

Canada-wide

Plastic Packaging Flows:

A Progress Report

Deliverable 1 & 2: Deposit Return, Residential, and Industrial, Commercial & Institutional Recycling System Performance

December 2024



A Solution Space by
Generate Canada

About the Canada Plastics Pact

The Canada Plastics Pact is made up of a diverse mix of leading organizations and governments from across Canada's plastics value chain who are committed to eliminating plastic waste and pollution, while advancing a circular economy for plastics.

By fostering innovation, collaboration and collective action, we are developing, testing and scaling solutions to the systemic barriers that will keep the **right** plastics in the economy and **all** plastics out of people, animals and nature.

CPP is a [Generate Canada](#) Solution Space, advancing a shared vision for a strong and inclusive economy that thrives within nature's limits.

Canada Plastics Pact is also an active participant in the Plastics Pact Network, convened by the [Ellen MacArthur Foundation](#) and the [Waste and Resource Action Programme](#) (WRAP).

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Prepared by:



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EXECUTIVE SUMMARY

This 2024 Progress Report provides Canada Plastics Pact (CPP) with an updated Canada-wide baseline of plastics packaging flows for 2022, including Canada's residential sector, provincial and territorial deposit return systems (DRSs), and the industrial, commercial, and institutional (ICI) sector. The report also presents an assessment of changes to that flow since CPP's Foundational Report, which was based on 2019 data. The scope of the plastics flow assessment for this report includes all plastic packaging generated and managed at end-of-life in Canada, except those materials generated by resource extraction industries and utility companies (e.g., electricity, gas, and water) or disposed through littering.

Based on the best available data, Canada is estimated to have generated 1,961,374 tonnes of plastic packaging through residential, DRS, and ICI packaging and paper product (PPP) recycling systems in 2022 (**ES Table 1**). This represents a slight increase of 67,207 tonnes or 4% by weight compared to the Foundational Report.

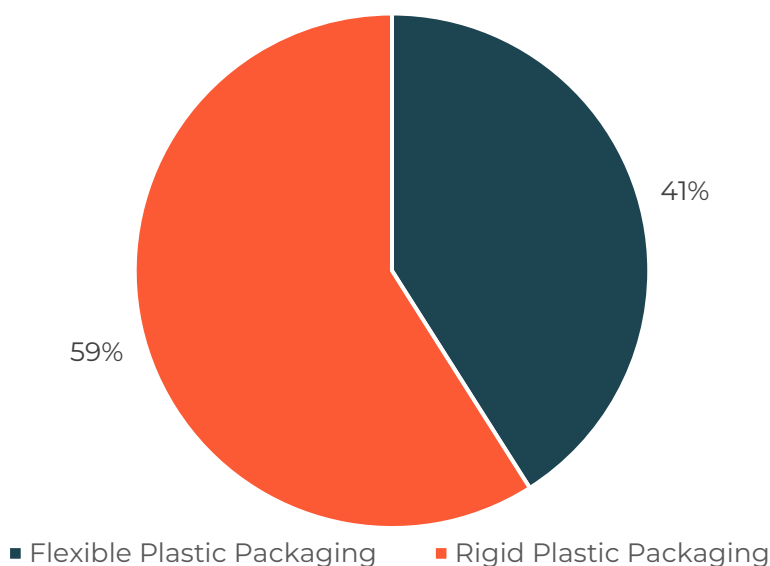
The amount of rigid plastic packaging generated has grown, while flexible plastic packaging generation has decreased. As a result, rigid packaging now represents 59% of plastic packaging generated as compared to 53% in 2019 (**ES Figure 1**). While this change in ratio is still within the margin of error, the decrease in flexible plastic packaging is not surprising given the implementation of plastic bag distribution bans and the move by some companies to switch to paper-based packaging.

The total amount of plastic packaging recycled through these systems has remained relatively consistent since 2019, though there has been some improvement in the overall recycling rates for both rigid and flexible plastic packaging compared to 2019 (**ES Table 1**). It is important to highlight that these results, which are based on 2022 data, are in advance of major reforms that have been regulated but not yet fully implemented to DRSs in Québec and New Brunswick, and the implementation of full extended producer responsibility (EPR) systems for residential PPP that is happening across the country. These new and expanded systems will lead to providing Canadians with greater accessibility to recycle plastic packaging (especially at home), increase the types of plastic packaging that can be collected for recycling, and introduce new recycling targets, which will drive new investment to find solutions to recycle 'hard to recycle' plastic packaging (e.g., low value plastic resins, flexible plastics).

ES Table 1: Plastic packaging flow summary in 2019 versus 2022 in Canada (residential, DRS, ICI).

| | 2019 | | 2022 | |
|-----------------------------------|--------------------|-------------------|--------------------|-------------------|
| | Generated (tonnes) | Recycled rate (%) | Generated (tonnes) | Recycled rate (%) |
| | Average | | Average | |
| Rigid plastic packaging | 997,550 | 21% | 1,163,272 | 24% |
| Flexible plastic packaging | 896,617 | 2% | 798,102 | 4% |
| Total plastic packaging | 1,894,167 | 12% | 1,961,374 | 16% |

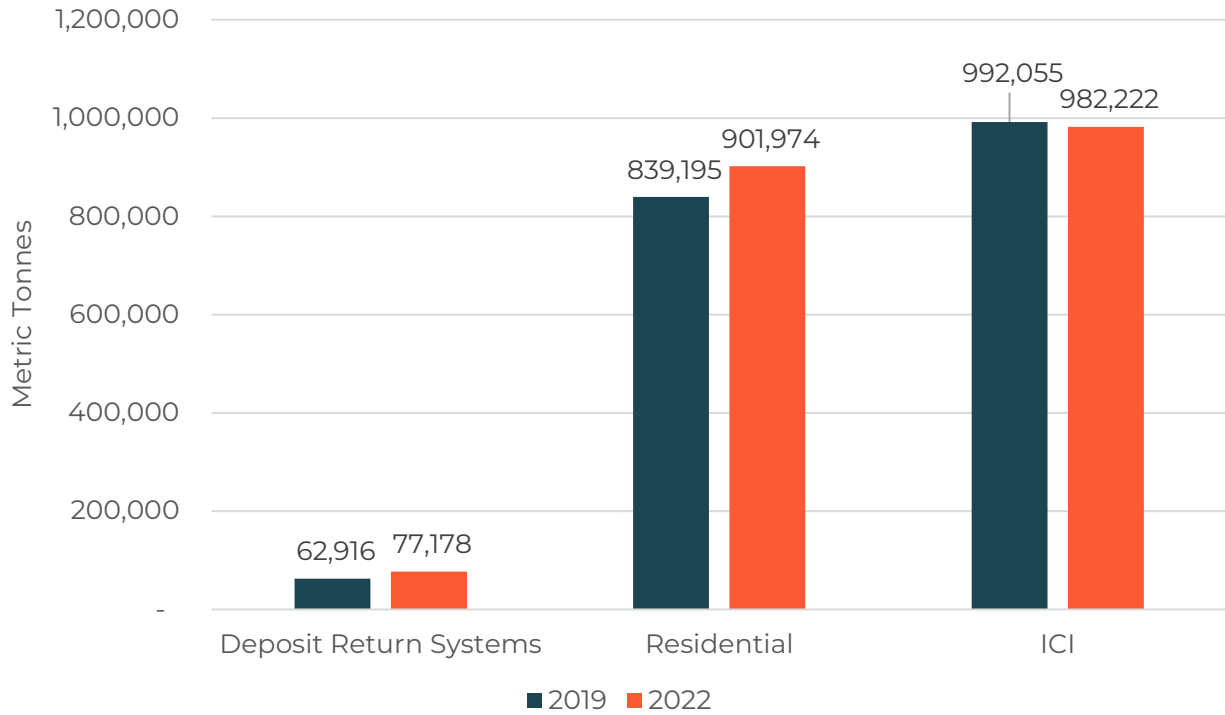
ES Figure 1: Proportion of rigid versus flexible plastic packaging in Canada.



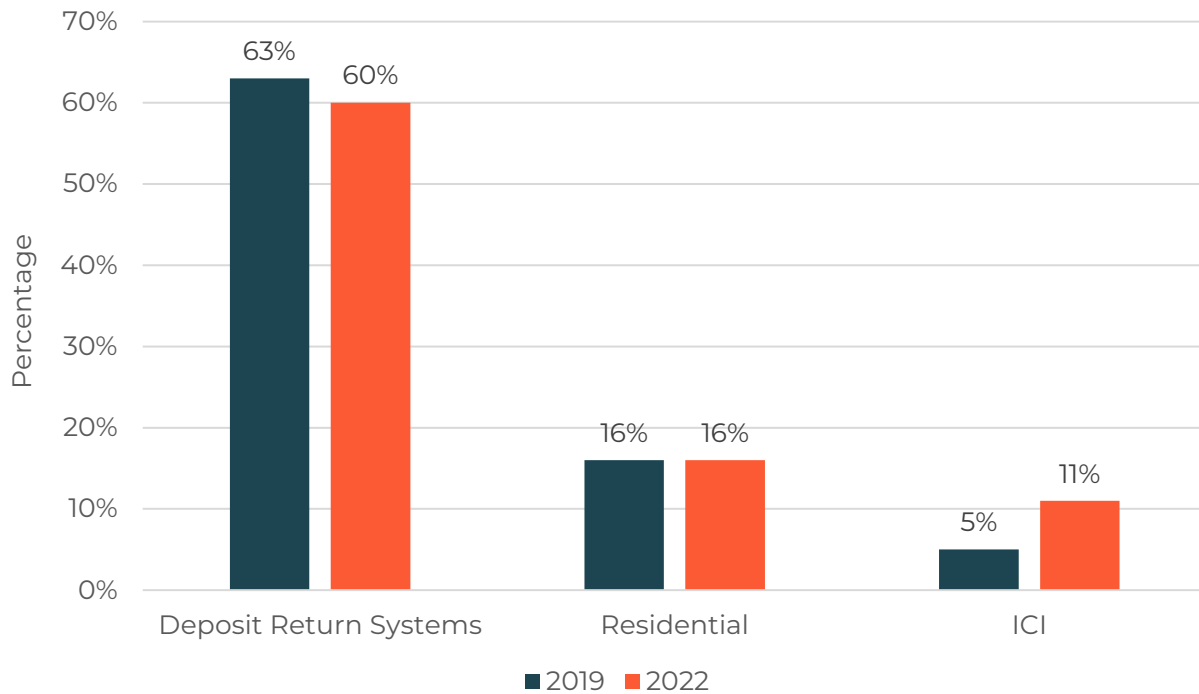
Overall, Canada's plastics packaging flow remained consistent compared to 2019. The most significant change was the increase in the generation of rigid plastic packaging as compared to flexible plastic packaging. There were also slight improvements in plastic packaging recycling rates. Key Canada-wide findings of this report include:

- For plastic packaging generated, DRSs account for only 4%, while residential systems account for 46% and ICI systems account for 50% (**ES Figure 2**).
- The composition of the plastic packaging supplied differs widely by sector. The DRS sector composition is 99% rigid and 1% flexible plastics, while the residential sector is 66% rigid and 34% flexible, and the ICI sector is approximately 50% rigid and 50% flexible (see **Section 5**).
- Across all sectors, there appears to have been a 6% drop in flexible packaging generation in 2022 compared to 2019; this was coupled with an overall increase in the recycling of the flexible packaging of 13% (**ES Figure 4**). Inversely, there was also a 17% increase in the amount of rigid packaging generated in 2022 compared to 2019; this was coupled with a drop in rigid packaging recycling of 2% (**ES Figure 5**).
- DRSs achieve significantly higher overall recycling rates compared to residential and ICI PPP systems (**ES Figure 3**). This is likely due to DRSs use of a financial incentive to encourage the containers' return to collection points, mandatory source separation of the containers at the point of collection into marketable bales and totes, and the fact that the majority of beverage containers are made from easier to recycle plastic resins (i.e., PET and HDPE). In comparison, neither the residential nor ICI sectors use financial incentives to elicit collection, and both manage a wide range of plastic packaging (i.e., including hard-to-recycle resins, multi-resin plastic packaging, and mixed material PPP such as multi-laminated packaging).
- Overall, the final recycling rate achieved by the ICI sector lags significantly behind the other sectors. However, while there appears to be some improvements in the recycling rates achieved by this sector, it is not clear from the results whether these improvements are due to better data capture and analysis in 2022 compared to 2019 or to actual improvements in sector activity.

