipalities	757	777
Other Municipality & Community Types	1,160	1,042
Provincial Average	543	526

Source: Eunomia Calculations.

[78] Projected costs are calculated according to current market conditions and do not include system efficiencies through more centralized provision of services. Calculating these potential efficiencies would require an assessment of current system efficiency, which was outside the scope of this study.

[79] Projected costs are calculated according to current market conditions and do not include system efficiencies through more centralized provision of services. Calculating these potential efficiencies would require an assessment of current system efficiency, which was outside the scope of this study.

For an increase of 12% in tonnage recycled, the system costs increase by approximately 9%. The recycled tonnages increase to a greater extent than the costs because a large percentage of the households added to the system are MF, which have a considerably lower costs of collection than SF households (though generally fewer kg/hh are collected and with higher contamination rates).

As seen in the table above, the cost per tonne collected is expected to fall in most municipality types, from $407 to $393 in large municipalities, $665 to $632 in medium municipalities and from $1,160 to $1,042 in other municipality and community types. In small municipalities, the price rises from $757 to $777, as more SF households are added to the system. Overall, the province-wide average costs for PPP collected falls from $543 per tonne to $526 per tonne.

5.1.4 Avoided Disposal Costs

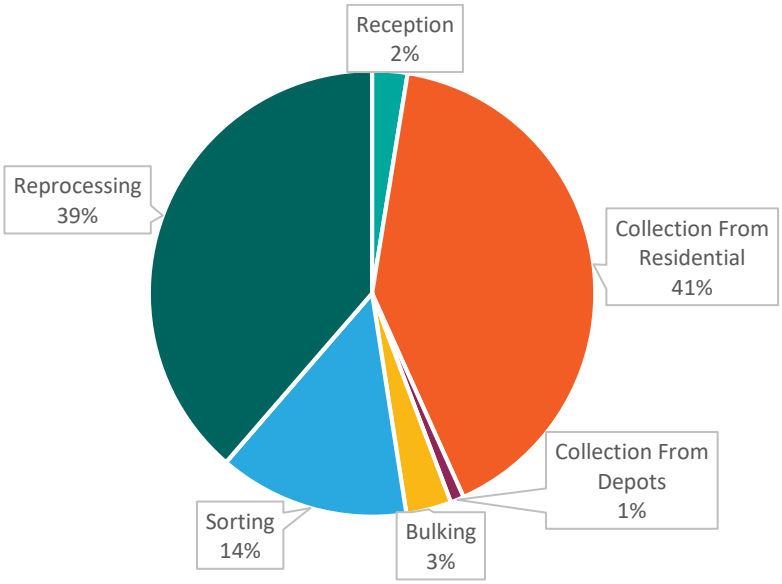
Increasing the quantities recycled means that 20,900 fewer tonnes of residential material need to be collected and disposed of as garbage. Assuming a cost of $100/tonne for garbage collection and $74-$120/tonne for disposal,[80] a potential additional $4.7 million in garbage and disposal related costs could be avoided. This calculation is based on the disposal fees set out in Table 4-3.

5.1.5 Jobs

Collecting an additional estimated 29,300 tonnes of PPP in the future state could, subject to system efficiencies, result in an estimated increase of 219 FTE[81] employees in direct, indirect and induced FTE jobs in Alberta, bringing the total number of jobs created by the recycling system to approximately 1,581 FTE, including 894 FTE direct jobs. [82] The breakdown of the projected future direct FTE jobs is provided in Figure 5-4.

[80] Data on garbage collection costs was provided by Kelleher Environmental. Data on disposal costs was provided by Morrison Hershfield.
[81] Proportionate to increase in tonnes recycled; does not incorporate potential reductions in tonnages associated with garbage collection. An assessment of efficiencies in garbage collection would be required to calculate this potential reduction.
[82] Based on the collection and processing of tonnages of PPP in the future state.

Figure 5-4: Projected FTE Direct Jobs Created in the Future State



Source: Eunomia calculations

5.1.6 Gross Value Added

The model created for this study used the income approach to measuring GVA, which is the value of goods or services added to the economy from recycling in Alberta. The income approach sums up all of the income earned by individuals or businesses involved in the production of goods and services. For the future state, GVA includes the additional income earned by individuals or businesses involved in recycling. The estimated contribution to Alberta's economy in the future state is an estimated $148.4 million in GVA.

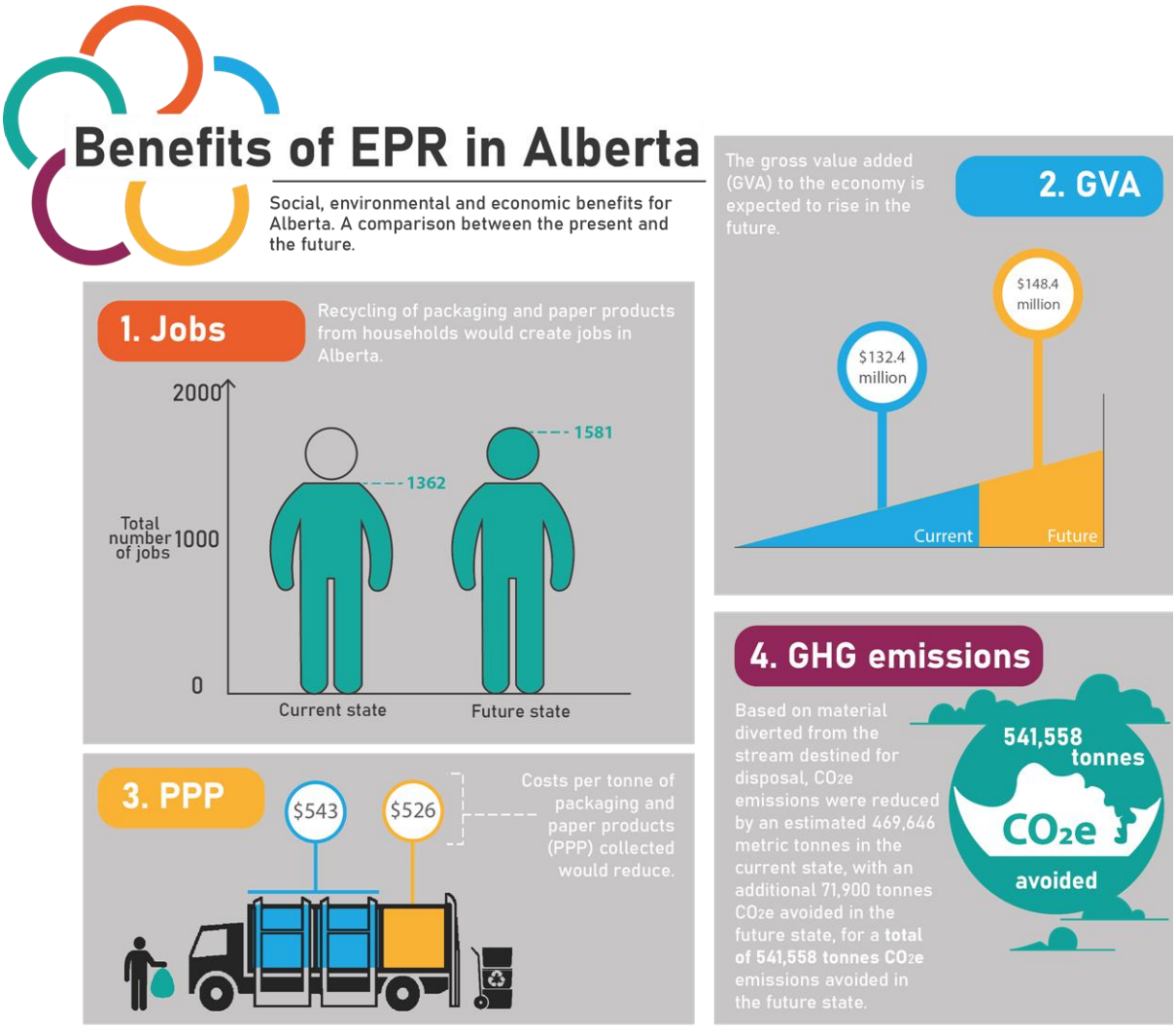
5.1.7 Environmental Benefits

The total quantity of material diverted will result in approximately 541,600 tonnes of CO_2e emissions avoided in the future state based on the additional tonnage recycled. This is the equivalent to the annual emissions of over 120,300 passenger vehicles. Appendix A.7.0 provides details of the conservative approach to this calculation. These are the calculated GHG emission savings associated with diverting 184,100 tonnes of waste from landfill and into recycling, based on specific composition of PPP in Alberta. In addition, the study does not calculate the reduced impact of litter, in terms of avoided clean-up costs on land and in the aquatic environment and improved public amenity delivered through a cleaner environment.

5.1.8 Future State Benefits Summary

As described above, the transition to EPR will produce many benefits for Albertans; these are summarized in Figure 5-5. Table 5-2 provides an overview of the change in costs and benefits from the current to the future state.

Figure 5-5: Benefits of Future State Under EPR Summary



Source: Eunomia calculations

Table 5-2: Change in Annual Costs and Benefits from Current State to Future State[83]

Category	Current	Future	Change (%)
Cost per Tonne Collected	$543	$526	-3.0
Jobs (FTE)	1,362	1,581	+16.1
GVA	$132.4 million	$148.4 million	+12.1
CO_2e Emissions Reduced (Tonnes)	469,700	541,600	+15.3
Total Tonnes Recycled	163,200	184,100	+12.8

Source: Eunomia calculations

Through the implementation of the EPR program in accordance with the vision developed, the cost per tonne of material recycled will be reduced and the costs for this service will move from the municipalities to the producers. This will not only create a more efficient PPP residential recycling system, but municipalities will be able to allocate their resources to other services and Albertans will benefit from program management honed across other Canadian provinces with EPR by producers that operate across the country.

5.2 Overarching Challenges with EPR

The main challenge in transitioning to a future EPR system is that there is already a PPP recycling system in place, managed by municipalities and paid for by taxpayers (through property taxes, utility fees and/or private fees). The PPP collection and processing system is operated by both municipalities and private sector companies under contract to municipalities, as well as private companies hired directly, in the case of some MF households. This section

[83] Projected costs are calculated according to current market conditions and do not include system efficiencies through more centralized provision of services. Calculating these potential efficiencies would require an assessment of current system efficiency, which was outside the scope of this study.

identifies the challenges that will be faced during the transition from the current state to the future EPR system, subject to some conditions being met.

5.2.1 Current Infrastructure

The existing infrastructure for PPP recycling consists of a combination of trucks, bins and other containers for collection; consolidation points with simple equipment such as balers and bins; transfer stations for aggregating recyclables before transportation to larger facilities; and MRFs of varying sizes, ages and complexity. As producers develop a province-wide collection system, efficiencies may lead to consolidation of some of these facilities and equipment. Transition processes should ensure that current contracts are honored and existing assets are utilized or compensated. Transition processes should also ensure that the financial impact of existing contracts and infrastructure is minimized for all stakeholders. Some of these considerations will be naturally mitigated, as existing contracts have expired and have been replaced with new contracts that have shorter terms or include clauses that fully recognize the risk of transition. Also, because of the long lead time, buildings and equipment have been amortized to be fully paid off by the time the transition occurs. In other words, some of the issues can be resolved by implementing change in a gradual manner.

5.2.2 Existing Contracts

Existing contracts often present challenges when transitioning from current PPP programs to EPR. However, this project has identified that of all current contracts for PPP collection and processing reviewed for this study, the one with the longest remaining term expires in 2024 (only four years from today). Compared to some other provinces that have implemented EPR, Alberta's contract timelines are shorter, which reduces the challenges associated with transitioning. Most Alberta contracts are set for terms of three to five years; this is in contrast to Ontario, for example, where contract durations are typically 10 years or more.

5.2.3 One or More PROs

A PRO is generally set up to collect fees from producers and manage the PPP recycling system using these revenues. In Europe, many EPR schemes have a single PRO, whereas in other jurisdictions, EPR schemes are operated by a few different groups operating in the same industry sector. In BC, for instance, the electronics EPR programs are operated by a number of different organizations (e.g. EPRA for some electronics; CESA for small household electronics; OPEIC for outdoor electronic equipment, etc.). The PPP EPR system in BC is operated by one PRO – Recycle BC. Ontario's shared EPR program is administered by Stewardship Ontario, which has been directed by the Ontario Minister of Environment, Conservation and Parks (MECP) to "wind up" the program in preparation for new regulations. There are differing opinions on whether having a single PRO is best and more efficient, or whether allowing for competition – where producers can choose to form different PROs – is a better approach. Regardless of approach, the key is to have well written regulations, high targets and strong enforcement. It is not known at this time how the Alberta marketplace will evolve.

5.2.4 Impacts on Alberta Residents

The move to EPR will have some impacts on Alberta residents. On the positive side, access to collection services will be improved, collection standards will likely be harmonized province-wide, and there is likely to be a standard list of materials collected throughout the province. On the negative side, there may be some initial confusion among residents if certain materials that were collected curbside are moved to depot collection, as was the case in some BC municipalities for film plastics and glass. A period of education for residents may also be required if collection frequency and set out rules change, however, based on experience from BC, this is not significant.

5.2.5 Further Points to Consider

Further points to consider during the future planning process include:

- Roles and responsibilities: The distribution of roles and responsibilities among stakeholders (provincial government, regulatory oversight agency, PROs, producers, the waste management industry, municipalities, consumers) must be clearly defined in regulation in order to avoid overlap or loopholes.
- Transparent and consistent data: Regulators should establish the appropriate level of public information needed from producers/PROs from the onset to ensure that reporting is consistent and complete and that the public has appropriate insight into the effectiveness of the EPR system and its benefits.
- Free-riding: As discussed in Section 3.0, all producers in Alberta who meet the de minimis threshold must comply with their obligations under EPR, including those that may be located outside of Alberta such as internet retailers. Free-riding (which refers to companies benefiting from the system but not paying their fair share of the costs of collecting and recycling their products) may happen if producers do not pay the appropriate EPR fees to the PRO or are non-compliant with data requests. The regulations should stipulate the obligations of all affected producers and allow for oversight and adequate penalties to deter free-riding.
- Inclusion of new products in EPR system: The definition of PPP should be clear in the regulation and should be flexible enough to allow for new products and packaging types that may enter the Alberta market over time, but that do not exist at the time of drafting.
- Waste leakage: Products that are not captured in the EPR system are said to be leaked. Products can leak through the system through other legal or illegal channels, such as informal recyclers, illegal or legal export of waste. Proper data collection and monitoring will be required to combat waste leakage.
- Disposal bans have been shown to be an effective complement to EPR policies. Recent European data indicates that countries with landfill restrictions on recyclable and recoverable materials, on average, achieve higher recycling rates of post-consumer

plastics.[84] The CCME, in Phase 1 of its Canada-Wide Action Plan on Zero Plastic Waste, has committed to developing best management practices for disposal bans of end-of-life plastics by December 2019.

5.3 Stakeholder Impact Assessments

Through the transition to EPR, the roles and responsibilities of many stakeholders will change. This will come with associated risks, opportunities and challenges. The overarching benefits have been presented in Section 5.1 and the challenges in Section 5.2. This section provides an initial assessment of these impacts on key stakeholders along with possible mitigating measures to ensure the smoothest possible transition to EPR.

Municipalities and First Nation Communities

Risks

- Some municipalities may feel they are not paid sufficiently if they continue to be involved in collection, depending on contract wording
- Some materials may get dropped from collection or moved to drop-off/takeback, reducing control over how services are delivered
- Remote communities' access to recycling services may be limited depending on what service standard is set
- Some First Nation communities are at risk of consultation fatigue, as many have limited staff capacity to address the consultation requests that they receive from industry and government and also face recycling challenges

Opportunities

- No longer subject to the risks associated with processing and marketing materials
- Improved service provision in other municipality and community types – greater level of service consistency for all Albertans regardless of whether living in urban or rural areas
- Opportunity to optimize collection systems to reduce contamination and increase recycling yield
- Less procurement and contract management required if responsibility for processing transfers to PRO
- First Nations communities and Metis settlements able to access services that they otherwise cannot provide. There may be interest from the federal and provincial governments to support capacity building opportunities in these communities.

[84] *Plastics – The Facts 2018: An Analysis of European Plastics Production, Demand and Waste Data*, by Plastics Europe, 2018, p. 35.

Challenges

- Perceived lack of control over service provisions
- Governing structure of Indigenous communities is very different comparing to municipalities. Metis settlement is a provincial responsibility, but First Nations communities are federal responsibility and both will need engagement in transitioning to EPR

Possible Mitigating Measures

- The transition to full EPR for PPP includes the requirement that there will be no reduction in service
- Municipalities will have the option of opting in or out of providing collection services
- Collection service standards will ensure recyclables collection is no less frequent than garbage collection (Recycle BC's model collection contracts can be a proven starting point)
- Convenient drop-off locations will be in place where curbside collection is not economically viable
- Ensuring producers are responsible for material marketing removes that risk from local municipalities
- Work with Alberta Environment & Parks, Alberta Indigenous Relations, Indigenous Services Canada, First Nations Technical Services Advisory Group and stakeholder organizations to determine strategy for First Nations communities moving forward

Waste Management Industry (Collection Contractors and Processors)

Risks

- As collection may become more consolidated, some will likely lose out on business with potential employment impacts
- May be reduced opportunities, as market may have fewer players over time

Opportunities

- Opportunity to standardize collection across the province
- Less contract administration if working with one PRO
- More material to process and potentially less contamination

Challenges

- Negotiation/renegotiation of contracts
- Ensuring collection service standards are well specified to deliver quality materials
- Ensuring processing standards and infrastructure is suitably specified and efficiently procured / run

Possible Mitigating Measures

- There will likely be some consolidation of collection and processing services but also an increase in total tonnes managed; local material consolidation is still needed as part of an expanded recycling system
- As the program will be implemented over time (and perhaps phased-in), contract re-negotiation should be minimized
- Producers will set collection and processing standards and foster healthy competition through their procurement of waste management services

Non-Governmental Organizations (NGOs)

Risks

- Potential for some NGOs who provide services to lose the ability to do so

Opportunities

- More diversion – opportunity to focus on reduction
- Availability of high-quality data for organizations such as Recycling Council of Alberta
- Potential to partner with PROs on marketing and communication

Challenges

- Determining role of NGOs

Possible Mitigating Measures

- NGOs can play a continued role in promoting system-wide waste reduction and reuse and educating residents
- Citizen and NGO advocacy roles are strengthened by availability of program performance data

Individual Producers

Risks

- Lack of markets for recovered materials; quality of collected and processed materials which they may need to sell
- Budgeting for uncertain markets and uncertain future contract costs
- Getting fees right
- Meeting targets in regulations
- Total system cost could be higher than BC, for example, because of greater distance to markets

Opportunities

- An efficient reverse supply-chain for the collection of materials from millions of Albertans and its management for use in a circular economy

- Driving static efficiency (cost reduction) and dynamic efficiency (innovation) in collection and processing
- Reuse of materials in manufacturing, driving a circular economy, reducing GHG emissions

Challenges

- Ensuring proper regulatory oversight to prevent free-riding and non-compliance[85]

Possible Mitigating Measures

- Producers manage different PPP programs in five other provinces; lessons learned/best practices from these programs can be adapted to Alberta
- Adding another producer-led PPP program in Canada presents opportunities for time and cost saving harmonization by producers
- Material-specific targets help ensure continuous improvement for Alberta's recycling programs
- Increasing the use of recycled content is a step towards packaging and product design that is more environmentally-friendly

Producer Responsibility Organization(s) (PRO(s))

Risks

- Poor performance in meeting targets

Opportunities

- Coordination of producers to create the most efficient system possible

Challenges

- Setting regulations to ensure that PROs have sufficient flexibility to design system, but ensuring that enforcement and political power belong to the government and oversight agencies

Possible Mitigating Measures

- Regulated penalties or enforcement mechanisms to incentivize achievement of targets

Provincial Regulators (Government and Regulatory Oversight Agency)

Risks

[85] Where an organization that should be part of a program and contributing to its costs avoids detection to avoid payment, which places excessive costs on companies that are complying with the regulation.

- Writing a sufficiently clear regulation that is flexible to adapt to future material composition changes and markets
- Having sufficient enforcement to minimize free-riders
- Ensuring appropriate reporting to collect sufficient data to evaluate system performance and whether targets are being met
- PROs may lobby against changes in laws and delay campaign for longer transition periods

Opportunities

- EPR could further the province's commitment to protecting our environment to encourage and attract investment in our province
- Use of regulatory design that minimizes red-tape while ensuring effective regulatory oversight and attendant high environmental performance
- Set challenging material-specific targets

Challenges

- Setting up systems to register producers and collect sufficient information to verify material-specific targets

Possible Mitigating Measures

- Governments need to set clear policy objectives and establish a regulation that sets performance standards to deliver desired environmental outcomes
- Government or a designated organization monitors progress and conducts enforcement
- Municipalities are given the right-of-first-refusal to act as collection interface with residents
- Producers lead on the design and implementation of the program in response to the regulation
- Regulation should limit political influence of PROs and state that they exist by virtue of the regulation

Consumers

Risks

- Need to ensure that they get reasonable collection service
- Clarity of instructions on what is recycled – some materials may no longer be collected curbside (some may move to depot only)

Opportunities

- Standardized set of materials collected, reducing consumer and service provider confusion and allowing for optimization of collection and management systems

Challenges

- Educating consumers about what the change means and why it is happening

Possible Mitigating Measures

- Aggressive and sustained promotion and education by PRO to residents and service providers
- Regulators set challenging material-specific targets for producers to meet

6.0 Summary, Conclusions and Considerations for Next Steps

6.1 Current PPP Recycling System

Key findings on the current state of residential PPP recycling in Alberta are listed below:

- About 74% of SF households in Alberta are estimated to have access to curbside services for recycling. An estimated 43% of MF households in the province have recycling collection services provided or managed by the municipality;
- An estimated 197,600 tonnes of PPP were collected for recycling in 2018 and about 163,200 tonnes were recycled. The recycled number is lower than the collected number as the collected tonnes include non-target materials which are removed in sorting processes prior to the recycling operation;
- The total cost of residential recyclables collection and processing net of revenue is estimated at $107.0 million/year. About half of this cost is related to residential recycling in the two largest cities with the remainder expended to provide recycling services to medium, small and other municipality and community types;
- It is estimated that 1,362 FTE direct, indirect and induced jobs were created by recycling of PPP from households in Alberta in 2018. The GVA to Alberta's economy in 2018 from the recycling system was an estimated $132.4 million; and
- CO_2e emissions were reduced by an estimated 469,700 metric tonnes based on the current state.

6.2 Impacts of Future PPP System with EPR

EPR for residential PPP in Alberta would result in the transfer of recycling costs to the producers of PPP. Key changes from the current system include:

- The operational and financial responsibility for managing PPP in Alberta would be transferred from municipalities to producers;

- An estimated additional 29,300 tonnes of PPP would be collected for recycling, with an additional estimated 20,900 tonnes recycled, increasing the total tonnes recycled from 163,200 tonnes/year to 184,100 tonnes/year;
- A further 219 FTE jobs created (for a total of about 1,581 FTE jobs) as a result of recycling with an additional estimated GVA of $16.0 million to Alberta's economy for a future total of $148.4 million;
- An additional 71,900 estimated tonnes of CO_2e emissions would be avoided for a total of 541,600 tonnes CO_2e through the recycling of 184,100 tonnes of materials. This is the equivalent to the annual emissions of over 120,300 passenger vehicles; and
- Services would be provided to 18% more households for an estimated 11% increase in system costs from $107.0 million to $119.3 million per year, but costs per tonne of PPP collected would fall from $543 in the current state to $526 in the future.

6.3 Next Steps

This report has described the current residential PPP recycling system in Alberta, outlined a vision for a future EPR system for PPP and estimated its potential impacts on key stakeholders and the environment. It also described a number of transition issues that need to be considered in the move to a future state EPR recycling system for residential PPP.

In Canada, BC's EPR PPP program has had promising results that other provinces are building upon. Ontario is in the midst of working out various transition issues involved in shifting from its current shared responsibility model, which has been in place since the late 1980s, to a full EPR model. The government has set a 6-year timeline for the transition, and considerable work has already been carried out in the last five to ten years to work out the details. Both the Saskatchewan and Manitoba governments are now considering moving to the BC model from the existing shared-responsibility models that exist in each province. While Alberta is considering an EPR PPP program, it is important to consider the experience of BC while concurrently considering Alberta's local municipal structure, recycling system and local circumstances.

To successfully transition Alberta's existing residential recycling to an EPR model, Alberta municipalities should engage representatives in other jurisdictions to learn from the experiences of those provinces and apply lessons learned and best practices to Alberta to create the most efficient and effective EPR system for residential PPP possible. Implementing a successful EPR program also requires ongoing, transparent, and informed discussions with the provincial government, producers, business associations and small businesses. Alberta municipalities can lead these discussions, invite different stakeholders to the table, inform Alberta companies what EPR policy means for their business, and help champion the transition to an EPR framework.