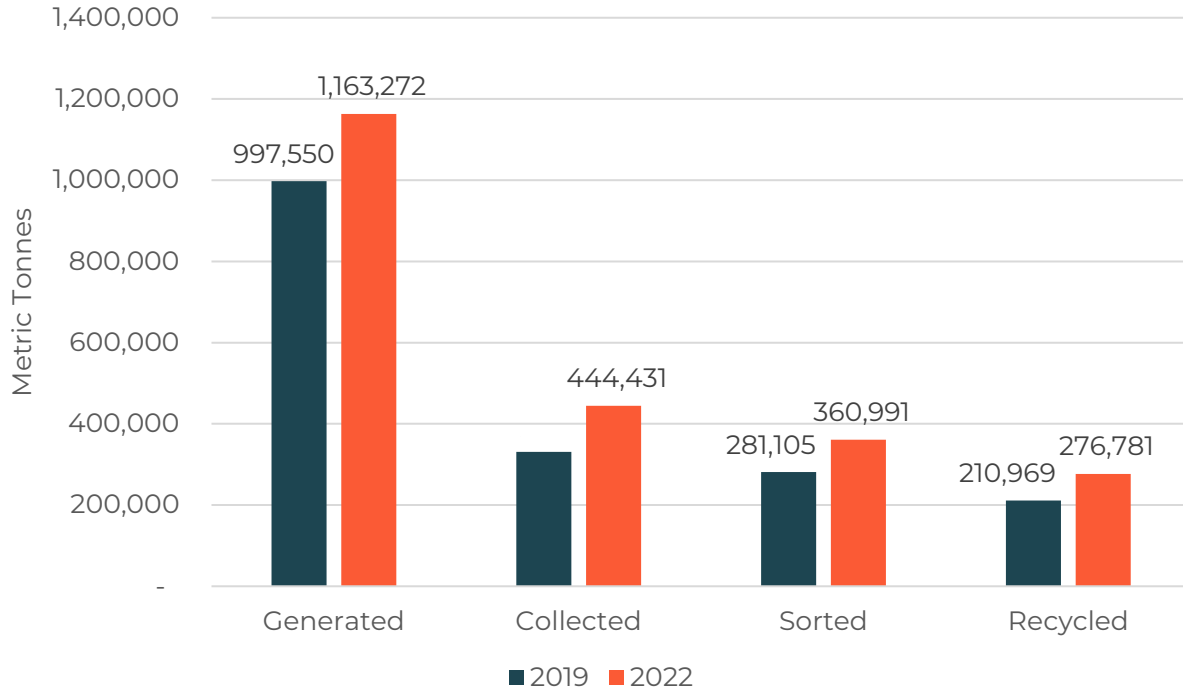
ES Figure 2: Plastic packaging generation in Canada in 2019 and 2022.



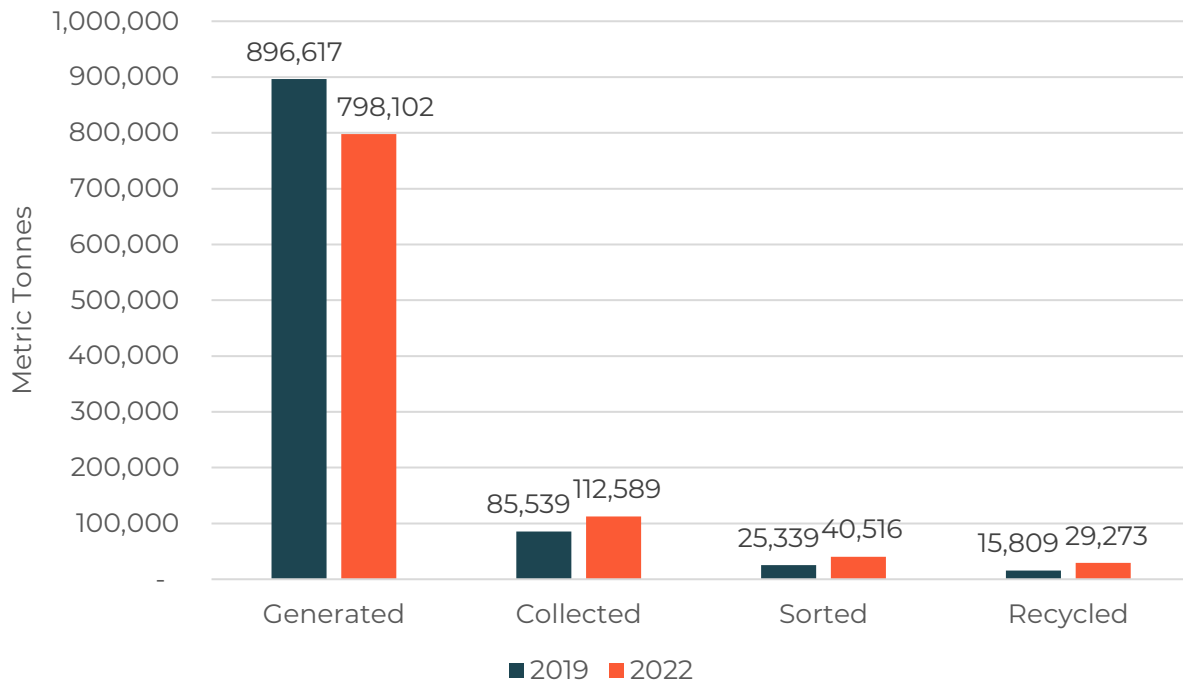
ES Figure 3: Plastic packaging recycling in Canada in 2019 and 2022.



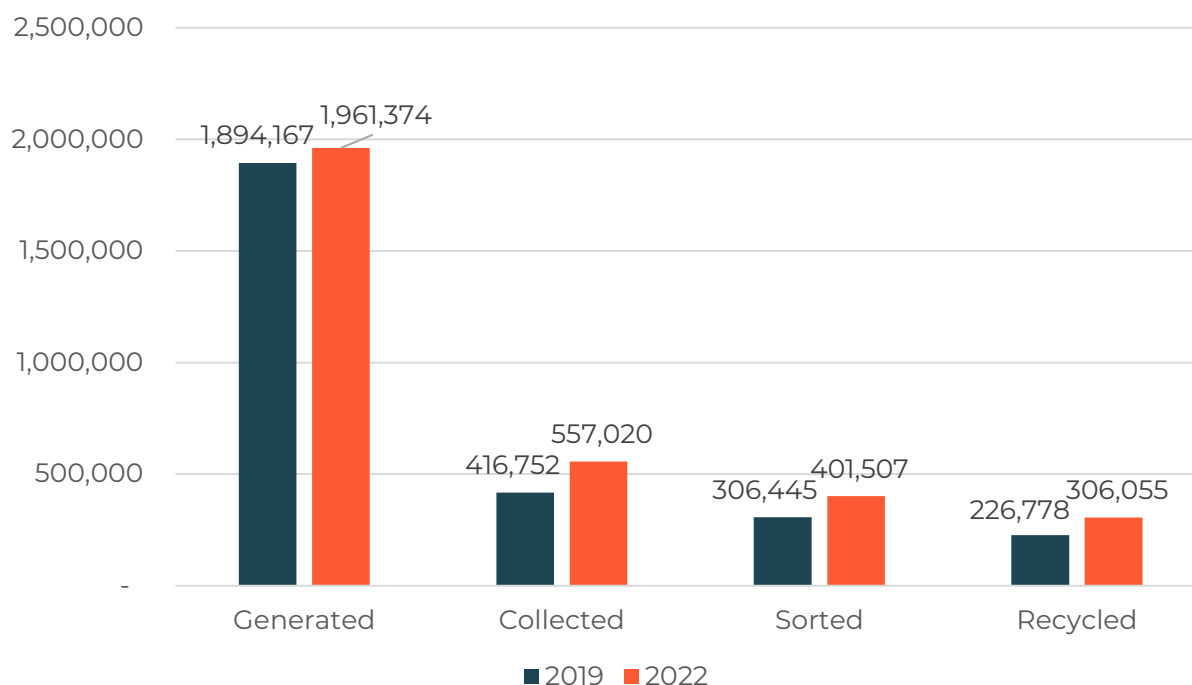
ES Figure 4: Canada-wide rigid plastic packaging flow in 2019 and 2022.



ES Figure 5: Canada-wide flexible plastic packaging flow in 2019 and 2022.



ES Figure 6: Canada-wide total plastic packaging flow in 2019 and 2022.



In addition to plastic packaging modelling across the DRS, residential, and ICI sector, additional effort was made to model the entire ICI PPP flow by ICI subsector. The model findings show that ICI subsectors differ in both plastic packaging and overall PPP generation, recycling, and disposal. ICI subsector modelling, in addition to ICI sector modelling as a whole, may better inform efforts to improve ICI plastic packaging and PPP collection and recycling.

ES Table 2 shows that the ICI subsectors disposing of the greatest quantity of plastic packaging are (from highest to lowest):

1. Food services;
2. Manufacturing;
3. Trade;
4. Health Care & Social Assistance; and
5. Administration & Offices.

ES Table 2: Contribution by ICI Subsector to plastic packaging disposed.

| | Rigid plastic packaging disposed (MT) | Flexible plastic packaging disposed (MT) | Total plastic packaging disposed (MT) | Percentage of contribution by each ICI subsector to total plastic packaging disposed |
|----------------------|---------------------------------------|--|---------------------------------------|--|
| Food services | 87,318 | 153,488 | 240,806 | 31% |
| Manufacturing | 90,501 | 117,765 | 208,267 | 27% |

| | Rigid plastic packaging disposed (MT) | Flexible plastic packaging disposed (MT) | Total plastic packaging disposed (MT) | Percentage of contribution by each ICI subsector to total plastic packaging disposed |
|---------------------------------|---------------------------------------|--|---------------------------------------|--|
| Trade | 38,942 | 46,947 | 85,889 | 11% |
| Health Care & Social Assistance | 51,785 | 16,091 | 67,876 | 9% |
| Administration & Offices | 22,613 | 33,072 | 55,685 | 7% |
| Agriculture | 19,142 | 35,884 | 55,026 | 7% |
| Construction | 16,632 | 9,282 | 25,914 | 3% |
| Transportation & Warehousing | 5,832 | 7,258 | 13,090 | 2% |
| Educational Services | 6,415 | 3,777 | 10,192 | 1% |
| Accommodation | 5,960 | 1,029 | 6,989 | 1% |
| Arts, Entertainment, Recreation | 4,261 | 2,024 | 6,285 | 1% |

The following conclusions can be drawn from the report:

1. **There are continued barriers to ICI plastic packaging recycling** including market demand, contamination, lack of recycling infrastructure, an imbalance of information and controls, lack of economies of scale, and economic instability. Focussed attention on finding solutions to these barriers will assist with improving outcomes.
2. **There are opportunities to target recycling system improvements in specific ICI subsectors.** The ICI modelled data estimates that four of the ICI subsectors (i.e., food services, manufacturing, trade, and health care and social assistance) generate 78% of all ICI plastic packaging disposed. However, while these subsectors contribute significantly to disposal, the raw waste audit data obtained also shows that there are individual organizations within each of these subsectors that achieve high levels of recycling. This suggests that there is potential to readily improve the overall ICI subsector performance by targeting actions that help individual generators overcome barriers to improved performance.
3. **There are early signs of improvement for flexible plastic packaging, but more work is needed.** Flexible packaging continues to be recycled at significantly lower rates than rigid packaging due to the complexity involved in recycling this material, including challenges with its collection, sorting, and final recycling. However, a switch from flexible to the more recyclable rigid packaging is not likely to solve this issue
4. **Changes are being implemented whose impacts are not yet realized -i.e., There has been significant expansion of regulated recycling systems.** The shift in policies across Canada will bring improvements to the collection and management of plastic packaging in the residential sector as well as DRS. This includes providing greater access to recycling for households and creating better economies of scale for the

recycling of more difficult to manage materials like flexible plastics. However, it will be important to monitor the implementation of these new policies to ensure they are achieving intended objectives. As well, there may be opportunities to better align policies and oversight to:

- Reduce the amount of producers who may not be reporting or are underreporting the materials they supply into the market; and
- Rationalize the current data that is reported in by different entities to PROs or government entities, and the consolidated data that is posted publicly; and
- Ensure more consistency in the materials designated and the exemptions included.