APPENDICES

A.1.0 Visioning Workshop Attendees and Minutes

Attendees:

- Consultant Team:
  - Eunomia: Sarah Edwards (Calgary), Dominic Hogg (phone), Sydnee Grushack (phone), John Carhart (phone)
  - Kelleher Environmental: Maria Kelleher (phone)
  - Love Environment: Geoff Love (Calgary)
  - S-Cubed Environmental: Tammy Schwass (Calgary)
- Project Team:
  - City of Calgary: Jason London (Calgary)
  - AUMA: Che-Wei Chung (Edmonton)
  - CSSA: Gemma Zechinni (phone)
  - City of St. Albert: Olivia Kwok (Edmonton)
  - Recycling Council of Alberta: Christina Seidel (Calgary)
  - City of Edmonton: Ryan Kos (Edmonton)
  - Town of Whitecourt: Dale Rankel (Edmonton)
  - Rural Municipalities of Alberta: Alex Mochid (Edmonton)
- Governance Committee:
  - City of St. Albert: Cathy Heron (phone)
  - City of Edmonton: Cameron Grayson (Edmonton)
  - City of Calgary: Peter Demong (Calgary)
  - AUMA: Nicole Martel for Dan Rude (Edmonton)
- Additional Stakeholders:
  - Recycling Council of Alberta: Jodi Tomchyshyn London (Calgary)
  - City of Calgary: David Duckworth (Calgary), Rick Valdarchi (Calgary), Blair Cunningham (Calgary), Kate Trajan (Calgary)

Introduction to EPR by Sarah Edwards

Presentation by Geoff Love

Discussion points:

- Harmonization across Alberta, Western Canada, enable potential for all provinces to come together
- Make sure residents know what recyclable materials are
- Consumers should be able to recycle the same materials, regardless of where they live
- All Alberta communities should have access, including rural areas
  - Accessibility standards are important

- No decline in recycling, no decline in service
- As many materials diverted as possible, including difficult plastics
- ICI inclusion
- Coordination between today's system and future PPP – integration
- Multifamily inclusion
- Consistency in the province
- Outcome-based producer flexibility
- Communications – transparency to Albertans – costs, recycling, recover and disposal rates
- Accountability to Albertans through the Minister of Environment and Parks
- Industry forming in Alberta – local processing
- First right of refusal for municipalities (to continue providing collection service under contract)
- Using terms as clearly as possible, i.e. 100% financial and operational responsibility for producers
- Smart and fair transition from now to 20+ years
- Be clear what information you want to gather – what, how, what gets recycled
- Ability to compel data from different areas of the supply chain
- Full 4R transparency on what is disposed
- Cost effective and efficient
- End-of-life responsibility – not shipped to disposal sites overseas
- Concrete plan for ICI (industrial, commercial and institutional) inclusion
- System key components
    - Move conversations upstream
        - Cross-border
        - Design
    - Don't lose things that work well in current system
        - Government sets outcomes, not tactics
    - Municipal engagement is key
    - Set priorities
    - Clarity on first right of refusal, fairness of negotiation
    - BC incentive rate term
    - Parking Lot
    - Individual producer orgs vs. collective orgs.
    - Consequences of outcomes

A.2.0 PPP Material Under EPR Measurement Process Details

In order to calculate the

In March 2019, the European Commission, through the Waste Framework Directive, revised the methodology used by EU Member States to calculate the quantity of material that is recycled and to report on progress against new targets. Under the new methodology, the amount of material recycled is to be calculated as described below:

> *"the weight of the municipal waste recycled shall be calculated as the weight of waste which, having undergone all necessary checking, sorting and other preliminary operations to remove waste materials that are not targeted by the subsequent reprocessing and to ensure high-quality recycling, enters the recycling operation whereby waste materials are actually reprocessed into products, materials or substances. The weight of the municipal waste recycled shall be measured when the waste enters the final recycling process (Article 11 (2))."*[86]

The Commission defines the final recycling process as:

> *"the recycling process which begins when no further mechanical sorting operation is needed and waste materials enter a production process and are effectively reprocessed into products, materials or substances (Article 17a)."*[87]

The calculation rules for the attainment of the EU's packaging and packaging waste targets for 2025 and 2030 established in Article 6a(1) and (2) of Directive 94/62/EC are that only waste that enters a recycling operation or waste that has achieved end of waste status should be used for the calculation of the recycling target and, as a general rule, the measurement of waste should be at the input to the recycling operation. In order to ensure uniform application of the calculation rules and comparability of data, the calculation points for the main packaging materials and recycling operations should be specified.

There are several reasons why 'supplied' and 'generated' quantities could be different, for example through the addition of material from free-riders (obligated producers who don't pay their fees and their tonnes are not reported as sold into the market) or exempt business (smaller businesses who are below the de minimis threshold), or from material brought in from outside the province, for instance through Internet shopping, or magazines that are sent from

[86] Eurostat. Glossary: Recycling of waste. https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Recycling_of_waste

[87] Ibid.

the US through the mail. Using either one as the denominator in the recycling calculation has several implications from a producer's perspective, especially as related to free-riders and producers exempt under the de minimis provision. The generated amount does not work as a denominator under an IPR (individual producer responsibility) framework, as each company is individually responsible for meeting recycling targets for the materials they sell into the market.

Where material generated is used as the denominator (in some collective responsibility programs), the calculated recycling rate is lower. If the supplied-into-market figure is used, the calculated recycling rate is higher (as the denominator is lower but the amount recycled – the numerator – stays the same).

A.3.0 Definition of Packaging and Paper Products and Accessibility Standards in Other Jurisdictions

Table A-1 details the definition of packaging and paper products under different producer obligated EPR programs.

A-1: Definitions for the Purposes of Producer Obligations

Jurisdiction	Legislation, Regulation Producer Responsibility		Packaging Definition	Paper Products
British Columbia	Legislation	Environmental Management Act[88] Chapter 53 Recycle BC	Primary packaging, i.e., packaging that contains the product at the point of sale to the residential consumer; Grouped packaging or secondary packaging that goes to the household; Transportation, distribution or tertiary packaging that goes to the household;	Paper of any description including flyers, brochures, booklets, catalogues, telephone directories, newspapers, magazines, paper fibre and paper used for copying, writing or any other general use. Paper does not include paper products that by virtue of their anticipated use could become unsafe or unsanitary to recycle
	Regulation	BC Recycling Regulation[90]		
	Producer Responsibility/ Stewardship Organization	Recycle BC		

[88] http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/03053_00

[90] http://www.bclaws.ca/Recon/document/ID/freeside/449_2004

Jurisdiction	Legislation, Regulation Producer Responsibility		Packaging Definition	Paper Products
	Cost Coverage	100% of the cost of collecting and processing obligated material	Service packaging designed and intended to be filled at the point of sale and "disposable" items sold, filled or designed and intended to be filled at the point of sale; Packaging components and ancillary elements integrated into packaging, including ancillary elements directly hung or attached to a product and which perform a packaging function unless they are an integral part of the product and all elements are intended to be consumed or disposed of together Full Definition provided in the July 2018 Recycling BC Program Plan here	or any type of bound books such as text books, reference books or literary books.[89] Full Definition provided in the July 2018 Recycling BC Program Plan here

[89] Please note that the BC Recycle Regulation as it reads, exempts all bound books. We believe the government's intention was only to exempt bound literary, textbooks and reference books and that it intends to make that clarification in upcoming amendments to the Regulation. With that clarification the Recycling Regulation will effectively obligate other kinds of bound books such as comic books, colouring books, and bound notebooks (e.g., journals, games and puzzle books and more) – all of which currently find their way into Recycle BC's blue bins, but for which their producers do not pay fees to recycle them. We suggest that Alberta ensure this clarification is made in the drafting of its regulation.

Jurisdiction	Legislation, Regulation Producer Responsibility		Packaging Definition	Paper Products
Saskatchewan	Legislation	The Environmental Management & Protection Act[91]	Primary packaging, i.e., packaging that contains the product at the point of sale to the residential consumer; Grouped packaging or secondary packaging that goes to the household; Transportation, distribution or tertiary packaging that goes to the household;	Paper of any description including flyers, brochures, booklets, catalogues, telephone directories, newspapers, magazines, paper fibre and paper used for copying, writing or any other general use. Excluded are paper products that, by virtue of their anticipated use, could become unsafe or unsanitary to recycle
	Regulation	The Household Packaging & Paper Stewardship Regulation[92]		
	Producer Responsibility/ Stewardship Organization	Multi-Material Stewardship Western		

[91] http://www.qp.gov.sk.ca/documents/english/Chapters/2010/E10-22.pdf

[92] http://www.qp.gov.sk.ca/documents/English/Regulations/Regulations/E10-21R5.pdf

Jurisdiction	Legislation, Regulation Producer Responsibility		Packaging Definition	Paper Products
	Cost Coverage	75% of the cost of collecting and processing obligated material	Service packaging designed and intended to be filled at the point of sale and “disposable” items sold, filled or designed and intended to be filled at the point of sale; Packaging components and ancillary elements integrated into packaging, including ancillary elements directly hung or attached to a product and which perform a packaging function unless they are an integral part of the product and all elements are intended to be consumed or disposed of together. This definition has been condensed. For the full definition of included packaging materials please refer to the MMSW Program Plan.	or any type of bound book not mentioned in clause. Paper comprises any type of cellulosic fibre source including but not limited to wood, wheat, rice, cotton, bananas, eucalyptus, bamboo, hemp, and sugar cane (bagasse) fibre sources. This definition has been condensed. For the full definition of included paper please see the MMSW Program Plan.

Jurisdiction	Legislation, Regulation Producer Responsibility		Packaging Definition	Paper Products
Manitoba	Legislation	The Waste Reduction & Prevention Act[93]	Designated materials for the MMSM program include: "Packaging", which means materials that are used for the containment, protection, handling, delivery or presentation of goods supplied to consumers, and includes, but is not limited to, service packaging and all packaging components and ancillary elements integrated into the Packaging. "Service packaging" means packaging which may or may not bear a brand that is supplied at the point of sale by the retail, food-service or other service providers to facilitate the delivery of goods, and includes all bags, boxes, and other items for the containment of goods at point of sale.	Designated printed paper for the MMSM program includes: newspapers, including those paid through subscription, provided through free distribution and those purchased through retail channels; daily, weekly, monthly and quarterly glossy magazines including those paid through subscription, provided through free distribution and those purchased through retail channels; directories, including those paid through subscription, provided through free distribution and
	Regulation	Packaging & Printed Paper Stewardship Regulation		
	Producer Responsibility/ Stewardship Organization	Multi-Material Stewardship Manitoba		

[93] http://web2.gov.mb.ca/laws/statutes/ccsm/w040e.php

	Cost Coverage	80% of the cost of collecting and processing obligated material	“Supplied”, means sold, leased, donated, disposed of, used, transferred the possession of or title of, or otherwise made available to a consumer in Manitoba or distributed for use by a consumer in Manitoba. “Consumer”, means an individual (other than a Person in the Industrial, Commercial, or Institutional (IC&I) sector) to whom Designated Blue Box Waste is Supplied. For more information on designated packaging for the MMSM program, please refer to the MMSM Rules or the MMSM Program Plan.	those purchased through retail channels; lottery tickets and lottery information; warranty information, assembly instructions, product use instructions and health information, product registration cards and promotional information that is found inside purchased products; envelopes, statements and information inserts from banks, credit companies, utilities, service providers, etc.; information, forms and promotional materials distributed by municipal, regional, provincial and federal governments; promotional calendars, posters that are distributed to consumers free of charge; unsolicited promotional information, coupons, handbills and flyers; and transportation and transit Printed paper does not include bound reference books, bound literary books, or bound textbooks.

Jurisdiction	Legislation, Regulation Producer Responsibility		Packaging Definition	Paper Products
				Please see the MMSM Rules or Program Plan for more information on designated printed paper.
Ontario	Legislation	Resource Recovery and Circular Economy Act[94]	"Packaging", refers to materials that are used for the containment, protection, handling, delivery or presentation of goods supplied to consumers, and includes, but is not limited to, service packaging and all packaging components and ancillary elements integrated into the Packaging. "Service Packaging", refers to packaging which may or may not bear a brand that is supplied at the	"Printed Paper" means any material that is not Packaging, but is printed with text or graphics as a medium for communicating information, Supplied to Consumers, and includes, but is not limited to: • newspapers, including those paid through subscription, provided through free distribution and those
	Regulation	The Blue Box Waste Regulation[95] Stewardship Ontario Regulation[96]		
	Producer Responsibility/ Stewardship Organization	Stewardship Ontario		

[94] https://www.ontario.ca/laws/statute/16r12

[95] https://www.ontario.ca/laws/regulation/020273

[96] https://www.ontario.ca/laws/regulation/160388

	Cost Coverage	50% of the cost of collecting and processing obligated material (in transition to 100%)	point of sale by the retail, food-service or other service providers to facilitate the delivery of goods, and includes all bags, boxes, and other items for the containment of goods at point of sale. "Supplied", means sold, leased, donated, disposed of, used, transferred the possession of or title of, or otherwise made available to a consumer in Ontario or distributed for use by a consumer in Ontario. Supply and supplies have similar meanings. "Consumer", means an individual (other than a person in the Industrial, Commercial, or Institutional (IC&I) sector) to whom Designated Blue Box Waste is supplied. Please refer to the Stewardship Ontario Program Plan or the Rules for more information on designated materials for the Stewardship Ontario program.	purchased through retail channels; • daily, weekly, monthly and quarterly glossy magazines, comic books, puzzle books including those paid through subscription, provided through free distribution and those purchased through retail channels; • directories, including those paid through subscription, provided through free distribution and those purchased through retail channels; • lottery tickets and lottery information; • warranty information, assembly instructions, product use instructions and health information, product registration cards and promotional information that is found inside purchased products; • envelopes, statements and information inserts from banks, credit companies, utilities, service providers, etc.; •information, forms and promotional materials distributed by municipal,

Jurisdiction	Legislation, Regulation Producer Responsibility		Packaging Definition	Paper Products
				regional, provincial and federal governments; • promotional calendars, posters that are distributed to consumers free of charge; • unsolicited promotional information, coupons, handbills and flyers; and • transportation and transit schedules Printed Paper does not include bound reference books, bound literary books, or bound textbooks. Please refer to the Stewardship Ontario Program Plan or the Rules for more information on designated materials for the Stewardship Ontario program.
Quebec	Legislation	Environment Quality Act Originally passed in 2002 and was revised in 2011		

Jurisdiction	Legislation, Regulation Producer Responsibility		Packaging Definition	Paper Products
	Regulation	Respecting Compensation for Municipal Services Provided to Recover and Reclaim Residual Materials	Containers and packaging - Made of flexible or rigid material such as paper, cardboard, plastic, glass or metal Designed to contain, protect or wrap products Intended for single use or a short service life Short-life containers and packaging sold as products and printed matter sold as products.[97]	Printed matter, paper and other cellulosic fibres, whether or not they are used a medium for text or images, except books and newspapers. The newspapers class is represented by RecycleMédias.[98]
	Producer Responsibility/ Stewardship Organization	Eco-Entreprises Quebec		
	Cost Coverage	Originally the amount that the programs had to provide was about 50% of the costs (this was negotiated on a yearly basis). The revisions in 2011 specified the yearly payment rate, that increased to 100% by 2013.		

[97] https://www.eeq.ca/en/for-companies/fee-structure/materials-guide/

[98] Ibid.

Jurisdiction	Legislation, Regulation Producer Responsibility		Packaging Definition	Paper Products
Europe	Legislation	EUROPEAN PARLIAMENT AND COUNCIL DIRECTIVE 94/62/EC of 20 December 1994 on packaging and packaging waste	'packaging' shall mean all products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer. 'Non-returnable' items used for the same purposes shall also be considered to constitute packaging. 'Packaging' consists only of: (a) sales packaging or primary packaging, i.e. packaging conceived	N/A
	Regulation	Country specific		
	Producer Responsibility/ Stewardship Organization	County specific		

	Cost Coverage		so as to constitute a sales unit to the final user or consumer at the point of purchase; (b) grouped packaging or secondary packaging, i.e. packaging conceived so as to constitute at the point of purchase a grouping of a certain number of sales units whether the latter is sold as such to the final user or consumer or whether it serves only as a means to replenish the shelves at the point of sale; it can be removed from the product without affecting its characteristics; (c) transport packaging or tertiary packaging, i.e. packaging conceived so as to facilitate handling and transport of a number of sales units or grouped packaging in order to prevent physical handling and transport damage. Transport packaging does not include road, rail, ship and air containers. The definition of 'packaging' shall be further based on the criteria set out below. The items listed in Annex I are illustrative examples of the application of these criteria. (i) Items shall be considered to be packaging if they fulfill the abovementioned definition without prejudice to other functions which the packaging might also perform,	

			unless the item is an integral part of a product and it is necessary to contain, support or preserve that product throughout its lifetime and all elements are intended to be used, consumed or disposed of together. (ii) Items designed and intended to be filled at the point of sale and 'disposable' items sold, filled or designed and intended to be filled at the point of sale shall be considered to be packaging provided they fulfill a packaging function. (iii) Packaging components and ancillary elements integrated into packaging shall be considered to be part of the packaging into which they are integrated. Ancillary elements hung directly on, or attached to, a product and which perform a packaging function shall be considered to be packaging unless they are an integral part of this product and all elements are intended to be consumed or disposed of together. The Commission shall, as appropriate, examine and, where necessary, review the illustrative examples for the definition of packaging given in Annex I.	

Source: Canadian Stewardship Services Alliance Guidebook and European Parliament and Council Directive 94/62/EC

Table A-2 provides a summary of the accessibility standards and performance of Canadian EPR provinces.

Table A-2: Accessibility Details from other Canadian Provinces with EPR

Province	Accessibility Standards in Regulation	% of Households with Access to EPR Program through Curbside or Depot Service
British Columbia	Accessibility measured by drive-time to depot metric: population located within a 30-minute (urban) or 45-minute (rural) drive-time to a depot	98.3%[99]
Saskatchewan	A Depot Only Household is deemed to have access to a depot if the household is within a 45-minute drive of the depot.[100]	82.2%[101]

[99] Recycle BC. 2018 Annual Report. http://recyclebc.ca/wp-content/uploads/2019/06/Recycle-BC-2018-Annual-Report-1.pdf

[100] Multi-Material Stewardship Western. Waste Packaging and Paper Stewardship Plan. Revised September 26and December 12, 2013. Revised September 24, 2015. https://www.mmsk.ca/wp-content/uploads/WPP-Stewardship-Plan_revised_September-12-2015.pdf

[101] Multi-Material Stewardship Western. 2018 Annual Report. https://www.mmsk.ca/wp-content/uploads/MMSW-2018-Annual-Report.pdf

Province	Accessibility Standards in Regulation	% of Households with Access to EPR Program through Curbside or Depot Service
Manitoba	No performance monitoring requirements in regulation[102]	91.5%[103]
Ontario	In progress	N/A
Quebec	Drop-off centres required to meet at least one of several criteria based on population and distance from retail outlets.[104]	N/A

[102] Packaging and Printed Paper Stewardship Regulation (2008). https://web2.gov.mb.ca/laws/regs/current/_pdf-regs.php?reg=195/2008

[103] Multi-Material Stewardship Manitoba. 2018 Annual Report. http://stewardshipmanitoba.org/wp-content/uploads/2018/06/200947-MMSM-Annual-Report_Composite_reduced.pdf

[104] http://legisquebec.gouv.qc.ca/en/ShowDoc/cr/Q-2,%20r.%2040.1

A.4.0 Packaging Materials Assumed to be in Scope

The materials to be included in the Alberta EPR program are based on CSSA's national material list. Table A-3 below lists all the materials as designated by Ontario, Manitoba, Saskatchewan and British Columbia and indicates whether they are covered by Alberta's Beverage Container Recycling Program, if they will be included under the EPR system or neither (a note has also been made for materials included in Alberta Recycling's stewardship programs). Further definitions of materials can be found in CSSA's guidebook at: http://guidebook.cssalliance.ca/wp-content/uploads/2019/03/CSSA-Guidebook_Updated-March-2019.pdf. Packaging-like products[105] may also be considered, as discussed in Section 3.1.1.

A-3: Definitions for the Purposes of Producer Obligations

Material	Included in Beverage Container Program	Include in PPP EPR System
Paper Products		
Newspaper		✓
Other Newsprint		✓
Magazines		✓
Catalogues		✓
Directories		✓
Paper for General Use		✓
Purchased Posters, Calendars, Greeting Cards and Envelopes, comic books, colouring books and bound notebooks[106]		✓

[105] I.e. products resembling packaging but sold as a product, such as aluminum pie plates

[106] Please note that the BC Recycle Regulation as it reads, exempts all bound books. We believe the government's intention was only to exempt bound literary, textbooks and reference books and that it intends to make that clarification in upcoming amendments to the Regulation. With that clarification the Recycling Regulation will effectively obligate other kinds of bound books such as comic books, colouring books, and bound notebooks (e.g., journals, games and puzzle books and more) – all of which currently find their way into Recycle BC's blue bins, but

Material	Included in Beverage Container Program	Include in PPP EPR System
Other Printed Materials		✓
Paper Packaging		
Gable Top Containers – Beverage – Milk and Milk Substitutes	✓	
Gable Top Containers – Beverage – Wine and Spirits	✓	
Gable Top Containers – Non-Alcoholic	✓	
Gable Top Containers – Non-Beverage		✓
Aseptic Containers – Beverage – Milk and Milk Substitutes	✓	
Aseptic Containers – Beverage – Wine and Spirits	✓	
Aseptic Containers – Beverage – Non-Alcoholic	✓	
Aseptic Containers – Non-Beverage		✓
Paper Laminates		✓
Kraft Paper Bags (Point of Sale)		✓
Kraft Paper – Non-Laminated		✓
Corrugated Cardboard		✓
Boxboard and Other Paper Packaging		✓
Plastic Packaging		
PET Bottles and Jars < 5 Litres – Beverage – Milk and Milk Substitutes	✓	
PET Bottles and Jars <5 Litres – Beverage – Wine and Spirits	✓	
PET Bottles and Jars < 5 Litres – Beverage – Non-Alcoholic	✓	
PET Bottles and Jars ≥ 5 Litres – Wine and Spirits	✓	

for which their producers do not pay fees to recycle them. We suggest that Alberta ensure this clarification is made in the drafting of its regulation.

Material	Included in Beverage Container Program	Include in PPP EPR System
PET Bottles and Jars ≥ 5 Litres – Non-Alcoholic	✓	
PET Bottles and Jars < 5 Litres – Non-Beverage		✓
PET Bottles and Jars ≥ 5 Litres – Non-Beverage		✓
HDPE Bottles, Jars and Jugs < 5 Litres – Beverage – Milk and Milk Substitutes	✓	
HDPE Bottles, Jars and Jugs < 5 Litres – Beverage – Wine and Spirits	✓	
HDPE Bottles, Jars and Jugs < 5 Litres – Beverage – Non-Alcoholic	✓	
HDPE Bottles, Jars and Jugs ≥ 5 Litres – Beverage – Wine and Spirits	✓	
HDPE Bottles, Jars and Jugs ≥ 5 Litres – Beverage – Non-Alcoholic	✓	
HDPE Bottles, Jars and Jugs < 5 Litres –Non-Beverage		✓
HDPE Bottles, Jars and Jugs ≥ 5 Litres – Non-Beverage		✓
Plastic Laminates – Beverage – Milk and Milk Substitutes	✓	
Plastic Laminates – Beverage – Wine and Spirits	✓	
Plastic Laminates – Beverage – Non-Alcoholic	✓	
Plastic Laminates – Non-Beverage		✓
PET Thermoform Containers < 5 Litres – Non-Beverage		✓
PLA, PHA, PHB – Beverage – Milk and Milk Substitutes	✓	
PLA, PHA, PHB – Beverage – Wine and Spirits	✓	
PLA, PHA, PHB – Beverage – Non-Alcoholic	✓	
PLA, PHA, PHB – Non-Beverage		✓
PLA, PHA, PHB – Plastic Film		TBD
PLA, PHA, PHB – Carry-Out Bags		TBD

Material	Included in Beverage Container Program	Include in PPP EPR System
LDPE or HDPE Film		TBD
LDPE or HDPE Film – Carry-Out Bags		TBD
Expanded Polystyrene – Food Packaging		TBD
Expanded Polystyrene – Other		TBD
Non-Expanded Polystyrene – Beverage Bottles – Milk and Milk Substitutes	✓	
Non-Expanded Polystyrene – Beverage Bottles – Wine and Spirits	✓	
Non-Expanded Polystyrene – Beverage Bottles – Non-Alcoholic	✓	
Non-Expanded Polystyrene - Other		TBD
Other Plastic Packaging (not listed above) < 5 Litres – Beverage – Milk and Milk Substitutes	✓	
Other Plastic Packaging (not listed above) < 5 Litres – Beverage – Wine and Spirits	✓	
Other Plastic Packaging (not listed above) < 5 Litres – Beverage – Non-Alcoholic	✓	
Other Plastic Packaging (not listed above) ≥ 5 Litres – Wine and Spirits	✓	
Other Plastic Packaging (not listed above) ≥ 5 Litres – Beverage – Non-Alcoholic	✓	
Other Plastic Packaging (not listed above) < 5 Litres – Non-Beverage		✓
Other Plastic Packaging (not listed above) ≥ 5 Litres – Non-Beverage		✓
Natural and Synthetic Textiles		Not Included
Steel Packaging		
Steel Aerosol Paint Containers		Included in Alberta Recycling Paint Stewardship Program
Steel Paint Cans		Included in Alberta Recycling Paint Stewardship Program
Other Steel Containers and Packaging – Beverage – Milk and Milk Substitutes	✓	

Material	Included in Beverage Container Program	Include in PPP EPR System
Other Steel Containers – Beverage – Wine and Spirits	✓	
Other Steel Containers – Beverage – Non-Alcoholic	✓	
Other Steel Containers – Non-Beverage		✓
Aluminum Packaging		
Aluminum Aerosol Paint Containers		Included in Alberta Recycling Paint Stewardship Program
Aluminum Food Containers – Non-Beverage		✓
Aluminum – Beverage Containers – Milk and Milk Substitutes	✓	
Aluminum – Beverage Containers– Wine and Spirits	✓	
Aluminum – Beverage Containers– Non-Alcoholic	✓	
Other Aluminum Packaging		✓
Glass Packaging		
Clear Glass – Beverage – Milk and Milk Substitutes	✓	
Clear Glass – Beverage – Wine and Spirits	✓	
Clear Glass – Beverage – Non-Alcoholic	✓	
Clear Glass – Non-Beverage		✓
Coloured Glass – Beverage – Milk and Milk Substitutes	✓	
Coloured Glass – Beverage – Wine and Spirits	✓	
Coloured Glass – Beverage – Non-Alcoholic	✓	
Coloured Glass – Non-Beverage		✓

A.5.0 Example of Agency Involved in EPR

Resource Productivity and Recovery Authority (RPRA)

The RPRA was created in November 2016 by the Government of Ontario to support the transition to a circular economy and a waste-free Ontario. The Authority receives its powers from the *Resource Recovery and Circular Economy Act*, 2016 (RRCEA) and the *Waste Diversion Transition Act*, 2016 (WDTA).

Under the WDTA, RPRA oversees three waste diversion programs: Blue Box, Municipal Hazardous or Special Waste (MHSW), and Waste Electrical and Electronic Equipment (WEEE) – and their eventual wind up.

Under the RRCEA, RPRA enforces individual producer responsibility (IPR) requirements for managing waste associated with products and packaging.

RPRA responsibilities include:

- Overseeing existing waste diversion programs until they are wound up;
- Approving wind-up plans developed by industry funding organizations and overseeing their implementation;
- Developing and operating a registry for producers responsible for materials under the RRCEA to register with the Authority and report on waste recovery;
- Managing, analyzing and reporting on the information in the registry;
- Carrying out compliance and enforcement activities; and
- Advocating for the circular economy to spur innovation and protect the environment.