5. **There are significant barriers and opportunities to improve the data related to plastic packaging flows.** Data availability and discrepancies remain major challenges to properly assess plastic packaging flows across Canada.

- Data availability – While a substantial amount of data are available across the plastics packaging value chain, it does not necessarily mean that the data are accessible. Data accessibility in the plastic packaging value chain is hindered by lack of:
 - incentives to openly share data, which is considered a commercially valuable asset;
 - consensus on which format data should be collected; and
 - clarity on which data are relevant at a system-level.
- Data discrepancies - When there is a void of common standards, formats, and systems to collect data, combining that data often requires significant expenditures of resources and there are challenges with transforming it into a useable format. Canada's current data collection and management approach is disjointed with:
 - Regulations (e.g., EPR and DRS) that lack consistency in standard data requirements, conversion factors, definitions, and material categories.
 - Waste composition studies and waste audits that are undertaken by different entities (i.e., governments and ICI) that lack consistency in scope and definitions.
 - No standards for waste service providers' reporting to generators, which leaves generators without the information they need to improve their waste management systems and, especially, their recycling rates.
- Issues with data availability and quality will be addressed in a separate report (CPP Data Current State Review and Roadmap Forward).

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1 BACKGROUND

In 2021, the Canada Plastics Pact (CPP) was launched and joined an international and globally aligned effort to eliminate plastics waste and end plastic pollution by ensuring that plastic packaging is used within a circular economy. CPP committed to achieving the following four ambitious targets by 2025:

1. Define a list of plastic packaging that is to be designated as problematic or unnecessary and take measures to eliminate them.
2. Ensure an average of at least 30% recycled content across all plastic packaging (by weight).
3. Support efforts towards 100% of plastic packaging being designed to be reusable, recyclable, or compostable.
4. Undertake ambitious actions to ensure that at least 50% of plastic packaging is effectively recycled or composted.

Since its launch, CPP has brought together 98+ partners from across Canada's plastics value chain (i.e., brand owners, waste management service providers, government, and not-for-profits) to research, fund, and trial solutions that overcome known barriers to the prudent use of plastics and its proper end-of-life management. CPP's efforts to support progress have been swift:

- In 2021, it released its first plan to keep plastics out of the environment (i.e., CPP's Roadmap to 2025) and [Canada Plastics Pact Foundational Research and Study: Canadian Plastic Packaging Flows](#) (henceforth called the 'Foundational Report'), which provided a baseline for Canada-wide plastic packaging generation, collection, recycling, and disposal using 2019 as the baseline data year.
- In 2022, it launched *The Canadian Guidance for the Golden Design Rules for Plastic Packaging* and its first pilot standup pouch with 20% post-consumer recycled content (PCR).
- In 2023, it:
 - released Canada's first industrial, commercial, and institutional (ICI) packaging and paper products (PPP) waste flows study, with a focus on British Columbia;
 - released a study on the reuse and refill of plastic packaging in Canada;
 - released a definitional framework for circular flexible plastic packaging;
 - released a report on improving data collection and reporting & transparency within the plastics packaging value chain;
 - released a report on pathways to mono-material flexible plastic packaging; and
 - undertook research as part of a consortium of circularity leaders to optimize the recycling system for flexible plastic packaging in Canada.

As CPP works to assess its progress towards completing its 2025 Roadmap, it continues to track Canada's progress on improving plastic packaging management Canada-wide. As a result, it commissioned an update to its Foundational Report based on the 2022 data year, which is the content of this report: *Canada-wide Plastic Packaging Flows: A Progress Report* (henceforth called the Progress Report).

2 DELIVERABLES & SCOPE

This Progress Report provides CPP with a Canada-wide baseline for plastic packaging flow for the year 2022. The baseline includes an estimate of the combined plastic packaging flow for Canada overall (i.e., across all sectors, including the deposit return system [DRS], residential, and ICI sectors), a breakdown of plastic packaging flow for each sector, and a breakdown of plastic packaging for most ICI subsectors (**Table 1**). The report also presents comparisons to the estimates of plastic packaging flow provided in the 2019 Foundational Report. This Progress Report updates and replaces both the Foundational Report and the CPP Progress Report published in December 2023, which only presented data for the DRS and residential sectors.

However, this report excludes the following data, which were deemed out-of-scope:

- ICI data for resource extraction industries (i.e., mining and forestry) and utilities (i.e., electricity, gas, and water), because plastic packaging data are not readily available for these industries and because they are unlikely to be major contributors to the plastic packaging waste stream; and
- litter, including ocean debris, because the generators of these materials are unknown, and generators of ocean debris might reside outside of Canada.

Table 1: Targeted ICI subsectors by North American Industry Classification System Code (NAICS).

| NAICS Codes | ICI Subsector |
|----------------------|---|
| 11 | Agriculture, forestry, fishing, and hunting 111, 112 Crop production, animal production and aquaculture |
| 23 | Construction |
| 31-33 | Manufacturing |
| 41, 44-45 | Trade |
| 51-56, 81, 91 | Administration and office |
| 48-49 | Transportation and Warehousing |
| 61 | Educational services 6111 Elementary and Secondary Schools 6112, 6113 Colleges and Universities |
| 62 | Health care and social assistance |
| 71 | Arts, entertainment, and recreation |
| 72 | Accommodation and food services 722 Food services 721 Accommodation |

3 DEFINITIONS AND OTHER CONTEXT

To best understand the analysis and findings, the Canada-wide baseline estimate of plastic packaging flow has been presented in two ways: 1) a compiled Canada-wide result and 2) a sector-by-sector result -i.e., DRS, residential, and ICI. While the Canada-wide results provide an overall benchmark for performance, the sector-by-sector findings are important to enable

future targeted planning and actions to improve performance. This is because each sector varies in terms of the accessibility and operations of its collection and recycling systems, the general scope of materials managed, and the efforts that would be needed to improve their performance. The following section provides an overview of the differences in material management between and within each sector, as well as an overview of the waste streams and plastic packaging categories targeted by this review.

3.1 The Deposit Return System Sector

The DRS sector straddles both the residential and ICI sectors.¹ DRSs are set up to manage the collection, sorting, and end-of-life management of residentially and commercially generated beverage containers in a separate system, essentially removing these materials from the residential and ICI waste flows. DRSs function by requiring consumers to pay a deposit on each designated container purchased and refunding that deposit to any person returning the container to a designated collection point (i.e., whether it is the original consumer or another person in possession of the container). Collection sites accept and source separate the containers into material categories (e.g., polyethylene terephthalate (PET), high-density polyethylene (HDPE), other plastic, aluminum, bi-metal, and glass of varying shapes and colours).

While Canada's DRSs share common characteristics, all vary in the type of beverage containers they manage, how data for containers supplied and collected for recycling are tracked, and how the details of system success are publicly reported.² Common characteristics include: each system charges a deposit on designated containers, each system refunds all or a portion of the deposit upon the containers' return to a collection point, and each system manages only 'ready-to-serve' beverages that are sealed by the manufacturer. As a result, all systems in Canada exclude to-go cups and other containers filled at retail, containers for concentrates, and containers for contents that are deemed to be a foodstuff or ingredients to a foodstuff or beverage, even if those contents could be served in a 'drinkable' format (e.g., single-serve soup, single-serve coffee creamers, infant formula). However, the definition of which contents are considered 'foodstuff' varies (e.g., some systems include meal replacement containers and others specifically exclude these containers). At present, all systems in Canada exclude wine and beer bottles that are sold empty for the purpose of home bottling.

One of the key characteristics that differ and affect which sector (i.e., DRS or residential and ICI) manages which beverage containers is the list of containers designated for management by the DRS (i.e., which containers are under deposit). The containers managed vary by each jurisdiction's definition of 'beverage' and 'designated container', which excludes certain containers from the system by container's original contents, size, and format. For example, Saskatchewan and Québec exclude flexible beverage containers from their systems (e.g., pouches and bladders). Jurisdictions also often exclude one or more of the following types of beverage containers due to their original contents: infant formula (i.e., all jurisdictions), meal replacements and liquid fortified diets (i.e., all jurisdictions except Alberta and Northwest Territories), milk and milk substitutes that are 'a source of protein' (Atlantic Canada, Manitoba, Ontario, and Québec in 2022), specific milk-derived beverages (e.g., drinkable yogurt, kefir, and buttermilk in British Columbia), unpasteurized apple cider (i.e., New Brunswick only), non-alcohol containers (i.e., Ontario only), refillable beer containers (e.g., Saskatchewan), and containers other than beer and malt containers (i.e., Manitoba). Finally,

¹ Note there are some other material designations like automotive containers (e.g., used oil, antifreeze) that also include residential and ICI materials, but they represent smaller quantities, and greater amounts are generated in the ICI sector. As a result, they have been included in the ICI sector data.

² Reloop, last update 2023. Global Deposit Book 2022, including 2023 Addendum. Available at: <https://www.reloopplatform.org/global-deposit-book-2022/>

all jurisdictions except Alberta exclude beverage containers based on size: (British Columbia excludes containers greater than 10L, Saskatchewan and Atlantic Canada excludes containers greater than 5L, and Québec excludes containers greater than 2L. Similarly, Ontario and Québec exclude containers less than 100ml and the Yukon and Northwest Territories exclude containers less than 30ml. Of the 12 DRSs operating in Canada, Alberta and the Northwest Territories have the widest list of containers included in their systems. As of 2022, only five of the systems actively encouraged containers to be returned with their caps on so the material can be recycled and litter avoided (i.e., British Columbia, Alberta, Québec, New Brunswick, and Nova Scotia).

There is a high-level of confidence in DRS data – including containers supplied, collected for recycling and sorted, and sent for reprocessing – because these containers are tracked on a unit basis from the point of supply to the point-of-collection for the purpose of returning accurate financial deposits back to consumers. However, while theoretically all DRS containers supplied are managed in the DRS waste stream, containers that are not returned to dedicated DRS collection points (e.g., bottle depots) could still be collected for recycling or disposed in the residential or ICI waste streams—including through streetscape waste collection points— or lost as litter. As a result, there is some 'bleeding' of the data through all three sectors.

3.2 The Residential Sector

Residential waste in Canada is defined by Statistics Canada as: "*Residential sources of waste for disposal*" and refers to the amount of non-hazardous solid waste produced in all residences. It includes waste that is picked up by the municipality and waste from residential sources that is self-hauled to depots, transfer stations and disposal facilities."³ In general, it consists of waste generated by households.