Under the *Waste Diversion Act*, Waste Diversion Ontario monitored progress on EPR programs but enforcement was carried out by Ministry of Environment, Conservation and Parks staff. Stewards paid some fees towards the enforcement staff costs, but minimal enforcement was carried out by MECP staff. Generally, the stewardship organizations such as Stewardship Ontario ensured maximum compliance with regulatory requirements with respect to fee payments. Where free riders were found, fines were levied.

A.6.0 Data Request

General Service Information

Collection and Depot

		Collection Channels												Collection Container	
Municipality	Delivery of Collection Service	Provides curbside recycling service	Service configuration	Service level (frequency)	Provides single-family	Number of single-family households in municipality	Number of single-family households serviced	Provides curbside to multi-family	Number of multi-family households in municipality	Number of multi-family households serviced	Is PPP service linked to residual/organics	Depot recycling services provided?	On-street container collection?	Blue Box	Size of Blue Box
Insert name	(e.g. private, municipal)	Y/N	(e.g. single stream)		Y/N			Y/N			(e.g. share resources) alternate week collections etc.	(e.g. is this additional to curbside or a substitute for it)			

Transfer

Municipality	Is material transferred after collection before being processed	If Yes please provide location	If Yes please provide name of operator
Insert name	Y/N		

Please provide details of where your curbside material is taken to for processing

Municipality	MRF Name	MRF Operator	MRF Location	Operational Start Date	Processing Capacity	MRF Contracts Term	MRF Termination	MRF Union Considerations	Stream	Level of Automation	Capital Cost	Net Cost	Data Links
Insert name						(e.g. contract length starts and end date)			single, dual				

Other

Have Relevant by Laws?	Link if Yes	Has Composition Data
		Please provide copy

Future State

Under EPR would your municipality

Want to continue to deliver services	Y/N
Be obligated under bylaws to deliver	Y/N
Want to continue to contract for services	Y/N

Materials Collected

Paper	Cardboard	Plastic bags/plastic wrap	Plastics (Symbol 1)	Plastics (Symbol 2)	Plastics (Symbol 3)	Plastics (Symbol 4)	Plastics (Symbol 5)	Plastics (Symbol 6)	Plastics (Symbol 7)	Tin cans	Tin foil	Glass containers	Lids and caps	Aluminum	Tetra pack	Cartons
(Y/N)	(Y/N)	(Y/N)	(Y/N)	(Y/N)	(Y/N)	(Y/N)	(Y/N)	(Y/N)	(Y/N)	(Y/N)	(Y/N)	(Y/N)	(Y/N)	(Y/N)	(Y/N)	(Y/N)

Tonnage Collected

	Single Stream	Dual-Stream	Multi-Stream	Residual
Tonnage				
Year Data Reported				

PPP Curbside Contractor

Please complete the following, if services are provided by a contractor

Municipality	Insert name
Service provider	
Services covered under contract	(e.g. PPP, Residual, Organics)
Total contract price	
Contract price for PPP services	(Preferably per household including any difference in cost for single vs multi-family collections)
Contract start date	

Contract end date	
Please can you provide a copy of your contract for us to better understand the relevant clauses that would need to be considered as part of transition to EPR	If you are unable to provide please ensure data below is completed
Does the contract have price escalation clause	(Y/N and % increase)
Does contract price include material processing	(Y/N, if no please complete relevant post collection tab - contractor or municipal)
Does contract include provision for education	(e.g. annual recycling leaflet or website if yes please provide details including specific cost if not included in total price)
Is contractor the first point of contact for residents they serve for inquiries	(e.g. does contractor they have customer support center) what is the cost for this function if not included in contract price above
Termination rights	(For contractor and municipality)
Transfer rights	Please provide details of clauses that allow for the contract to be transfer to another entity.
Workforce clauses	Are there any clauses relevant to workforce unions, pay agreements, minimum wage etc.
Does contractor provide containers	If yes what is the contract cost associated with this
If no, what is the capital or amortized cost of containers to the municipality	Please state if residents purchase their own containers
Is there revenue share for collected PPP materials	Please provide contract clause related to any revenue share

PPP Depot Contractor

Annual contractor operating price	
% of contract price associated with providing PPP services	Please make an educated assessment potentially based on tonnage or relative time spent managing PPP versus other materials that maybe processed through the recycling centre
Amortized cost of PPP collection containers	(if not covered under contract but provided by municipality)
Is there revenue share for collected PPP materials	Please provide contract clause related to any revenue share
Contract start date	
Contract end date	
Please can you provide a copy of your contract for us to better understand the relevant clauses that would need to be considered as part of transition to EPR	If you are unable to provide please ensure data below is completed
Does the contract have price escalation clause	(Y/N and % increase)
Termination rights	(For contractor and municipality)
Transfer rights	Please provide details of clauses that allow for the contract to be transfer to another entity.
Workforce clauses	Are there any clauses relevant to workforce unions, pay agreements, minimum wage etc.

Contract Material Transfer and Processing Costs

Material Processing

Municipality	Insert name
MRF treatment cost/tonne	$ -
Contract start date	
Contract end date	
Please can you provide a copy of your contract for us to better understand the relevant clauses that would need to be considered as part of transition to EPR	If you are unable to provide please ensure data below is completed
Permissible contracted contamination rate (%)	Please include details of relevant clauses related to any costs that have to be included by municipality if contamination levels exceed contracted value
Does the contract have a price escalation clause	(Y/N include details including calculation for increase or annual percentage)
Does contract include provision for education	(e.g. annual recycling leaflet or website if yes please provide details including specific cost if not included in total price)
Termination rights	(For contractor and municipality)
Transfer rights	Please provide details of clauses that allow for the contract to be transfer to another entity.
Workforce clauses	Are there any clauses relevant to workforce unions, pay agreements, minimum wage etc.

Does the facility revert back to the municipality at the end of the contract term	Please detail relevant clauses e.g. is there an assumed operating life at point of handover
Is there revenue share for collected PPP materials	Please provide contract clause related to any revenue share

Transfer Station

Municipality	Insert name
Transfer Station Location	
Transfer Station Operator	
Transfer cost/tonne	$ -
Does the contract cover both transfer and processing of PPP	
Contract start date	
Contract end date	
Please can you provide a copy of your contract for us to better understand the relevant clauses that would need to be considered as part of transition to EPR	If you are unable to provide please ensure data below is completed
Permissible contracted contamination rate (%)	Please include details of relevant clauses related to any costs that have to be included by municipality if contamination levels exceed contracted value
Does the contract have a price escalation clause	(Y/N include details including calculation for increase or annual percentage)
Termination rights	(For contractor and municipality)

Contract transfer rights	Please provide details of clauses that allow for the contract to be transfer to another entity by whether party
Workforce clauses	Are there any clauses relevant to workforce unions, pay agreements, minimum wage etc.
Does the facility revert back to the municipality at the end of the contract term	Please detail relevant clauses e.g. is there an assumed operating life at point of handover

Tonnage Collected

	Single Stream	Dual-Stream	Multi-Stream	Residual
Tonnage				
Year Data Reported				

Municipality Provided Curbside Services - Single Family

Municipality	
Year	
Please provide organization chart for the PPP services	Y/N

Please provide full year costs and revenues

Costs

Vehicles

Please include details of all vehicles or part of that are used in the provision of PPP services including supervisor vehicles

	Vehicle 1 (insert the type of vehicle)	Vehicle 2 (insert the type of vehicle)	Vehicle 3 (insert the type of vehicle)
Number	If vehicles are shared e.g. with garbage please provide details of the % of the vehicles time that is spent on providing PPP services		
Purchase date or average age			
Capital costs	or book value of asset		
Amortized cost			
Rental cost			
Maintenance Costs/Fleet management			
Fuel			

Labor

	Managers	Foreman/Supervisor	Drivers	Operatives/Helpers	Other
Number					
% of time spent on PPP services					
Salary	$ -	$ -	$ -	$ -	$ -
Overhead	$ -	$ -	$ -	$ -	$ -

Training Costs	$ -	$ -	$ -	$ -	$ -
Other personnel costs	$ -	$ -	$ -	$ -	$ -

Buildings

Rental and rates	
Building maintenance	
Utilities	
Telephones	
Security	
Other	

Other Costs

Radio airtime costs	
License and permit costs	
Insurance costs	
Other	

Revenue Streams

Material revenue	Total and by material if relevant
Municipal rates	
Sale of containers to residents	
Grants	
Other please specify	

Recycling Depot/Centre

Costs

Municipality	
Year	
Please provide organization chart for services	Y/N
Number of recycling depots/centres	Number that the costs below relate to

Vehicles and Equipment

Please include details of all vehicles or part of that are used in the provision of PPP services including supervisor vehicles

Vehicle/Equipment 1 (insert the type of vehicle)	**Vehicle/Equipment 2 (insert the type of vehicle)**	**Vehicle/Equipment 3 (insert the type of vehicle)**

Number	If vehicles are shared e.g. with garbage please provide details of the % of the vehicles time that is spend on providing PP services		
Purchase date or average age			
Capital costs	or book value of asset		
Amortized cost			
Rental cost			
Maintenance Costs/Fleet management	servicing etc.		
Fuel			

Labor

	Manager	Foreman/Supervisor	Drivers	Operatives/Helpers	Other
Number					
% of time spent on PPP services					
Salary					
Overhead					
Training Costs					
Other personnel costs					

Buildings

Rental and rates	
Building maintenance	
Utilities	
Telephones	
Security	
Other	

Other Costs

Radio airtime costs	
License and permit costs	
Insurance costs	
Suppliers	
Other	

Municipality Provided Curbside Services - Multi Family

Municipality	
Year	
Please provide organization chart for the PPP services	Y/N

Please provide full year costs and revenues

Costs

Vehicles

Please include details of all vehicles or part of that are used in the provision of PPP services including supervisor vehicles

	Vehicle 1 (insert the type of vehicle)	**Vehicle 2 (insert the type of vehicle)**	**Vehicle 3 (insert the type of vehicle)**
Number	If vehicles are shared e.g. with garbage please provide details of the % of the vehicles time that is spend on providing PPP services		
Purchase date or average age			
Capital costs	or book value of asset		
Amortized cost			
Rental cost			
Maintenance Costs/Fleet management			
Fuel			

Labor

	Managers	Foreman/Supervisor	Drivers	Operatives/Helpers	Other
Number					
% of time spent on PPP services					
Salary	$ -	$ -	$ -	$ -	$ -
Overhead	$ -	$ -	$ -	$ -	$ -
Training Costs	$ -	$ -	$ -	$ -	$ -
Other personnel costs	$ -	$ -	$ -	$ -	$ -

Buildings

Rental and rates	
Building maintenance	
Utilities	
Telephones	
Security	
Other	

Other Costs

Radio airtime costs	
License and permit costs	

Insurance costs	
Other	

Revenue Streams

Material revenue	Total and by material if relevant
Municipal rates	
Sale of containers to residents	
Grants	
Other please specify	

Material Handling/Processing

Costs

Municipality	
Year	
Facility type	e.g. transfer station, MRF
Number of facilities for which cost below refer to	
Please provide organization chart for services	Y/N

please provide full Asset list for vehicles and equipment	Y/N

Vehicles

Please include details of all vehicles or part of that are used in the provision of PPP services including supervisor vehicles

	Vehicle/Equipment 1 (insert the type of vehicle)	Vehicle/Equipment 2 (insert the type of vehicle)	Vehicle/Equipment 3 (insert the type of vehicle)	Total
Number	If vehicles are shared e.g. with garbage please provide details of the % of the vehicles time that is spend on providing PP services			
Purchase date or average age				
Capital costs	or book value of asset			
Amortized cost				
Rental cost				
Maintenance Costs/Fleet management	inc servicing etc.			
Fuel				
Other				

Equipment

Please include details of all pieces of equipment - if asset list is provided please just complete cost information where not included on asset list

	Equipment 1 (insert the type of vehicle)	Equipment 2 (insert the type of vehicle)	Equipment 3 (insert the type of vehicle)	Equipment 4 (insert the type of vehicle)	Equipment 5 (insert the type of vehicle)	Equipment 6 (insert the type of vehicle)	Equipment 3 (insert the type of vehicle)
Number							
Purchase date or average age							
Capital costs	or book value of asset						
Amortized cost							
Rental cost							
Maintenance cost	inc servicing etc.						
Other							

Labor

	Manager	Foreman/Supervisor	Drivers	Plant Operator	Sorter	Other
Number						
% of time spent on PPP services						

Salary						
Overhead						
Training Costs						
Other personnel costs						

Buildings

Capital cost	If relevant
Rental and rates	
Building maintenance	
Utilities	
Telephones	
Security	
Sprinkler	
Other	

Other Costs

Radio airtime costs	
License and permit costs	

Insurance costs	
Suppliers	
Residual disposal costs	

Revenue Streams

Material revenue	Total and by material if relevant
Gate fee/tipping fees	
Sale of containers to residents	
Grants	
Other please specify	

Service Administration and Support

Municipality	Insert name
Budget year	

Labor

Cost in accounts

Service Area	HR	Services administration	Customer Services	Education	Sorter	Other

Total Cost for PPP Services						

Or actual resource costs

	Insert position e.g. HR administrator					
% of time spent on PPP services						
Salary						
Overhead						
Training Costs						
Other personnel costs						

Buildings

As related to support functions above

Capital cost	If relevant
Rental and rates	
Building maintenance	
Utilities	
Telephones	

Security	
Other	

Other Costs

Communications and education budget	e.g. for leaflets, website etc.
Other	

A.7.0 Introduction to Method

A.7.1 Data Gathering

The first step in modelling the effects of introducing an EPR residential PPP recycling system in Alberta was to understand the PPP recycling system as it stands today. This current-state analysis required Eunomia to collect comprehensive survey data from municipalities on:

- type of materials collected through residential PPP curbside and depot services;
- quantity of material collected and recycled from different PPP services to SF and MF households, as well as through depots;
- the cost of both depot and curbside services provided in-house or through a contractor;
- revenue from material sales.