As of 2022, the residential recovery of plastic packaging waste was still largely managed through municipally operated recycling programs (i.e., curbside or depot) paid for by taxpayers or individual ratepayers. In urban and sub-urban municipalities, residential waste streams (including plastics recovery streams) are generally collected from individual homes, though some urban drop off centres exist. In rural communities, this waste is typically transported by individual residents to local waste collection points (e.g., depots, transfer stations, 'dumps', or landfills). Residential waste collected 'at the curb' (i.e., individual services provided to individual homes) is often called curbside waste. Residential waste collected in 'communal collection vessels' such as front-end bins or shared carts, is often called multi-residential (or multi-family or multi-unit) waste. However, a growing number of residential PPP collection and recycling streams are managed as regulated extended producer responsibility (EPR) systems, operated by producer responsibility organizations (PROs).

However, while the source of waste (i.e., a household) can be theoretically used to define which waste should be considered, tracked, and managed as residential waste, in practice whether waste is tracked as residential or ICI waste depends on which entity is responsible for managing the waste. For example, municipalities are almost always responsible for arranging curbside collection of all waste streams unless responsibility for managing the recycling stream is delegated to a PRO. In either of these cases, the waste would be tracked and managed as residential waste. However, for multi-residential buildings, the waste may be managed either by a municipality or under a business-to-business (B2B) contract between a building manager and a private waste management company. In the latter case,

³ Statistics Canada. 2019. *Classification of sources of waste*. Available at: <https://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=1231840&CVD=1231840&CLV=0&MLV=1&D=1&adm=0&dis=0>

the waste would be tracked and managed as ICI waste. Despite this, while there are some non-residential materials measured as residential waste and residential materials measured as ICI materials, the majority of materials are measured by their appropriate stream. In Ontario, their Auditor General reports: "*almost 80% of multi-residential households receive municipal garbage and recycling collection, which is counted as residential waste for data purposes.*"⁴

In general, in Canada, the definition of residential waste varies on a municipality-by-municipality basis as follows:

- It always includes waste from detached and semi-detached homes.
- It may include none, some, or all of the waste generated by multi-residential buildings, for example:
 - it usually includes some portion of multi-residential waste generated by small multi-residential buildings such as townhomes, duplexes, rowhouses, and even small apartment buildings up to a certain number of units in size (e.g., a six-plex); or
 - it may include multi-residential buildings of any size (e.g., the City of Edmonton);
- It may include waste generated by specific types of ICI entities (e.g., business improvement areas, churches, community centres, schools, and even government buildings).
- It may include streetscape waste.

It is important to note that there is no common definition of what is considered to be a multi-residential building for the purpose of waste collection across Canada.

Canada-wide, the PPP and plastic packaging waste generated by households is fairly homogenous – it is the waste of day-to-day living from preparation of food, personal hygiene, cleaning, clothing, and hobbies. Residential plastic packaging waste may include plastics of a diverse array of sizes, resins, and formats (e.g., rigid versus flexible), but in general, it is relatively small compared to most ICI plastic packaging waste. However, while the generation across households is generally homogeneous, it is well-established that curbside waste is often better source separated into the appropriate waste streams (i.e., garbage, recycling, and organics) compared to multi-residential waste. This could be due to a number of factors such as a lack of access or less convenient recycling services in multi-residential buildings, a lack of understanding or incentives for residents of multi-unit buildings to sort their recyclables into the recycling stream, a lack building property management oversight of collection bins, etc. Numerous studies have been undertaken to try to improve multi-residential recycling. See The CIF: Continuous Improvement Fund for a list of studies.⁵

The breadth of plastic packaging collection systems offered to curbside and multi-residential premises varies Canada-wide, ranging from collecting all plastic packaging and single-use plastics (in British Columbia in 2022⁶), to targeting specific plastic resins and formats (e.g., The City of Calgary collects resin identification codes for rigid plastic packaging of 1-7 and

⁴ Office of the Auditor General of Ontario. 2021. Value-for-Money Audit: Non-Hazardous Waste Reduction and Diversion in the Industrial, Commercial and Institutional (IC&I) Sector. Available at:

https://www.auditor.on.ca/en/content/annualreports/arreports/en21/ENV_ICI_en21.pdf

⁵ The CIF: Continuous Improvement Fund. Available at: https://thecif.ca/cif-funding-process-overview/funded-projects-catalogue/?_sft_portfolio_cat=multi-residential+contamination

⁶ Recycle BC. 2023. Goodnews! More items are now accepted for recycling. Available at: <https://recyclebc.ca/learn/campaigns/new-items-accepted-for-recycling/>

stretchable film plastic, but does not offer the collection of other flexible plastic packaging⁷), to not offering plastic packaging collection (e.g., Nunavut Territory). However, residential collection of plastic packaging is becoming more harmonized as new provincial and territorial regulations shift the responsibility for residential PPP management from municipalities to regulated EPR systems, which provides PROs with the opportunity to harmonize Canada-wide collection as much as regulations permit.⁸

Plastic packaging recyclables collected from residential premises are transported to one or more materials recovery facilities (MRFs), sorted into marketable commodities, and sent to an end-market (e.g., a plastics reprocessor). As of 2022, municipalities in Canada were not collecting reusable packaging items directly from consumers through curbside or depot collection systems, though this could change in the future as packaging collection systems continue to evolve.

3.3 The Industrial, Commercial, and Institutional (ICI) Sector

ICI wastes are those generated by Canadians 'away from home', whether that waste is generated in a work setting, a tourist setting (e.g., a hotel), a school, in a public park, at the streetscape level, in an institution like a hospital, or at an event (e.g., a stadium). Statistics Canada refers to these as 'non-residential' properties.⁹

The ICI plastics recovery system is markedly different than the residential system in terms of the spectrum and quantity of PPP managed, and how it is set out for collection, collected by haulers, sorted, and ultimately processed. First, it is important to understand that there are two types of ICI packaging:

- Residential-like packaging –This type of ICI packaging resembles household packaging in size and type, but it is deemed to be ICI waste because of where the item inside the packaging was consumed or used. For example, in some jurisdictions PPP generated in public spaces or streetscapes are considered ICI PPP, even if that material was purchased for household consumption. Ready-to-serve beverage containers that are not under a DRS and are consumed away from home (e.g., in a restaurant, school, stadium, or long-term care facility) are considered ICI PPP, even though the containers are identical to the beverage containers that would be consumed at home. Food packaging disposed at schools, food services establishments, nursing homes, and long-term care facilities can be identical those disposed in residential settings, as can many personal care items like shampoos and soaps. Residential-like packaging also includes off spec, recalled, or overstock items that were disposed at retail and that never reached a consumer (e.g., to conform with Canada's Duty Drawback rules¹⁰). These 'residential like' ICI PPP items could, if collected, flow through similar channels as residential PPP for their effective capture and reprocessing.
- ICI only packaging –This type of ICI packaging is markedly different than residential packaging. This includes both single-use and reusable items that are used to transport large quantities of materials. This includes items like pallet wrap (also called skid wrap), beverage bladders, bulk bags, large volumes of old corrugated cardboard (OCC),

⁷ The City of Calgary. N.d. What goes where. Available at: <https://www.calgary.ca/waste/what-goes-where/default.html>

⁸ Circular Materials. 2023. National Integration for Blue Box in Canada. Available at: <https://www.circularmaterials.ca/news/national-integration/>

⁹ Statistics Canada. 2022. *Biennial Waste Management Survey*. Available at: <https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=2009>

¹⁰ Canada Border Services Agency. 2014. Duty Drawback Program. Memorandum D7-4-2 Available at: <https://www.cbsa-asfc.gc.ca/publications/dm-md/d7/d7-4-2-eng.html>

flexible intermediate bulk containers (FIBCs), pallets (also called skids), gaylord boxes, crates, and trays. These items do not and could not effectively flow through the same channels as residential PPP for recycling.

ICI recycling requires more effort of its generators than is required of residential generators. Unlike residential consumers, who must only put materials comingled or roughly sorted into their curbside carts / bins / bags (e.g., removing glass containers and flexible plastics from curbside bins and taking these to depots) or bring materials to a depot to have them flow into a recycling stream, ICI generators must form B2B relationships to have their material managed and often must do so on a material-by-material basis. Typically, ICI generators contract haulers who will only collect specific recyclable materials that they have been effectively source separated onsite (e.g., pallet wrap and OCC). ICI generators may also contract directly with brokers who then arrange for onsite collection by haulers as well as manage the material marketing.

The haulers who collect ICI recyclables often do so along dedicated collection routes targeting specific loads of materials (e.g., OCC), as opposed to the single or dual stream systems offered to householders. This narrow stream of items collected keeps ICI recycling streams clean throughout the collection route. The haulers will then often deliver the collected material to consolidation points (e.g., a transfer station or facility) before it is sent to an end-market. Post consolidation, service providers may either directly work with end-markets or enter into their own contracts with brokers, who manage the marketing of the material.

The commercial confidential nature of the B2B relationships for the flow of ICI PPP recyclables makes data gathering challenging and opaque. The relationships often exist based on the value of the materials. If the cost to transport the materials to an end market or to sort the materials at the end-market is too high, these materials will flow to the cheapest management option, which is often landfill. It is in understanding the resultant flow of materials through B2B relationships, that service provider intelligence provides particularity important insights.

The ICI sector, in general, does not track reusable PPP as part of a waste stream. These are items that companies have invested in and manage as infrastructure and are used until they are no longer suitable for their original purposes (e.g., crates). Some companies even invest in their repair.¹¹ As a result, data on reusable PPP is often anecdotal, at best.

¹¹ Alberta Beverage Container Recycling Corporation. 2023. 2022 Sustainability Report: Leave no trace. See materials usage (p.15). Available at: <https://abcrc.com/wp-content/uploads/2023/08/ABCRC-2022-Sustainability-Report.pdf>

Office of the Auditor General of Ontario – Value for Money Audit: Non-Hazardous Waste Reduction and Diversion in the Industrial, Commercial, and Institutional Sector¹²

In their 2021 report, the Auditor General identified a number of areas of potential concern in the management of PPP collected for recycling including a lack of appropriate infrastructure, proper controls to ensure materials are recycled, and an imbalance of information (i.e., waste generators often lack the information needed to improve recycling outcomes):

"Waste management companies often send IC&I source-separated materials intended for diversion to landfill. We found that waste collectors take roughly half of the IC&I source-separated recycling that they collect to transfer stations, but only 34% of the transfer stations we examined transfer loads of IC&I recycling to facilities that sort and process the materials (*emphasis added*). The other 66% of the transfer stations accept the IC&I recycling as garbage, which they mostly send to landfill or energy-from-waste facilities. We also found that waste collectors take about one-fifth of collected IC&I organic waste directly to landfill. This means that many materials that are collected separately by IC&I establishments, such as retail stores, restaurants, offices, and hotels, with the intent of being diverted, never reach a processing facility to be recycled or composted.

Establishments do not have access to information about waste industry activities to verify where recyclables are taken or to make informed decisions when contracting waste services. The Ministry does not compile or publish information about waste management companies' operations, such as their diversion rates, the types of materials they divert, or what they do with the materials they handle. We found that it was difficult to obtain reliable information about waste facilities' operations. For example, our review of a sample of 20 waste company websites found that the information about how the facility manages the IC&I materials that it accepts was unclear in 19 cases, and misleading in four of those cases. For example, some facilities advertised recycling services when in practice they send almost all of the materials they receive to landfill as garbage."

3.4 Waste Streams Included in the Baseline and Waste Stream Definitions

The PPP waste stream consists of five components, which are defined by where the material is collected at end-of-life, including:

1. disposal stream (sometimes colloquially called the "garbage" or "black cart" stream)
2. recycling stream;
3. reuse stream;
4. organics stream (i.e., often colloquially called green bin or compost bin streams); and
5. litter stream (i.e., material that remains unmanaged in the environment).

This report seeks to track the flow of plastic packaging waste from supply through the disposal stream, recycling stream, and reuse streams. It does not seek to track material through the litter or organics streams. Litter, by definition is unmanaged waste. Compostable plastic packaging, other than compostable bags, are not yet managed through organics

¹² Office of the Auditor General of Ontario. 2021. *Value for Money Audit: Non-Hazardous Waste Reduction and Diversion in the Industrial, Commercial, and Institutional Sector*. Available at: https://www.auditor.on.ca/en/content/annualreports/arreports/en21/ENV_ICI_en21.pdf

management systems at-scale Canada-wide, and so tracking of materials in the organics streams was not undertaken.

When describing plastics flow through recycling stream, careful consideration was given to track and describe plastics flows at different points along that stream to enable conclusions that are clear, precise, and better inform possible opportunities for intervention. Plastics may be collected for recycling at the point of generation in the recycling stream but exit and be disposed at various points along the recycling stream before final recycling takes place. As a result, the plastics flow was tracked through the recycling stream at specific stages, including:

- **Collected for recycling** – This stage includes materials collected by the generator with the intent that material be ultimately recycled. However, it does not mean this material is ultimately recycled downstream as it might not be sent to a processor (i.e., MRF) or an end-market (e.g., plastics reprocessor) if, for example, the materials are too contaminated.
- **Sorted** – This stage includes materials that have been sorted by a processor (i.e., a MRF) into commodities for sale or delivery to an end-market (e.g., a plastics reprocessor). This stream consists of plastic packaging materials that have not yet been reprocessed into PCR. However, once again, it does not mean this material is ultimately recycled as it might be sorted out as waste by the end-market if, for example, the materials are too contaminated or if packaging design does not lend itself to sorting using existing MRF technologies.
- **Recycled** – This includes plastic packaging that has been reprocessed into PCR for sale to a final end-user as recycled content. It includes both mechanical and chemical processes but excludes all materials that are recovered for use as a fuel. Whether packaging was recycled in a closed or open loop was not assessed.

3.5 Plastic Packaging Categories

In this report, plastic packaging data were collected in the most discrete form available and then compiled into the following categories: PET, HDPE, mixed PET/HDPE, other rigid plastics, unclassified, film, and laminates. The terms other rigid plastics and unclassified are particularly important to understand when reading the tables and figures provided:

- **Other Rigid** – The term 'other' in this context means that the plastic resins are known to not be PET or HDPE (e.g., rigid PP, PVC). They have been grouped together due to a lack of consistency in their reporting in the waste audits collected.
- **Unclassified** – The term 'unclassified' means the plastic resins that could not be identified as 'rigid' or 'flexible' and are of an unknown material. These were classified as rigid plastics as they were the predominant format identified (e.g., plastic beverage containers).

4 DATA ANALYSIS AND APPROACH

The following section outlines the methodological approach taken to collect and analyze data used to inform this report. It includes an overview of the data sources and their reliability, the model used to estimate current plastic packaging flows, and the process of 'triangulation', which assisted in confirming the accuracy of the ICI modelling results.

Appendix A provides definitions for the acronyms used in this report. **Appendix B** provides definitions for the key terms and points of measurement, which are unchanged from the Foundational Report.¹³

4.1 Data Sources and Acquisition

The most recent data available was collected from five general sources: 1) provincially and territorially regulated EPR and product stewardship systems (i.e., DRSs, residential PPP systems, and hazardous and special products systems that collect plastic packaging); 2) municipalities (e.g., waste composition studies at landfill, facility waste audits); 3) ICI entities, across all targeted ICI subsectors (**Table 1**); 4) government and industry studies (e.g., *Cleanfarms' Report - Agricultural Plastic Characterization and Management on Canadian Farms*, RECYC-QUÉBEC's construction and demolition (C&D) waste composition study); and 5) direct information from producers, processors, and haulers. The 2022 data year was used, where available. When 2022 data were not available, the most recent available data were used.

As was done for the Foundational Report, data for the Atlantic provinces (i.e., New Brunswick, Newfoundland and Labrador, Nova Scotia, and Prince Edward Island) were combined into an “Atlantic Canada” category and data for the territories were combined into a Territories category to respect concerns raised that presenting data by province or territory would reveal commercially sensitive information due to the small number of recyclers in each jurisdiction, and to reflect performance more accurately in each region given the scarcity of data available from one jurisdiction to another.

Many participants provided data for this work in confidence. As a result, none of the data will be released in any form other than this report. Provincial and regional data are included in **Appendix F**.

4.1.1 Deposit Return System Plastic Packaging Data

As was the case in 2019, in 2022 all but two of the provinces and territories (i.e., Manitoba¹⁴ and Nunavut¹⁵) have a DRS in place to collect and manage significant quantities of plastic beverage containers, though Ontario's DRS only manages plastic beverage containers for alcohol beverages. In general, the resins used in plastic beverage container packaging supplied includes PET (e.g., pop bottles), HDPE (e.g., milk jugs), other rigid plastics (e.g., PP bottles, polycups), and flexible packaging (i.e., bladders and pouches).

¹³ Canada Plastics Pact. 2021. *Foundational research and study: Canadian plastic packaging flows*. Available at: <https://plasticspact.ca/wp-content/uploads/2021/10/CPP-Foundational-Research-on-Canadian-Plastics-Packaging-Flows-May-2021-final.pdf>

¹⁴ In Manitoba, only beer and malt beverages are managed under a DRS operated by Manitoba Liquor & Lotteries, and they report that less than 0.00004% of the containers managed are plastic, which equated to less than 300 units of containers in 2023 (personal communication Bryan Letkeman I Director, Supply Chain, Manitoba Liquor & Lotteries). The vast majority of plastic beverage containers are collected through Manitoba's residential EPR system PPP and through direct recycling collections from streetscape, businesses, and institutions. For more information see:

- Government of Manitoba, n.d. *Manitoba's Extended Producer Responsibility Program*. Available at: [https://www.gov.mb.ca/sd/wastewise/recycle/index.html#:~:text=Manitoba's%20extended%20producer%20responsibility%20program%20\(EPR\)%20is%20based%20on%20a, and%20sustainable%20use%20of%20resources](https://www.gov.mb.ca/sd/wastewise/recycle/index.html#:~:text=Manitoba's%20extended%20producer%20responsibility%20program%20(EPR)%20is%20based%20on%20a, and%20sustainable%20use%20of%20resources)
- Canadian Beverage Container Recycling Association (CBCRA), 2022. *Canadian Beverage Container Recycling Association (CBCRA) DRAFT Manitoba Program Plan 2018 – 2022*. Available at: https://www.gov.mb.ca/sd/wastewise/pdf/plans/cbcra_plan.pdf

¹⁵ In 2021, the Nunavut Liquor and Cannabis Commission removed its DRS on all plastic and glass beverage containers due. It maintains its DRS for alcohol bearing aluminum cans. See Nunavut, Department of Finance. 2021. *Removal of bottle deposits at the NULC*. Available at: <https://gov.nu.ca/finance/news/removal-bottle-deposits-nulc>

British Columbia, Alberta, and the Yukon are the only jurisdictions that publicly report both the units of plastic beverage containers supplied and collected for both alcohol and non-alcohol containers. Most of the other DRS operators only publicly report the collection rate for all designated beverage containers as a combined statistic (i.e., a collection rate for containers made of all materials supplied). Ontario reports units supplied and collected for alcohol containers only and, in 2022, Québec only reported on units supplied and collected for soft drinks and beer. As a result, to obtain more detailed information (e.g., supplied and collected units by resin) the program operator in each jurisdiction was contacted and more detailed information was obtained (**Table 2**).

Table 2: Sources for deposit return systems data collected or calculated.

| Province / Region | Supplied | Generated | Collected | Sorted | Recycled |
|---------------------|---|-------------------|---|--------------------|--|
| All programs | Based on 2022 annual report or data supplied by the program operator. | Same as supplied. | Based on 2022 annual report or data supplied by the program operator. | Same as collected. | Based on a yield factor. See Table 10 . |

The categories of beverage containers and the level of detail available for each resin type (e.g., PET, HDPE, other rigid plastics) varies by province and territory (**Table 3**). In some jurisdictions, the data collected has become less discrete since 2019, and in others it has become more discrete. For example, in 2022 British Columbia’s Encorp Pacific was able to expand its reporting to include supplied and collected for PET, HDPE, other rigid plastics, polycups, Key Kegs, and flexible plastics (drink pouches and bladders).

Table 3: Resins reported by provinces & territories with deposit return systems.¹⁶

| Province / Territory | Supplied | Collected |
|-------------------------|--|---|
| British Columbia | PET HDPE Other rigid plastics Polycups Key Kegs Flexible plastics (drink pouches, bag-in-box) | PET HDPE Other rigid plastics Polycups Key Kegs Drink pouches Bag-in-box bladders |
| Alberta | Rigid plastics Bag-in-box bladders Drink pouches Polycups | PET HDPE Other rigid plastics Polycups Key Kegs Drink pouches Bag-in-box bladders |

¹⁶ Not all the data available is publicly reported. Program operators were contacted to obtain the most discrete data available.

| Province / Territory | Supplied | Collected |
|------------------------------------|--|---|
| Saskatchewan ¹⁷ | Plastic | PET HDPE Other rigid plastics |
| Ontario ¹⁸ | PET Tetra Pack and Bag-in-Box containers | PET Mixed Plastic |
| Québec ¹⁹ | PET | PET |
| New Brunswick | PET HDPE | PET HDPE |
| Nova Scotia | PET HDPE Other plastics (rigid and flexible) | PET HDPE Other plastics (rigid and flexible) |
| Prince Edward Island | PET HDPE Other rigid plastics Pouches | PET HDPE Other rigid plastics Pouches |
| Newfoundland & Labrador | Plastics | PET HDPE Other plastics (rigid and flexible) |
| Yukon | PET HDPE | PET HDPE |
| Northwest Territories | Rigid plastics Flexible plastics | PET HDPE Other rigid plastics Polycups Key Kegs Drink pouches Bag-in-box bladders |

In general, DRSs do not measure nor report the quantity of plastic ultimately recycled (i.e., the container recyclability rate achieved by the plastics reprocessor)²⁰ except for Alberta, which reports a theoretical recyclability rate (i.e., the amount of each container that could be recycled under optimum conditions). As a result, additional interviews were conducted with the reprocessing facilities that manage DRS plastics to gain an understanding of the final recycling rate (or yield) for deposit bearing beverage containers based on container format and resin.

¹⁷ In Saskatchewan, neither flexible plastics (i.e., bag-in-box bladders and drink pouches) nor Key Kegs are included in its DRS.

¹⁸ In Ontario, only alcohol containers are included in the DRS for the 2022 data year.

¹⁹ In Québec, only soft drinks and non-refillable beer containers are included in the DRS for the 2022 data year.

²⁰ For example, the percentage of material converted into post consumer resin (PCR) by the end-market, excluding the material sent to incineration or energy recovery.

4.1.2 Residential Sector Plastic Packaging Data

As was the case in 2019, in 2022 British Columbia, Saskatchewan, Manitoba, Ontario, and Québec had provincially regulated residential PPP recycling systems in place to manage an array of plastic packaging. British Columbia's EPR system has been operating since 2014 and it collects a harmonized list of PPP province-wide. The systems operating in the other provinces were not EPR systems in 2022. Instead, they were shared responsibility systems that required producers pay varying degrees of financial support to fund municipally operated recycling programs, and the list of materials collected for recycling often varied municipality-by-municipality.