Eunomia was required to collect residential PPP service data from both of Alberta's two large municipalities, a minimum of eight medium municipalities, ten small municipalities and two First Nations. To meet this requirement the survey request included in Appendix A.6.0 was issued to over 100 municipalities identified during the planning stage. In addition to the primary data received from 31 survey responses, secondary research (a review of reports and websites) was collected from an additional 101 municipalities within the province of Alberta. This secondary research provided additional data on which municipalities had curbside services.

A.7.2 Modelling Current State

A bottom-up cost benefit model was developed from the data received through the survey. The model was developed so that cost and tonnage outputs from the model could be viewed from the perspective of small, medium and large municipalities, other municipality and community types, as well as the province as a whole.

Data entered into the model went through a quality review process so that outlier data that could disproportionately skew final outputs could be verified with the responding municipality or else excluded from the calculations.

Because survey responses did not cover all municipalities, the data provided from the responding 31 municipalities was extrapolated to cover the whole province. Data was received from cities in the large municipality category, so no extrapolation was required. However, for small and medium sized municipalities as well as other municipality and community types, a process was undertaken to scale the data received as detailed below.

A.7.2.1 Data Extrapolation for Current State

Tonnes Collected and Recycled

To estimate the tonnage of material collected from those municipalities for which data was not received Eunomia first calculated the average kg per household per year (kg/hh/year) for medium and small municipalities and other municipality and community types. Average kg/hh/year values were calculated for SF, MF and depot collections. There were two average depot collection rates: one for municipalities that only provided PPP collection services through depots and one for municipalities where curbside services were also provided. This distinction was made to avoid over-estimating the total tonnage during the extrapolation process.

Eunomia then determined through a web-based search which small and medium sized municipalities provided curbside PPP collection services to SF households as well as collection services to MF households versus those which only provided depot services. This process determined that 76% of households living in medium sized municipalities and 57% of households in small municipalities were provided with curbside services and only 7% of MF households in medium sized municipalities had access to a similar level of service.

The average kg/hh/year collection rates for curbside SF service, MF collection and depot service (with or without curbside also being provided in the community) were then applied to the number of properties that were identified as having the service provided or managed by municipalities. Data for those households that hire their own services from private contractors was not available.

The average level of contamination (residue rate) for SF, MF and depot collection in small and medium municipalities was applied to the collected tonnage to estimate the tonnes recycled. Contamination is taken into account when estimating the GHG benefits from avoided landfill.

Seven responses were received from other municipality and community types. All of these municipalities provided depot services only. It was therefore assumed that the 13% of the population that live in other municipality and community types only receive depot services. The depot only average kg/hh/year for small municipalities was applied to these households.

One concern with depot tonnage for this study (which is focused on residential PPP only) is that it includes PPP generated from the ICI sector. Most depots could not clearly identify what percentage of PPP tonnage was from the residential sector or the ICI sector. In these cases, we reduced the reported tonnages by 50% to mitigate the possibility of over-reporting the residential PPP. No data was available to determine actual percentages of ICI vs. residential, so this was based on knowledge of typical tonnages per household.

Cost

Cost data provided by the 29 small, medium and other municipality and community types was extrapolated to estimate an overall cost for services provided to these areas as well as to estimate a total Alberta cost.

Cost data was received for services provided in-house as well as for services provided by contractors. Collection, transportation, and processing costs, as well as other costs associated with recycling programs (i.e., administration and education and promotion) could be identified from in-house data which was very granular. It was also possible to identify separate costs for labor, buildings, vehicles and equipment and administrative support. An average cost per household was calculated for the following types of services, and these averages were applied to the properties that received them:

- Medium municipalities:
    - Average SF curbside with depot
    - Average MF service with depot
    - Average depot only
- Small municipality
    - Average SF curbside with depot
    - Average depot only

The average cost per household was calculated from costs provided from both in-house and contracted out services.

The number of SF and MF households in small and medium municipalities was taken from 2016 Statistics Canada census data. For all other areas where data was not provided, the total population in these areas was divided by 2.7 (the average number of people per household) to estimate household counts. The percentage split between SF and MF households taken from the primary and secondary data was then applied to the total number of households to estimate the number of SF and MF households in these areas.

Allocating costs for resources or assets that are only used a proportion of the time for PPP collection or processing activities is a challenge. The data survey clearly asked respondents to estimate the amount of time a person or asset was used for the provision of residential PPP services or activities. Despite Eunomia's efforts to make this clear with survey respondents through an introductory phone call, there were several instances where the costs per tonne processed through depots appeared excessively high. In such cases, outlier data were either clarified and corrected with the respondent or were not used.

Jobs

Data obtained from the survey was used to update the jobs model developed as part of the *Quantifying the Economic Value of Alberta's Recycling Program* study carried out on behalf of the Recycling Council of Alberta earlier in 2019. The jobs model calculates the number of jobs per 1,000 tonnes of material recycled by activity including:

- Curbside collection, processing and administration

- Depot operation, bulking, transportation and administration

To calculate the number of full-time equivalent (FTE) jobs provided by the PPP collection system, Eunomia took the calculated tonnes of PPP collected through curbside and depot services and divided the total by the jobs per 1,000 tonnes for the corresponding service.

The municipal survey asked respondents to make a best guess at what proportion of staff time (for those not fully dedicated to PPP recycling) was allocated to residential PPP recycling services vs. other duties. Many respondents had difficulty allocating the time, particularly for administration and legal services. Where the allocation in responses seemed disproportionately high it was not used for the analysis.

A.7.2.2 Large Municipalities Overview

Tonnes

A summary of the tonnes collected by large municipalities, as well as their contamination (residue) rates, can be found in Table A-4 below. Our level of confidence in the tonnage results for large municipalities is high because detailed data was provided by both cities (Edmonton and Calgary) that make up the large municipality category, therefore no extrapolation was needed.

A-4: Tonnage Calculations and Contamination Assumptions for Large Municipalities (2018)

Assumption	Total Tonnes Collected	Kg Collected per Household	Contamination Rate
SF Curbside	94,805	173	19%
MF Collection	11,800	67	33%
Depot	6,800	7	8%
Other Services	6,900	17	12%

**Source: Eunomia calculations, assuming 50% depot discount for ICI sector*

Costs

Service budget breakdowns provided by both the large municipalities for the provision of each in-house service was used to determine the percentage of the total collection costs spent on:

- Labour, which included both operational staff, supervisors and management costs associated with residential PPP services only;
- Building leases or annual capital depreciation plus maintenance and utilities;
- Vehicles and equipment used in whole or part for the provision of PPP services; and
- Administration, which includes items such as insurance, supplies, security, etc.

A summary of these proportions can be found in Table A-5 below.

A-5: Costs Related to Different Functions in Large Municipalities (%)

Cost	% of Single-Family Collection Budget	% of Multi-Family Collection Budget	% of Depot Collection Budget
Labour	22%	32%	63%
Building	6%	<1%	6%
Vehicle & Equipment	64%	68%	11%
Administrative	1%	1%	20%
Other (mostly debt)	6%	0%	0%

Source: Eunomia calculations

The collection costs make up 63% of the total residential PPP recycling system costs, as shown in Table A-6.

A-6: Cost Breakdown by Activity in Medium Sized Municipalities (2018) (%)

Activity	% of Total System Budget
Collection (SF, MF, depot)	63%
Transportation	1%
Processing	21%
Support Services and Communication and Education	14%
Total Gross Costs	100%

Source: Eunomia calculations

There were cost differences between the two municipalities. The average cost by collection service type (SF, MF, depot) was calculated by dividing the total costs for that service in each municipality by the number of households serviced. Eunomia found that the average net cost per household in large municipalities of the service was $53.78.

The gross costs per household for each serviced were calculated from the data responses. In order to avoid distorting the overall average, a weighted average approach was used to calculate the average gross cost per household values presented in Table A-7.

A-7: Gross Per Household Cost of PPP Collection in Large Municipalities (2018)

Service Type	Estimated Cost per Household Served ($)
SF Curbside	50.75
MF Collection	9.42
Depot	6.46

Source: Eunomia calculations

Note that these costs are the costs for households that only receive the specific collection service. For example, SF collection costs per household are an average of the costs for SF collection divided by the number of SF households served. Therefore, adding the service costs together will not yield the total per household cost within a municipality.

The study analysis determined that SF curbside services in large municipalities cost on average $50.75 per household (gross collection costs), while the average per household cost for MF service is $9.42 (gross collection costs).

Table A-8 breaks down the total costs per household for all services by activity aside from collection, which is provided in Table A-7 above. Commentary is also provided on the level of confidence we have in the cost estimates.

A-8: Per Household Costs of PPP Management in Large Municipalities (2018)

Activity	Degree of Confidence	Estimated Cost per Household Served ($)
Processing (Including labor, capital, and admin costs)	High	13.67
Transportation	High	0.86
Support Services and Communication and Education	Medium	8.89
Revenues	High	7.50

Source: Eunomia calculations

There were some support service and communication costs that seemed idiosyncratic and hard to include in an average picture.

A.7.2.3 Medium Municipalities Overview

Tonnes

To calculate the per household average tonnes collected by service type Eunomia applied the same methodology as described in section A.5.2.1 and A.5.2.2. Eunomia used a weighted average approach from the data received to identify a cost/household average. Responses from municipalities that covered a greater number of households had more weight in the average calculation. This prevented skewing costs from municipalities that covered fewer households. This weighted average was then applied to the estimated number of households served in medium municipalities throughout Alberta. The estimated kg/hh/year collected from the survey responses is presented in Table A-9 below.

A-9: Tonnage Calculations and Contamination Assumptions for Medium Municipalities (2018) (kg/hh/year)

Assumption	Total Tonnes Collected	Kg Collected per Household	Contamination Rates
SF Curbside	38,032	139	17%
MF Collection	275	67	33%
Depot	9,381	25	9%

Source: Eunomia calculations

Some challenges to calculating the estimates above were that the data reported had to be analyzed to identify outliers and municipalities contacted to verify the reported values. Some municipalities, for example, reported unusually high contamination rates. Eunomia received confirmed recycling rates ranged from 77 to 190 kg/hh/year which is a very wide range.

Additionally, it was difficult to achieve representative samples and heterogeneous depot collection systems made synthesis challenging at times. Some municipalities had mini-MRFs while others were only collection depots.

The kg/hh/year values were then multiplied by the number of households known to have each of the services in order to calculate the total tonnages collected in medium sized municipalities.

The data received covered 158,269 households, representing 68% of the population in Alberta that lives in medium municipalities. Eunomia followed the same approach for calculating the per household costs of the PPP recycling system in medium municipalities as it did for large municipalities.

Costs

Taking the weighted average in this instance had a more profound effect on the per household numbers than on the large municipalities. In this case, costs varied by municipality by a greater degree than in large municipalities. Some smaller medium municipalities, for instance, would have high collection costs, but only serve a small number of households. To ensure these costs did not skew the final average costs, we took the weighted average of collection costs by giving the municipalities that served more households a higher weight.

The weighted average of the costs provided by municipalities allowed for the smoothing out of outlier data. This produced a representative average cost per household by service as detailed in Table A-12. The data for MF households was provided by one response only. The percentage split of costs by activity is provided in Table A-10 and Table A-11 below. Responded medium municipalities did not provide debt obligations.

A-10: Costs Related to Different Functions in Medium Municipalities (2018) (%)

Cost	% of Single-Family Collection Budget	% of Depot Collection Budget
Labour	32%	37%
Building	4%	5%
Vehicle & Equipment	53%	47%
Administrative	11%	11%

Source: Eunomia calculations

A-11: Cost Breakdown by Activity in Medium Municipalities (2018) (%)

Process	% of Total System Budget
Collection (SF, MF, depot)	70%
Transportation	4%
Processing	16%
Support Services and Communication and Education	10%
Total Gross Costs	100%

Source: Eunomia calculations

Eunomia found that the net per household cost of service in households with all services provided was $86.85.

A-12: Gross Per Household Cost of PPP Collection in Medium Municipalities (2018)

Service Type	Degree of Confidence	Estimated Cost per Household Served ($)
SF Curbside	Medium	49.00
MF Collection	Medium	17.03
Depot	Medium	27.45

Source: Eunomia calculations

Some challenges to calculating the estimates above were controlling for outliers and having only one data point for MF collection costs.

The per household cost for each major component of the recycling service aside from collection is presented in Table A-13.