Information on plastic packaging supplied, collected, and sorted from the residential sector (i.e., households) were derived from two main sources:

1. The published annual reports of regulated PPP systems that operate in British Columbia, Saskatchewan, Manitoba,²¹ Ontario, and Québec. In most cases, data for plastic packaging supplied and collected were available through the system operators, though there is significant variation in reporting between those operators (**Table 4**).

When reviewing these reports, it is important to understand that the amount of plastic packaging generated in the jurisdiction is greater than the amount reported as supplied by PROs operating regulated EPR systems for PPP. This is because, unlike DRSS (where the amount supplied is equivalent to the amount generated), all the regulated provincial PPP systems operating in Canada apply a *de minimis* that exempts small producers from a requirement to report the tonnes they supply onto the market if they generate materials in quantities and/or dollar values below a defined limit, and in some cases if they are a charitable organization or standalone retail establishment.²² There are also some types of plastic packaging that might be exempted (e.g., reusable or refillable packaging, packaging that cannot be easily separated from hazardous or special products).

Table 4: Resins reported by PROs operating regulated PPP systems.

| Province / Territory | Supplied | Collected | Sorted | Recycled |
|----------------------|---|---|----------------------------|--------------|
| British Columbia | Rigid, Flexible | Rigid, Flexible | Not reported | Not reported |
| Saskatchewan | All PPP ²³ | All PPP | All plastic* ²⁴ | Not reported |
| Manitoba | PET containers and bottles, HDPE containers | PET containers and bottles, HDPE containers and | Not reported | Not reported |

²¹ Manitoba does not have a DRS for non-beer/malt beverage containers. Beverage containers collected from households are collected through the residential PPP program and are included in the program's published data. The Canadian Beverage Container Recycling Association encourages the collection of beverage containers from streetscapes and businesses in Manitoba, but these data are not discernable from the household collection of containers in their annual report.

²² A *de minimis* is an exemption from the program for small producers. The material produced by these exempt producers are not included in supplied data reported by PROs. The *de minimis* level varies by province or territory.

²³ All PPP means there is no disaggregation of the types or amount of plastic packaging either supplied or collected.

²⁴ The addition of a star "*" denotes a change from previous reporting.

| | | | | |
|------------------------------|--|---|---|--------------|
| | and bottles, Film, Laminates, PS, other resins | bottles, Film, Laminates, PS, other resins | | |
| Ontario ²⁵ | PET, HDPE, Film, Laminates, PS, Mixed resins | Not reported | PET, HDPE, Film, Laminates, PS, Mixed resins | Not reported |
| Québec | PET bottles, HDPE bottles, Laminates, HDPE & LDPE film, HDPE & LDPE shopping bags, EPS food packaging, EPS goods packaging, PS, PET containers, PLA and other degradable packaging, other resins | PET bottles, HDPE bottles, Laminates, HDPE & LDPE film, HDPE & LDPE shopping bags, EPS food, EPS protection, PS, PET containers, PLA and other degradable packaging, other resins | PET, HDPE, Plastic mix, Mixed Rigid Plastic (MRP), Plastic film | Not reported |

2. Municipal government waste management data were collected from each province and territory. This includes data for:
- residential waste disposal rates;
 - waste composition studies;
 - waste audits at MRFs on inbound and outbound recyclables; and
 - waste audits of recycling collected at curbside or depot.

Waste audit and waste composition studies were used to assess the amount of designated material generated to account for the quantity supplied by exempt producers. However, as was found in the Foundational Report, there remains little consistency in the municipal waste data collected Canada-wide, especially related to the types of plastic resins and packaging formats that are tracked in the waste audits (i.e., conducted at curbside, inbound loads to the MRF, outbound loads at from the MRF) or in waste composition studies (i.e., conducted at landfill). There is also significant variation in how often waste audits and waste composition studies are undertaken (e.g., annually, biannually, or longer) and the sampling frequency used for each study (e.g., monthly assessments, seasonal assessments, or one assessment per year). Wherever possible, seasonal audits with more detailed categories were used.

Table 5 provides a summary the data sources used to inform residential sector plastic packaging flow analyses. Recycling for all regions was calculated using a yield factor based on discussions with the downstream end-markets.

²⁵ As currently reported through the Stewardship Ontario’s pay-in-model. Data in Stewardship Ontario’s Annual Report are consolidated.

Table 5: Sources for residential PPP sector data collected or calculated.

| Province / Region | Generated | Supplied | Collected | Sorted |
|-------------------------|---|---|---|---|
| British Columbia | Calculation and extrapolation based on waste composition studies (2021/2022). | Based on Recycle BC Annual Report (2022). ²⁶ | Based on Recycle BC Annual Report (2022). | Estimated marketed tonnes and calculation based on post-collection contract obligation and collected tonnage. |
| Alberta | Calculation and extrapolation based on waste composition studies from two municipalities (garbage) and inbound composition from two MRFs (collected) and inbound quantity based on ACES report. ²⁷ | N/A | Calculation and extrapolation based on inbound composition studies from two MRFs (collected) and inbound quantity based on ACES Report. ²⁸ | Calculation and extrapolation based on sorted tonnes from Calgary, Edmonton, and Lethbridge MRFs. |
| Saskatchewan | Calculation and extrapolation based on Saskatoon (2019) waste composition study (waste and recycling). | Based on Multi-Material Stewardship Western Annual Report (2022). | Calculation and extrapolation based on waste composition studies (waste and recycling) (2019). | Calculation and extrapolation based on sorted tonnes from Regina's MRF. |

²⁶ Recycle BC. 2023. 2022 Annual Report. Available at: https://recyclebc.ca/wp-content/uploads/2023/06/RecycleBC_AR2022_FINAL.pdf

²⁷ Eunomia. 2020. Alberta Collaborative Extended Producer Responsibility Study (ACES). Available at: <https://rmaalberta.com/news/alberta-collaborative-extended-producer-responsibility-study-now-available/>

²⁸ For the 2022 reporting year, the City of Edmonton made significant improvements to its MRF and began to collect a wider array of plastics.

| Province / Region | Generated | Supplied | Collected | Sorted |
|------------------------|--|--|---|---|
| Manitoba | Calculation and extrapolation based on waste composition studies (waste and recycling) (2019). | Based on Multi-Material Stewardship Manitoba Annual Report (2022). | Calculation and extrapolation based on waste composition studies (waste and recycling) (2019). | Calculation and extrapolation based on sorted tonnes from Winnipeg's MRF. |
| Ontario | Calculation and extrapolation based on waste composition studies (waste and recycling) (2021/2022). | Based on Stewardship Ontario's Pay-In-Model data (2022). | Calculation based on CIF/SO. ²⁹ waste composition study and RPR Datacall (2022). | Calculation based on RPR Datacall (2022) for sorted tonnes. |
| Québec | Calculation and extrapolation based on 2022 province-wide waste composition study (garbage and recycling). | Based on 2022 Schedule of Contribution calculation. | Calculation based on 2022 province-wide waste composition study (garbage and recycling). | Calculation based on 2022 price index and marketed tonnes from RECYC-QUÉBEC. |
| Atlantic Canada | Calculation and extrapolation based on New Brunswick composition studies (2019). | N/A | Calculation and extrapolation based on New Brunswick composition studies (2019). | Calculation and extrapolation based on Nova Scotia and Prince Edward Island marketed tonnes and Central Newfoundland MRF. |
| Territories | Limited data available for the residential sector that is representative of the entire territories. | N/A | Limited data available for the residential sector that is representative of the entire territories. | Limited data available for the residential sector that is representative of the entire territories. |

²⁹ Continuous Improvement Fund. 2023. *CIF/SO Terms of Reference Year 6 (2021/22). Residential Waste Composition Study*. Available at: <https://thecif.ca/wp-content/uploads/2023/03/CIF-Year-6-Residential-Waste-Composition-Study-Feb-2023.pdf>

4.1.3 ICI System Plastic Packaging Data

In total, 1,248 audits were collected to inform this report (**Table 6**). **Table 7** provides an overview. Of the audits collected, 99% included disposal data and 46% included recycling data. This is not surprising given that these types of audits are often undertaken by ICI facilities for different purposes:

- The purpose of undertaking a waste audit on disposal data is to determine 'what is in the disposal stream'. This can be undertaken by a facility that does not have a recycling stream in place or wishes to expand an existing recycling system. The audit enables policy and target setting, informs recycling system design, and is an indicator of compliance with and participation in existing recycling systems. In some locations and for some facilities, disposal stream waste audits are required by law.³⁰
- The purpose of a waste audit on the recycling stream is slightly different. In general, these are used to identify sources of contamination in the recycling stream to inform improved compliance with the recycling systems and improved promotion and education materials that will enable better participation. These audits might also be undertaken alongside disposal audits to measure the amount of material collected for recycling, which enables establishing a diversion rate for the facility.

ICI data normalization factors were acquired from Statistics Canada. **Table 9** provides an overview of Canada's employment activity (i.e., number of FTEs by ICI subsector) and shows that Canada-wide, the top three ICI subsectors contributing 59% of Canada's employment include:

- Administration and Office (30% of the FTEs);
- Trade (16% of the FTEs); and
- Health care and social assistance (13% of the FTEs).

The table also shows that ICI subsectors contributing the least to Canada's employment include:

- Agriculture, forestry, fishing, and hunting (<1% of the FTEs, in-scope for this study due to known agricultural plastic generation);
- Utilities (<1% of the FTEs, out-of-scope for this study due to lack of data);
- Mining, quarrying and oil and gas extraction (1% of the FTEs, out-of-scope for this study due to lack of data); and
- Arts, entertainment, and recreation (2% of the FTEs, (<1% of the FTEs, in-scope for this study).

Collectively, these generate less than 4% of Canada's employment.

The table also shows that these results are fairly consistent across Canada's provinces and territories for in-scope ICI subsectors, with the exception of the territories where some anomalies appear. For the territories:

- Office and administration comprise a significantly higher proportion of FTEs (at 46% of the FTEs) compared to the provinces (which ranges from 27% -33%);

³⁰ Government of Ontario. *O.Reg. 103/94: Industrial, Commercial and Institutional Source Separation Programs*. Last updated June 13, 2011. Available at: <https://www.ontario.ca/laws/regulation/940103>

- Health care and social assistance comprises a significantly lower proportion of FTEs (at 7%) compared to the provinces (which ranges from 11%-16%); and
- Manufacturing comprises a significantly lower proportion of FTEs (at <1%) compared to the provinces (which ranges from 5%-11%).

In the territories, the top four ICI subsectors, which contribute 75% of their FTEs include: administration and office (46% of the FTEs), trade (14% of the FTEs), accommodation and food services (8% of the FTEs), and health care and social assistance (7% of the FTEs).