A-13: Per Household Costs of PPP Management in Medium Municipalities (2018)

Activity	Degree of Confidence	Estimated Cost per Household Served ($)
Processing	Medium	14.88
Transportation	High	3.59
Support Services and Communication and Education	High	9.22
Revenues	Medium – Low	4.60

Source: Eunomia calculations

Some challenges to calculating the estimates above were that types and extents of post collection services described in data responses varied greatly. For example, some municipalities responded with post collection costs that were difficult to separate completely from other stages in the process, such as depot collections because some depots function as transfer stations as well. These are difficult to compare to one another, as there are there instances of depots, transfer stations, and mini-MRFs.

Additionally, it was difficult to achieve consistent, representative revenue figures for these municipalities due to market fluctuations and incomplete data on behalf of the municipalities and MRF operators.[107]

[107] Conversations with GFL representative 08/12/19

A.7.2.4 Small Municipalities Overview

Ten survey responses which covered 20,428 households (representing just 7% of the population) living in small municipalities were received as part of the project research. All of the curbside services in small municipalities are provided by contractors.

Tonnes

The estimated kg/hh/year collected was developed from survey responses using a weighted average approach described previously. Results are presented in Table A-14 below.

A-14: Tonnage Calculations and Contamination Assumptions for Small Municipalities (2018)

Assumption	Total Tonnes Collected	Kg Collected per Household	Contamination Rate
SF Curbside	11,773	141	17%
MF Service	N/A	N/A	33%
Depot	8,174	55	9%

Source: Eunomia calculations

Some challenges when calculating the estimates above were small sample sizes as well as outliers that had to be confirmed with municipalities or removed.

Furthermore, high depot yields were often reported, which had to be confirmed with municipalities. Commercial tonnages were likely included in many of the reported tonnages given by municipalities. Therefore, depot tonnages reported were reduced by 50% to account for likely ICI contributions. No data was available to determine actual percentages of ICI vs. residential, so this was based on knowledge of typical tonnages per household.

No reliable contamination rates were provided from small municipalities, medium contamination rates were therefore used.

Total household numbers in small municipalities, as well as the coverage rates, were combined to calculate the total PPP tonnes collected in small municipalities.

Costs

Eunomia found that the average per household cost in small municipalities with SF curbside and depot services was $102.46. A summary of the costs of collection only (i.e., no processing, revenues, support services or post-collection transportation) is presented in Table A-15 below.

A-15: Gross Collection Costs in Small Municipalities in 2018

Service Type	Degree of Confidence	Estimated Costs per Household Served ($)
SF Curbside	Medium - Low	68.40
MF Collection	N/A	N/A
Depot	Medium - Low	35.12

Source: Eunomia Calculations

Some challenges to calculating the estimates above were inconsistencies of service scope across municipalities and small sample size.

Furthermore, heterogeneous depot collection systems were hard to compare to each other and revenue figures were highly variable.

Because only total contract costs were provided for PPP services a breakdown by activity cannot be provided.

The per household costs for all stages of the recycling service are presented in Table A-16 below.

A-16: Average per Household Costs of PPP Recycling System in Small Municipalities in 2018

Cost	Degree of Confidence	Estimated Cost per Household Served ($)
Processing	Low	18.57
Transportation	Low	4.48
Support Services and Communication and Education	Medium	9.22
Revenues	Medium – Low	4.02

Source: Eunomia calculations

Some challenges to estimating the estimates above were limited data availability, no transportation costs were given from the sample, a per household costs increase of 25% from medium municipalities to small municipalities was therefore assumed to achieve a per household number. Additionally, it was difficult to find consistent, representative revenue figures for these municipalities due to market fluctuations and incomplete data given by the municipalities.

The total population living in small municipalities was divided by 2.7 to calculate the number of households. The average cost/household was applied to the estimated number of households believed to receive each of the service to calculate total costs.

It was estimated that 57% of SF households in small municipalities had curbside service, while no MF households received service.

The average per household costs for SF and depot service were applied to total households to calculate the total cost of PPP recycling in small municipalities, which is estimated at approximately $25 million.

A.7.3 Summary of Tonnes Per Household

Table A-17 details the tonnes per household collected across collection methods and municipality types.

A-17: Summary of Average Tonnes Collected per Household in Alberta, by Municipality Type and Collection Method in 2018

Municipality Type	Collection Method				
	SF Curbside (kg/hh/year)	MF Collection (kg/hh/year)	Depot (kg/hh/year)	Other (kg/hh/year)	Average (kg/hh/year)
Large Municipalities	173	67	7	17	132
Medium Municipalities	139	67	25	N/A	125
Small Municipalities	141	N/A	55	N/A	117
Other Municipality and Community Types	N/A	N/A	47	N/A	47
Average	160	67	21	17	120

Source: Eunomia calculations

A.7.3.1 Avoided Garbage Collection and Disposal Costs

Each tonne of PPP collected and recycled avoids the need to collect and manage the PPP material as garbage.

Eunomia calculated that the current garbage collection and disposal savings in Alberta is equal to $28 million. This number was calculated by assuming a landfill rate of $120/tonne for large municipalities, $75/tonne for medium municipalities, and $102/tonne for small and other municipality and community types. The rates were taken from responding municipalities.

Garbage collection costs of $100 per tonne were assumed. Garbage collection costs were obtained from conversations with representatives from Morrison Hershfield.

The same methodology was used to calculate the future avoided garbage collection costs.

Morrison Hershfield maintains a database of local Alberta per tonne tipping fees for municipal waste. The average cost per tonne for each municipality size was multiplied by the tonnes recycled (tonnes collected minus the MRF and depot contamination rates) to estimate the avoided landfill costs in 2018.

A.7.3.2 Avoided GHG Emissions

The avoided GHG emissions were calculated using Environment and Climate Change Canada (ECCC)'s GHG Calculator.[108] Under the current state, an estimated 197,600 tonnes of residential PPP were collected, with 163,200 tonnes recycled. A conservative 132,000 tonnes were used for the GHG Calculator to account for MRF residue and other material losses, based on material composition of PPP in Alberta. For the GHG emissions saved, national average assumptions on landfill gas recovery in the ECCC model was used. There is apparently limited landfill gas recovery in Alberta.

A.7.4 Future State Assumptions

A.7.4.1 Future State Design

Table A-18 below details the design assumptions for the future state.

[108] Environment Canada, Determination of the Impact of Waste Management Activities on Greenhouse Gas Emissions: 2005 Update Final Report https://www.rcbc.ca/files/u3/ICF-final-report.pdf

A-18: Future State Design Assumptions

Category	Future State Modelling Assumptions
Accessibility Standard	Any household that has curbside services for garbage is also provided with curbside service for recycling, including multi-family at the same collection frequency as garbage collection Municipalities with depot-only services (for garbage and recyclables) will have same materials collected as curbside services.
Designated Materials	All paper product and packaging (PPP) materials generated by obligated households
Materials Collected	Consistent across curbside and depot services and consist of paper product and packaging (PPP) materials necessary to meet targets.
Convenience	The existing network of depots is sufficient and there is no need for additional depots. Unstaffed depots will continue to be unstaffed, but a formula will be developed for ensuring tonnage from the ICI sector is excluded from payments for example based on agreed caps by material taken from staffed depots.
Tonnage	Additional tonnage expected through an EPR system for residential PPP has been calculated as follows: Additional properties being provided with curbside services, predominately MF properties in Calgary plus some SF in those areas that receive curbside garbage but not PPP. Uplift (increased tonnage recycled) resulting from consistent range of materials collected at both the curbside and through depots taken from an assessment of the waste composition studies received: Percentage material increase at curbside: 9% for small municipalities and 7% for medium and large Percentage material uplift: 16% for depots in small municipalities. No additional material capture assumed as a result of setting targets as targets not determined.
Collection Frequency and Methodology	Assumed no change in current collection frequencies or methodology. The majority of municipalities for which data was obtained provide curbside PPP recycling weekly. Consideration: Curbside recycling should be provided at least at the same frequency as curbside garbage. PRO should have flexibility to introduce alternative collection frequency/methodology if targets not met.

Category	Future State Modelling Assumptions
Containerization	Municipalities continue to choose appropriate containers if they are providing or contracting recycling services. If producers are the contracting party, they will choose the containers supplied. Consideration: Potential in long term to move to automated collection as program develops. If target is not being met, PRO should have flexibility to introduce alternative collection methodology.
Capital Costs	No additional capital cost has been assumed for new processing infrastructure; processing costs based on a per tonne average from existing costs for large, medium and small municipalities

A.7.4.2 Future State Assumptions for Large Municipalities

How the assumptions listed in Table A- 21 are observed in the future state in large municipalities are summarized below:

- SF Curbside:
  - Access: No increase in access as 100% of SF already have access
  - Tonnes and material consistency: No increase in SF tonnes as range of materials is consistent with other municipalities
  - Cost: No change in SF costs to the system. Although contracting and potential regional processing efficiencies could be realized through EPR over time, these savings are difficult to quantify and as such no assumptions have been applied.
- MF Collection:
  - Access: Increased by 180,000 households to cover Calgary MF properties currently without service provided or managed by the municipality, resulting in 100% of MF having access to services in the future state.
  - Tonnes and material consistency: Additional 14,800 tonnes from MF service and 8.5% increase in tonnes per household based on a consistent range of service. This resulted in a future average of 73kg/hh/year applied across all MF.
  - Cost: $3.95 million for adding MF households in large municipalities to system based on cost per household from the one large municipality that provides the service:
    - $9.42 for collection;
    - $0.76 for additional tonnage processing costs of already covered municipalities due to increased tonnage;
    - $11 for processing costs of new households;
    - $1.85 for support services;
    - Less $0.21 of revenue
- Depot:

- Access: No change in number of depots
- Tonnes: No change in depot tonnes
- Costs: No change in costs

The assumptions have the following effect on large municipalities from the current to future state:

- Access: An additional 188,055 households covered
- Tonnes: An increase of 14,000 tonnes collected
- Cost: An increase of $4,108,863 to the system

A.7.4.3 Future State Assumptions for Medium Municipalities

- SF Curbside:
  - Access: Expand service so that all SF households that have curbside garbage PPP. Additional 29,100 households determined through primary and secondary data. Additional properties as well as the yield increase explained below increased tonnage by 6,394 tonnes.
  - Tonnes and material consistency: A yield increase of 8.5% to all properties for consistent service and collection of materials that brought the tonnes collected per household to .153 which was then multiplied to households already covered. The yield increase was determined by seeing how many materials were covered in our sample, and then applying the additional material collection tonnage if all PPP materials were covered.
  - Cost: An increase in cost of $2.5 million in medium municipality SF coverage. Cost of adding 29,100 SF households to the service each with a cost per household of:
    - $49 for collection
    - $15 for processing
    - $9.22 for administration
    - Less $0.13 of revenue
    - A $1/hh increase in processing & collection costs for households already covered due to tonnage yield increase of 8.5% from all materials collected
- MF Collection:
  - Access: Increase of 50,845 multi-family households to service
    - Expansion based on 100% coverage of households with garbage collection, determined through primary and secondary research based on % of households with garbage who are not covered for recycling
  - Tonnes and material consistency: Additional 3,600 tonnes from existing MF service tonnage yield increase and addition of new MF households to service.

Increased tonnage uplift of 8.5% due to expanded coverage of materials to existing recycling services multiplied by already covered MF households
    - Cost: A $1.6 million additional cost to the collection system for providing collection service to an additional 50,900 MF properties each with a per household cost of:
        - $17 for collection
        - $7 for processing costs of new households
        - $9 for support services
        - $0.13 for revenues
        - $0.05 increase in processing costs for households already covered for yield increase collection and processing
        - A $61,644 decrease in transportation costs from fewer tonnages collected at depots and depot expansions to mini-MRFs
- Depot:
    - Access: No change in number of depots, however expansion of current depot services assumed
    - Tonnes and material consistency: A 3,060 tonne decrease in depot tonnes collected due to the expansion of curbside service which drops the kg/hh collected at depots as households substitute away from depots.
    - Cost: A decrease of $304,543 in depot processing costs due to drops in the tonnage collected at depots

The assumptions result in the following:

- Access: An additional 79,945 households covered
- Tonnes: An increase of 8,921 tonnes collected
- Cost: An increase of $4,048,000 to the system

A.7.4.4 Future State Assumptions for Small Municipalities

- SF Curbside:
    - Access: 35,885 household increase in single family coverage. Expand service to everyone who has garbage curbside collection and will therefore have recycling curbside.
    - Tonnes and material consistency; A 6,500 tonne increase in SF tonnage collected as the collection rate increases by 8.5% to 153 kg/hh/year
    - Cost: An increase in cost of $3.3 million in small municipality SF recycling for adding 29,100 SF households to recycling service, each with a per household cost of:
        - $68 for collection
        - $15 for processing

        - A decrease of $2.13 for depot transportation costs, as costs were lowered due to expansion of depots into transfer stations/mini MRFs
        - Support service costs of $9
    - Less $3.40 of revenue
    - Additional $7.02/hh for additional processing & collection costs for households already covered due to tonnage yield increase of 8.5%
- MF Collection:
    - Access: Increase of 380 multi-family households to service. Expansion based on assumed 100% coverage of households with garbage collection, determined through primary and secondary research based on % of households with garbage curbside service who are not covered by curbside recycling.
    - Tonnes and material consistency: Additional 30 tonnes from new households added to service
    - Cost: A $10,556 additional cost to the MF collection system due to the cost of providing collection service to an additional 380 MF properties, each with a cost per household of:
        - $17 for collection
        - $7 for new processing costs
        - $2.13 decrease in transportation costs for expansion of depots to transfer stations/mini MRFs for all households old and new
        - $9 for support services
        - Less $3.40 of revenue
- Depot:
    - Access: No changes in number of depots assumed, but expansion of depot services assumed
    - Tonnes and material consistency: A 2,800 tonne change in depot tonnes collected due to expansion of curbside service drops the amount collected from 55kg/hh/year to 36kg/hh/year.
    - Cost: A decrease of $405,290 in depot processing costs due to drops in tonnage collected at depots. $2.13/hh decrease in transportation costs for expansion of depots to transfer stations/mini MRFs for all households old and new

The impact of these assumptions has the following effect on small municipalities from the current to future state:

- Access: An additional 36,261 households covered
- Tonnes: An increase of 3,624 tonnes collected
- Cost: An increased cost of $3.25 million to the system

A-19: Future State Assumptions for Households in Other Municipality and Community Types

- Depot:
  - Access: No changes in number of depots assumed, but expansion of depot services assumed
  - Tonnes: An increase of 1,940 tonnes collected from consistency of service at depots
  - Costs: An increase in costs at depots by $1.34/hh, transportation costs increase by $113/tonne for each additional tonne for transportation, $1.28/hh for administrative costs, revenues of $0.26/hh

The impact of these assumptions on other municipality and community types from the current to future state is estimated at:

- Access: No change in number of depots assumed, but an increase in services provided at depots assumed
- Tonnes: An increase of 1,940 tonnes collected
- Cost: An increase of $858,427 to the system

A.7.5 Options for Future Efficiencies

Table A-20 below highlights where there is the potential for service and costs efficiencies in the future state:

A-20: Other Factors

Potential System Change	Rationale
Standardized contracts for collection	Standardized contracts provide for a uniform approach to collection service; with the limited data available assumptions were not made on the potential impacts that standardized contracts would provide.
Collection contract transparency	The transparency afforded by a single PRO could help reduce the variation in contract costs, however, the contracted costs received from the limited data responses showed a large variance between responses. It was not possible to identify what cost efficiencies could be realized.
Cross municipality border service efficiencies	This is partly linked to assumptions 1 and 2 above. Benefits are generally derived from cross-border delivery of services; however, no assumptions have been made in this report. Resources are being already shared by the private sector in delivering their services (e.g., collection schedules that collect in one municipality on Monday and Tuesday, and a neighboring municipality on Wednesday and Thursday).

Frequency of collection	29 of the 31 responses received have weekly recycling collections already. There is a potential to move to bi-weekly collections, but this would need to be carried out in conjunction with the municipality to assess the impact on garbage as well as green bin services.

A.8.0 Bylaws Details

The bylaws of individual municipalities vary immensely. It is likely that there may need to be broad adjustments to the bylaws of many municipalities to accommodate for the provincial transition to an EPR system for residential PPP. Additional details on disparities in bylaws across municipalities in Alberta are discussed below.

The definition of SF and specifically MF varies by municipality as demonstrated in Box 6-1.[109] These examples highlight the need for standardized definitions to be established when an EPR system is put in place.

In British Columbia, the Packaging and Paper Product Extended Producer Responsibility Plan defines MF properties as:

"Residential complexes with 5 or more units where all households deposit their recycling at a centralized location in shared containers.[110]"

[109] Sourced from the bylaws of various municipalities across Alberta.

[110] Recycle BC. "Packaging and Paper Product Extended Producer Responsibility Plan." https://recyclebc.ca/wp-content/uploads/2018/07/Packaging-and-Paper-Product-Extended-Producer-Responsibility-Plan-July2018.pdf

Box 6-1: Definition of Multi-family in Two Alberta Cities

MF Definition 1:

> *"(i) a class of building containing more than one dwelling unit, except for row housing where each dwelling unit is on a separate tax parcel; or*
>
> *(ii) a class of property containing more than one building with dwelling units on a single tax parcel."*

MF Definition 2:

> *"residential recycling services and residential diversion of food and yard waste material will be provided by the City to only those residential dwellings that are not located in a multi-residential complex and: are a:*
>
> *(i) single detached dwelling;*
>
> *(ii) duplex;*
>
> *(iii) triplex;*
>
> *(iv) fourplex;*
>
> *(v) multiplex;*
>
> *(vi) rowhouse;*
>
> *(vii) townhouse; and*
>
> *(b) receive weekly residential black cart collection services."*

MF Definition 3: "Multiple Dwelling Development" means a "residential condominium development or any development containing 3 or more Dwelling units on a single legal parcel of land."

The definition of MF properties in Alberta should be standardized to reflect the demographics of the province.

Large Municipalities

All large municipalities have bylaws regulating waste management services. Municipalities are required to provide waste services to residents or to contract with a private agency to do so. In order to enable producers to manage the recycling system under EPR, provincial policy will need to ensure producers have unfettered discretion to operate collection and post-collection management systems.

Additionally, large municipalities offer curbside services along with depots that accept additional materials to those accepted in the blue box. In a producer-operated system, standardization of materials accepted will occur as a standard material list established pursuant to provincial policy.

The waste management bylaws of large municipalities are very detailed and include definitions of MF units and details on service provisions to such households. These will be replaced by definitions in provincial policy.

Non-residential premises must arrange with private contractors for the removal and treatment of waste and recycling.

Medium Municipalities

All medium municipalities have bylaws regulating waste management services. In most cases, the municipality is required to provide waste services to residents or to contract with a private agency to do so.

Often, a Chief Administrative Officer (CAO) is designated as the responsible party for fulfilling the obligations outlined in the bylaw. This single person is authorized to enter into contracts for waste collection services with commercial contractors for the collection and disposal of waste, if necessary.

The extent to which packaging recycling is specified varies; some define all packaging types and their method of disposal, others define the responsibilities of the municipality and the residents, and some do not distinguish recycling from other solid waste management.

Small Municipalities

Compared to larger municipalities, small municipalities tend to specify less in their bylaws. Like the medium municipalities, the small municipalities often name the administrator responsible for making arrangements for waste management on behalf of the town or village. This individual is often authorized to determine the types of waste accepted as well as manage contracts with any commercial agency for collection or processing.

One municipality states that the authorized agent may:

> *"specify the types of waste, recyclable or compostable material accepted at the Town's designated disposal site or community recycling depot, make and execute agreements on behalf of the [small municipality] for the collection of waste, recyclable or compostable material and disposal services."*

Though there is responsibility for waste management designated in the bylaws of most of the small municipalities, provincial policy will override local bylaws in this regard.

A.9.0 PPP Processing Facilities

Summary of Identified Alberta Processing Facilities

Facility No.	Facility Type	Owner	Operator	Operational Start Date	Current Processing Tonnage (MT p/a)	Max Processing Capacity (MT p/a)	Capital Cost ($M)	Level of Automation	Source of Material	Remaining Asset Life
1	Dual-stream	Public	Public	2014	1,800	Approx. 15,000 (10MT/hr)	3.8	Low: Plastics and metal sorting line, plus baler	SF	2033

Facility No.	Facility Type	Owner	Operator	Operational Start Date	Current Processing Tonnage (MT p/a)	Max Processing Capacity (MT p/a)	Capital Cost ($M)	Level of Automation	Source of Material	Remaining Asset Life
2	Single-stream	Private	Private	2009	56,000 single-stream (one shift, 8.5hrs per day, 5 days per week), plus 25,000 source-separated material (cardboard) from ICI sector	Approx. 85,000 (one shift) or 155,000 (two shifts)	N/A	High: 70%	SF plus some ICI as source segregated	N/A
3	Single-stream	Private	Private	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
4	Single-stream	Private	Private	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	N/A

Facility No.	Facility Type	Owner	Operator	Operational Start Date	Current Processing Tonnage (MT p/a)	Max Processing Capacity (MT p/a)	Capital Cost ($M)	Level of Automation	Source of Material	Remaining Asset Life
5	Single-stream	Public	Private	2019	8,840 (one shift, 8.5hrs per day, 5 per days)	17,680	Not Available	Medium	SF, MF, Depots, ICI	Not Available
6	Single-stream	Private	Private	2013	30,000 single-stream (one shift, 8.5hrs per day, 5 per days) plus 4,800 other	Approx. 79,000	35.5	High	85% SF, 10% MF, 5% ICI	6 – 8 years
7	Single-stream	Public	Private	1999	58,000	58,000	12	Medium	SF	N/A
8	Single-stream	Public	Private	2018	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

Facility No.	Facility Type	Owner	Operator	Operational Start Date	Current Processing Tonnage (MT p/a)	Max Processing Capacity (MT p/a)	Capital Cost ($M)	Level of Automation	Source of Material	Remaining Asset Life
9	Dual-stream	Public	Public	2011	1,600	Not Available	3.2	Low: Plastics and metal sorting line, plus baler	SF	Not Available
10	Multi-stream	Public	Public	2015	890	N/A	0.3	Very Low: Baler only	SF (20%) and ICI (80%)	Not Available
11	Multi-stream	Private	Private	N/A	N/A	N/A	0.8	Very Low: Baler only	Not Available	Not Available
12	Multi-stream	Public	Public	2017	N/A	N/A	0.1 (excluding building)	Baler only	N/A	N/A

Source: Eunomia primary data from municipality data request

A.10.0 Current Private Sector Service Providers

A selection of waste management organizations, cited by study group participants, is provided in Table A-21.

A-21: Alberta Commercial Waste Management Organizations

Waste Management Organizations			
GFL Environmental, Inc.	Blueplanet	Green for Life	SASH
Can Pak Environmental, Inc.	Empringham	Dr. Recycle	Prairie Disposal
Collective Waste	Aquaterra	Waste Connections	Evergreen Ecological
Environmental 360 Solutions			

A.11.0 Waste Composition Data

Table A-22 provides an average waste composition breakdown of the recycling stream across municipality types and through every collection method, based on data provided by a subset of the study group. Waste composition data was only available in a limited number of municipalities, so should be used with caution if applying more broadly. Average composition is weighted based on the tonnes collected in each municipality type.

A-22: Composition of Recycling Stream Across Study Municipalities

	Large	Medium	Small	Average
Paper	37%	51%	51%	44%
Cardboard	33%	12%	12%	22%
Plastic Bags/Plastic Wrap	1%	6%	6%	3%
Plastics (rigid)	3%	3%	3%	3%
Tin Cans	2%	2%	2%	2%
Glass Containers	3%	4%	3%	3%
Aluminum	1%	0%	0%	0%
Stewardship	5%	5%	5%	5%
Other Metal	1%	1%	1%	1%
Other	19%	17%	17%	17%

Source: Survey responses and Eunomia calculations.

A.12.0 Other Jurisdiction Targets

The proposed recovery targets in the latest Recycle BC Packaging and Paper Product Extended Producer Responsibility Plan are set out in Table A-23.

A-23: British Columbia Proposed Recovery Target[111]

Material Category	2017 Recovery Rate (%)	Target Recovery Rate (%)	Year to Achieve Target
Paper	87	90	2020
Plastic	41	50	2025
Rigid Plastic	50	55	2022
		60	2025
Flexible Plastic	20	22	2022
		25	2025
Metal	66	67	2020
Glass	72	75	2020

Source: Packaging and Paper Product Extended Producer Responsibility Plan revised June 2019

Table A-24 summarizes the current packaging mandatory recycling targets as set out in the European Union's Packaging and Packaging Waste Directive.

A-24: Packaging Targets in Europe

Material Category	Mandatory Recycling Rate (%)	Year to Achieve Target
All Packaging	65	2025
	70	2030

[111] The plan also includes overall recovery targets of 75% (2018); 75% (2019), 77% (2020), 77% (2021), and 78% (2022).

Material Category	Mandatory Recycling Rate (%)	Year to Achieve Target
Paper and Cardboard	75	2025
	85	2030
Plastic	50	2025
	55	2030
Ferrous Metals	70	2025
	80	2030
Aluminum	50	2025
	60	2030
Glass	70	2025
	75	2030
Wood	25	2025
	30	2030

Source: Packaging and Packaging Waste Directive (94/62/EC), Article 6[112]

[112] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1567873308871&uri=CELEX:01994L0062-20180704

A.13.0 Collection Contract Clause Examples

Contract Example 1: Collection Contract

- Assignment: Neither party shall assign its interest in this Agreement, or any part hereof, in any manner whatsoever without having first received written consent from the other party. This consent shall not be unreasonably withheld.

Contract Example 2: Curbside and Depot

- Assignment: Contractor cannot assign the contract; contract is silent on municipality assignment.
- Termination for Convenience: The County can terminate the contract at any time but must pay the contractor:
    - In the event of a termination notice being given pursuant to this section, the Contractor shall be entitled to be paid, to the extent that costs have been reasonably and properly incurred for purposes of performing the Contract and to the extent that the Contractor has not already been so paid or reimbursed by the County.

Contract Example 3: Curbside

- Assignment: Neither party shall assign its interest in this Agreement, or any part hereof, in any manner whatsoever without having first received written consent from the other party, which consent shall not be unreasonably withheld.
- Termination: Ability for the municipality to terminate the contract for any reason giving 180 days' notice. The contractor's right to payment shall be limited to payment for the services performed and not previously paid for.