Table 6: Overview of waste audit data collected by sector, including normalization factors.

| | Total Waste Audits | Audits with Disposal Data | | Audits with Recycling Data | | Audits with FTEs | | Audits with sq. Ft. | |
|---|---|---------------------------|------|----------------------------|------|------------------|-----|---------------------|-----|
| | # | # | % | # | % | # | % | # | % |
| 11 Agriculture, forestry, fishing, and hunting – 111, 112 Crop production, animal production and aquaculture | <i>Data from Cleanfarms research used.³¹</i> | | | | | | | | |
| 23 Construction | <i>Data from RECYC-QUÉBEC used</i> | | | | | | | | |
| 31-33 Manufacturing | 126 | 124 | 98% | 94 | 75% | 72 | 57% | 49 | 39% |
| 41,44-45 Trade | 276 | 276 | 100% | 61 | 22% | 87 | 32% | 96 | 35% |
| 41 Wholesale trade | – | – | – | – | – | – | – | – | – |
| 44-45 Retail trade | 276 | 276 | 100% | 61 | 22% | 87 | 32% | 96 | 35% |
| 51-56, 81, 91 Administration and office | 569 | 561 | 99% | 220 | 39% | 87 | 15% | 132 | 23% |
| 48-49 Transportation & warehousing | 17 | 17 | 100% | 9 | 53% | 4 | 24% | 5 | 29% |
| 61 Educational services | 101 | 100 | 99% | 94 | 93% | 57 | 56% | 9 | 9% |
| 6111 Elementary and Secondary Schools | 44 | 44 | 100% | 44 | 100% | 33 | 75% | – | 0% |
| 6112, 6113 Colleges and Universities | 57 | 56 | 98% | 50 | 88% | 24 | 42% | 9 | 16% |
| 62 Health care and social assistance | 35 | 34 | 97% | 22 | 63% | 12 | 34% | 15 | 43% |
| 71 Arts, entertainment, and recreation | 42 | 42 | 100% | 38 | 90% | 6 | 14% | 18 | 43% |

³¹ Cleanfarms. 2021. *Agricultural Plastic Characterization and management on Canadian Farms*. Available at: <https://cleanfarms.ca/wp-content/uploads/2021/08/Project-Building-a-Canada-Wide-Zero-Plastic-Waste-Strategy-for-Agriculture.pdf>.

| | Total Waste Audits | Audits with Disposal Data | | Audits with Recycling Data | | Audits with FTEs | | Audits with sq. Ft. | |
|---|--------------------|---------------------------|------------|----------------------------|------------|------------------|------------|---------------------|------------|
| | # | # | % | # | % | # | % | # | % |
| 72 Accommodation and food services | 82 | 82 | 100% | 37 | 45% | 55 | 67% | 23 | 28% |
| 722 Food services | 54 | 54 | 100% | 14 | 26% | 45 | 83% | 3 | 6% |
| 721 Accommodation | 28 | 28 | 100% | 23 | 82% | 10 | 36% | 20 | 71% |
| Total | 1,248 | 1,236 | 99% | 575 | 46% | 380 | 30% | 347 | 28% |

Table 7: Averages associated with ICI PPP audit data collected.

| Facility type | | Average FTEs per facility | Average students per school | Average facility size | Annual PPP Disposed | Annual PPP Disposed | Annual PPP Collected for Recycling | Annual PPP Collected for Recycling |
|--|--|---------------------------|-----------------------------|-----------------------|---------------------|---------------------|------------------------------------|------------------------------------|
| | | # collected | #collected | ft ² | kg/FTE | kg/ student | kg/FTE | kg/ student |
| 111, 112 Crop production, animal production and aquaculture | | – | – | – | 554 | – | 55 | – |
| 23 Construction | | – | – | – | 128 | – | 53 | – |
| 31-33 Manufacturing | | 315 | – | 119,200 | 273 | – | 501 | – |
| 41,44-45 Trade | | 85 | – | 107,811 | 212 | – | 293 | – |
| 51-56, 81, 91 Administration & Office | | 652 | – | 229,398 | 22 | – | 33 | – |
| 48-49 Transportation & Warehousing | | 315 | – | 119,200 | 273 | – | 501 | – |
| 61 Educational services | <i>6111 Elementary and Secondary Schools</i> | – | 1,082 | – | – | 3 | – | 6 |
| | <i>6112, 6113 Colleges and Universities</i> | – | 17,957 | 2,446,869 | – | 9 | – | 18 |
| 62 Health care and social assistance | | 1,508 | – | 616,460 | 71 | – | 87 | – |

| Facility type | | Average FTEs per facility | Average students per school | Average facility size | Annual PPP Disposed | Annual PPP Disposed | Annual PPP Collected for Recycling | Annual PPP Collected for Recycling |
|---|--------------------------|---------------------------|-----------------------------|-----------------------|---------------------|---------------------|------------------------------------|------------------------------------|
| | | # collected | #collected | ft ² | kg/FTE | kg/ student | kg/FTE | kg/ student |
| 71 Arts, entertainment, and recreation | | 257 | – | 74,664 | 66 | – | 59 | – |
| 72 Accommodation and food services | <i>722 Food services</i> | 98 | – | 4,889 | 524 | – | 86 | – |
| | <i>721 Accommodation</i> | 159 | – | 104,793 | 118 | – | 616 | – |

Table 8: Number of FTEs and students (2022).

| ICI Subsector | BC | AB | SK | MB | ON | QC | AC | TR | Canada |
|---|---------|---------|--------|--------|-----------|---------|---------|-------|-----------|
| Agriculture | 10,738 | 14,842 | 8,179 | 7,844 | 30,091 | 22,243 | 5,347 | - | 99,284 |
| Forestry, logging, and support | 17,194 | 3,855 | - | - | 3,677 | 9,238 | 2,919 | - | 38,032 |
| Mining, quarrying and oil and gas extraction | 23,086 | 97,402 | 17,896 | - | 29,288 | 21,028 | 5,450 | 2,266 | 206,516 |
| Utilities | 12,074 | 16,709 | - | - | 51,084 | 28,700 | 438 | - | 128,986 |
| Construction | 183,201 | 178,555 | 30,336 | 36,116 | 393,824 | 237,250 | 66,409 | 4,973 | 1,130,666 |
| Manufacturing | 153,645 | 121,113 | 25,348 | 57,818 | 675,355 | 440,811 | 80,015 | - | 1,554,624 |
| Trade | 382,883 | 345,138 | 89,350 | 92,349 | 1,088,939 | 637,241 | 181,004 | 8,173 | 2,825,079 |
| Transportation & warehousing | 122,218 | 110,146 | 18,640 | 37,612 | 296,700 | 170,703 | 47,019 | 3,544 | 806,581 |
| Information & cultural industries | 63,173 | 26,016 | 9,398 | 18,209 | 165,007 | 79,355 | 18,532 | 530 | 381,336 |
| Finance, insurance, real estate, and leasing | 95,171 | 68,269 | 22,346 | 33,025 | 377,030 | 165,944 | 44,697 | 1,149 | 807,630 |

| ICI Subsector | BC | AB | SK | MB | ON | QC | AC | TR | Canada |
|---|------------------|------------------|----------------|----------------|------------------|------------------|------------------|---------------|-------------------|
| Professional, scientific, and technical services | 48,829 | 38,063 | 5,474 | 7,910 | 116,119 | 53,220 | 12,589 | 1,572 | 283,777 |
| Business, building and other support services | 200,739 | 145,971 | 20,280 | 24,330 | 552,000 | 293,118 | 49,467 | 2,058 | 1,288,209 |
| Administrative and support, waste management, and remediation services | 114,601 | 89,905 | 13,009 | 21,427 | 380,674 | 166,427 | 44,220 | 1,819 | 832,083 |
| Educational services (FTEs) | 177,755 | 147,444 | 46,866 | 52,200 | 530,182 | 343,925 | 90,926 | 4,290 | 1,393,587 |
| Elementary & Secondary Schools (students) | 574,047 | 675,504 | 182,727 | 182,535 | 2,028,690 | 982,734 | 308,970 | 25,206 | 4,960,410 |
| Post Secondary Schools (students) | 173,694 | 179,283 | 41,910 | 50,292 | 756,822 | 407,823 | 97,251 | 1,647 | 1,708,725 |
| Health care and social assistance | 314,026 | 232,130 | 72,694 | 98,740 | 789,978 | 537,892 | 172,884 | 5,068 | 2,223,413 |
| Arts, entertainment, and recreation | 45,854 | 36,949 | 8,154 | 11,756 | 108,417 | 59,981 | 13,215 | 730 | 285,056 |
| Accommodation | 34,196 | 29,080 | 6,403 | 7,521 | 52,973 | 30,863 | 12,700 | 2,290 | 176,027 |
| Food services | 181,975 | 125,111 | 28,836 | 35,201 | 401,076 | 220,630 | 65,460 | 1,768 | 1,060,055 |
| Other services | 78,699 | 71,678 | 17,170 | 19,387 | 193,429 | 126,706 | 29,824 | 1,872 | 538,764 |
| Unclassified | 69,329 | 44,197 | 5,565 | 11,972 | 126,563 | 64,770 | 20,949 | 1,125 | 344,472 |
| Public administration | 147,953 | 108,160 | 50,971 | 51,030 | 453,122 | 282,656 | 102,381 | 21,968 | 1,218,240 |
| Total | 3,225,080 | 2,905,520 | 721,552 | 857,274 | 9,601,040 | 5,383,258 | 1,472,666 | 92,048 | 24,291,552 |

Table 9: Canada-wide economic activity by share of FTE.

| ICI Subsector | | BC | AB | SK | MB | ON | QC | AC | TR | Canada |
|--|---|-----|-----|-----|-----|-----|-----|-----|-----|--------|
| 11 Agriculture, forestry, fishing, and hunting | 11N Forestry, logging, and support | <1% | <1% | <1% | <1% | <1% | <1% | <1% | <1% | <1% |
| | 111, 112 Crop production, animal production and aquaculture | <1% | <1% | 2% | 1% | <1% | <1% | 2% | <1% | <1% |
| | Sum of 11 Agriculture, forestry, fishing, and hunting | 1% | <1% | 2% | 1% | <1% | <1% | 2% | <1% | <1% |
| 21 Mining, quarrying and oil and gas extraction | | <1% | 5% | 4% | <1% | <1% | <1% | 2% | <1% | 1% |
| 22 Utilities | | <1% | <1% | <1% | <1% | <1% | <1% | <1% | <1% | <1% |
| 23 Construction | | 7% | 9% | 6% | 6% | 6% | 6% | 7% | 8% | 6% |
| 31-33 Manufacturing | | 6% | 6% | 5% | 9% | 10% | 11% | 5% | <1% | 9% |
| 41,44-45 Trade | | 15% | 17% | 18% | 15% | 16% | 16% | 17% | 14% | 16% |
| 51-56, 81, 91 Administration and office | 51 Information and cultural industries | 3% | 1% | 2% | 3% | 2% | 2% | 2% | 2% | 2% |
| | 52-53 Finance, insurance, real estate, and leasing | 4% | 3% | 4% | 5% | 6% | 4% | 4% | 2% | 5% |
| | 54 Professional, scientific, and technical services | 2% | 2% | 1% | 1% | 2% | 1% | <1% | 1% | 2% |
| | 55-56 Business, building, and other support services | 7% | 6% | 4% | 3% | 7% | 7% | 4% | 4% | 7% |
| | 55, 551, 5511 Management of companies and enterprises | <1% | <1% | <1% | <1% | <1% | <1% | <1% | <1% | <1% |
| | 56 Administrative and support, waste management and remediation service | 5% | 4% | 3% | 3% | 6% | 4% | 3% | 2% | 5% |
| | 81 Other services | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 2% | 3% |
| | 91 Public administration | 6% | 5% | 10% | 8% | 7% | 7% | 10% | 33% | 7% |
| | Sum of 51-56, 81, 91 Administration and office | 30% | 27% | 28% | 28% | 33% | 29% | 27% | 46% | 30% |

| ICI Subsector | | BC | AB | SK | MB | ON | QC | AC | TR | Canada |
|---|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 48-49 Transportation & warehousing | | 5% | 5% | 4% | 6% | 4% | 4% | 4% | 6% | 5% |
| 61 Educational services | | 7% | 7% | 9% | 8% | 8% | 9% | 9% | 7% | 8% |
| 62 Health care and social assistance | | 13% | 11% | 15% | 16% | 12% | 13% | 16% | 7% | 13% |
| 71 Arts, entertainment, and recreation | | 2% | 2% | 2% | 2% | 2% | 2% | 1% | 2% | 2% |
| 72 Accommodation and food services | 722 Food services and drinking places | 7% | 6% | 6% | 6% | 6% | 6% | 6% | 4% | 6% |
| | 721 Accommodation services | 1% | 1% | 1% | 1% | <1% | <1% | 1% | 3% | <1% |
| | Sum of 72 Accommodation and food services | 9% | 8% | 7% | 7% | 7% | 6% | 7% | 8% | 7% |
| 00 Unclassified businesses | | 3% | 2% | 1% | 2% | 2% | 2% | 2% | 3% | 2% |
| Total | | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

4.2 Modelling and Analysis

The model used to inform this Progress Report mirrored processes used to inform the Foundational Report. This ensures 2022 model results are maximally comparable to the 2019 baseline results, and that progress can be detected. The approach used is a 'bottom up' approach that uses waste audit data to extrapolate and model results for Canada, its regions, as well as the ICI sector and its subsectors.

However, while similar, the model used to inform this Progress Report was refined to improve the accuracy in the results generated. First, an 'all plastics flow' modelling system was developed that better enables the team to collect, input, and track data and information at the most discrete level available from different data sources, while also enabling that data to be compiled into larger categories to enable meaningful current state analyses. This means that while both the Foundational Report and this Progress Report provide data for PET, HDPE, mixed rigid plastics, film, and plastic laminates, where additional resin specific data were available (i.e., additional resin categories), this has been entered into the model along with appropriate normalizing factors (e.g., population, full time equivalents [FTEs]).

As new and more discrete data sources become available, they can be easily input into this model to enable future analyses that provide a retrospective assessment at the resin level. Second, for this Progress Report, significantly more waste audits were collected, transcribed, and analysed than were used to inform the 2019 baseline published in the Foundational Report, which improves confidence in the findings. As a result of these improvements, comparisons of the 2019 versus 2022 baselines should be done with a degree of nuance and caution.

To enable comparisons between the Foundational Report (2019 data) and this Project Report (2022 data), both new data and data from the consolidated databases of previous projects were input into the model including:

- Canada Plastics Pact Foundational Research and Study: Canadian Plastic Packaging Flows (2019) -i.e., the Foundational Report;³²
- British Columbia Industrial, Commercial, and Institutional Packaging and Paper Products Baseline Report: Waste Flows Study (2023);³³
- Yukon Industrial, Commercial and Institutional Packaging and Paper Products Baseline Report: Waste Flows Study (2023);³⁴
- PRFLEX: Perfecting the Recycling System for Flexible Plastic Packaging in Canada, Part 1 - Diagnostics Report (2023);³⁵ and
- Canada-Wide Plastic Packaging Flows: A Progress Report (2023).³⁶

³² Canada Plastics Pact. 2021. *Canada Plastics Pact Foundational Research and Study*. Available at: <https://plasticspact.ca/wp-content/uploads/2021/10/PPP-Foundational-Research-on-Canadian-Plastics-Packaging-Flows-May-2021-final.pdf>

³³ Canada Plastics Pact. 2023. *British Columbia Industrial, Commercial, and Institutional Packaging and Paper Products Baseline Report: Waste Flows Study*. Available at: <https://plasticspact.ca/british-columbia-industrial-commercial-and-institutional-packaging-and-paper-products-baseline-report-waste-flows-study/>

³⁴ Policy Integrity. 2023. *Yukon Industrial, Commercial and Institutional Packaging and Paper Products Baseline Report: Waste Flows Study*. Available at: <https://emrlibrary.gov.yk.ca/environment/yukon-industrial-commercial-institutional-packaging-paper-products-baseline-report-waste-flows-study-2023.pdf>

³⁵ NovAxia Inc. 2023. *PRFLEX: Perfecting the Recycling System for Flexible Plastic Packaging in Canada, Part 1 - Diagnostics Report* Available at: <https://gapc.ca/wp-content/uploads/2023/02/technical-paper-prflex-final-18dec.pdf>

³⁶ Canada Plastics Pact. 2023. *Canada-Wide Plastic Packaging Flows: A Progress Report*. Available at: https://plasticspact.ca/wp-content/uploads/2024/01/PPP_Canadian-Plastics-Flow_2023-Progress-Report.pdf

Key lessons learned from those previous reports were applied to the model's development, including how to overcome challenges in improving data availability and fill data gaps.

Both old (2019) and new (2022) data were obtained in varying formats and needed to be organized into a standardized format so that the data could be analyzed -e.g., how plastic packaging categories were reported in each waste audit differed significantly across the waste audits reviewed, and so terminology had to be standardized to allow for comparison. The data were transcribed in the database in the most discrete format provided in each audit (e.g., resin type, packaging type). Once entered, the data were standardized (i.e., sorted into key categories), further cleaned (e.g., to remove unexplainable outliers, identify and correct potential errors), normalized (e.g., by population or FTE), and processed (e.g., calculations to convert units to weight) so that the individual data points could be collectively modelled to provide a 2022 plastics flow estimate for Canada, each province and region, and the ICI sector and its subsectors. The final step in the assessment was to compare the 2022 model results to the 2019 baseline results to assess changes in trends and progress.

For data cleaning and calculations, it is important to note:

- For plastic packaging under deposit, the factors to convert quantity in units to quantity in metric tonnes were usually provided by the program operators. In some cases, conversion factors from one province were applied to another where jurisdiction-specific conversion factors were not available.
- The yield factors used to calculate the amount of plastic ultimately recycled into PCR varied by data set (see sections 4.2.1 and 4.2.2 below).
- Employment and population statistics were obtained from Statistics Canada.
- One important 2019 data input was corrected in the 2019 data set that was used to inform the Foundational Report: i.e., 2019 bag-in-box bladder data for British Columbia's DRS was updated to correct an error. Because there was (in 2019) and is (in 2022) a relatively small amount of flexible plastics collected and recycled across all sectors, this one data point appears to have significantly affected the results of flexible plastics collected and recycled for both the DRS systems and the compiled all sector results for Canada and British Columbia in 2019.

To assess the data variability as an indicator of confidence in the final results, confidence intervals are used. Confidence intervals for the model results varied based on the availability and quality of each data set (**Appendix E**). In general, there is:

- High confidence in the DRS data set. DRS beverage container quantity supplied is tracked on a unit basis because a container recycling fee and deposit is charged to the consumer on a unit basis. The quantity collected is also counted on a unit basis and deposit refunds are dispersed on a unit basis. At container collection points (e.g., bottle depots, reverse vending machines), the collected containers are source separated into market-ready bales or totes. The bales or totes might include mixed resins (e.g., labelled as 'other plastics') that will be further sorted by the end-market.
- There is less confidence in the residential and ICI data sets. For residential and ICI data, where multiple data sets were available within the same province or region, a confidence interval of 90% was used for residential data and a confidence interval of 95% was used for ICI data, and high and low ranges were determined.

The outputs of the analyses resulted in a series of summary tables and charts of plastic packaging generated, collected, sorted, and recycled by system, material, and province or regional grouping (i.e., Atlantic Canada and the Territories).

4.2.1 Modelling DRS and Residential Data – Yield Calculations

The DRS and residential data were modelled using the same process as the Foundational Report (i.e., DRS – 2022 annual reports and residential – 2022 annual reports and the latest waste composition studies). In addition to the steps described in **Section 4.2** above, one additional step was taken to model DRS and residential data: yield was calculated. The yield factors applied to the sorted quantities to estimate the amount of material recycled in DRS and residential systems are presented in **Table 10 and Table 11**.

It is important to note the following:

- The term "yield" reflects the proportion of inbound material received by a reprocessor that is converted into PCR.
- Yield factors reported here were established based on discussions with reproducers accepting deposit return and residential plastic packaging across Canada. As a result, confidence intervals cannot be applied to this factor.
- The 50% – 75% yield factor applied for DRS flexible plastic packaging (i.e., pouches, bladders) is a change from the Foundational Report in which a 0% yield was applied. This change was made because both Alberta and British Columbia's DRS now report recycling of this material.
- The 50% – 75% yield factor applied for residential flexible plastic packaging reflects a yield factor for film plastic only. This is because in all provinces and territories, except for British Columbia, only film plastic is being collected through residential recycling programs. The low yield factor represents the typical bale contamination of film bales inbound to reproducers (which reproducers report currently contain an average of 30-40 % contamination) and an average yield loss in the recycling process of 10-15%. Where film bales are of higher quality (i.e., less contamination) higher yields can be realized.
- In future reports, the residential PPP flexible plastics yield factor applied may initially fall if PPP systems begin to collect a wider array of flexible plastic packaging until reprocessing technologies for flexible plastics improve.

Table 10: Yield factor applied to estimate the quantity recycled for beverage containers managed in deposit return systems.

| Resin | Low estimate of yield | High estimate of yield |
|-------------------|-----------------------|------------------------|
| PET | 80% | 85% |
| HDPE | 80% | 85% |
| Flexible Plastics | 50% | 75% |

Table 11: Yield factor applied to estimate the quantity recycled for plastic packaging managed in residential PPP systems.

| Bale | Low estimate of yield | High estimate of yield |
|---------------------------|-----------------------|------------------------|
| PET | 70% | 85% |
| HDPE, PP, Tubs & lids, PS | 75% | 85% |
| MRP | 50% | 67% |

| Bale | Low estimate of yield | High estimate of yield |
|------------------|-----------------------|------------------------|
| Flexible plastic | 50% | 75% |

4.2.2 Modelling the ICI Data

In addition to the steps described in **Section 4.2**, several additional steps were required to model the ICI data. The ICI model used in the Foundational Report was refined and improved to enable more accurate results and to enable more robust future trend analyses. First, for the Progress Report, the ICI PPP data were modelled as a whole (i.e., all PPP materials) instead of just modelling the plastic packaging flow (as was done for the Foundational Report). This allows assessment of the plastic packaging flow in the context of other PPP materials, enabling an understanding of proportionality of the materials in the waste streams, i.e., material composition – of each ICI subsector. It also enables the results of the modelling exercise to be compared to other ICI PPP studies. Second, ICI data were modelled for both the whole of the ICI sector (as was done for the Foundational Report) and by each targeted ICI subsector (new) to enable a better understanding of where plastic packaging is being lost. The Canada-wide ICI baseline (provided in the Foundational Report and here in this Progress Report) provides a benchmark at a macro level, but it does not provide enough information to propose appropriate interventions to improve performance for individual ICI subsectors. The ICI sector is far more diverse than the residential sector (i.e., less homogenous in its waste composition and more diverse in its recycling system design practices). ICI plastic packaging use, generation as waste, and management varies across and within ICI subsectors, as do the barriers and limitations to improving ICI plastic packaging performance. As a result, a more discrete analysis by ICI subsector enables identification of subsector hot spots for plastic packaging disposal. Finally, to improve confidence in the ICI plastics flow assessment, a three-step research approach known as “triangulation” was introduced to enhance the reliability, validity, and credibility of the ICI model findings. This is discussed further below.

The ICI data modelling consisted of several steps:

1. The first step was to normalize the raw waste data collected from individual businesses. This involved converting the quantity of waste disposed and collected for recycling (i.e., as reported in each facility waste audit) to an annual tonnage based on the number of days the business operates in a year, and then dividing the quantity of waste disposed and collected for recycling by appropriate independent variables (i.e., FTEs at workplaces and in the case of schools, student enrollment). This provided an estimate of the average quantity of waste disposed and collected for recycling per FTE / student for each individual business.
2. Once normalized, the average quantity of waste disposed and collected for recycling per FTE / student for each subsector was calculated. To do this, the normalized individual business results (i.e., tonnage/FTE or tonnage/student) from all the waste audits collected for each subsector were averaged. This provided the average tonnage generated per FTE or student for that subsector.
3. Next the average proportion of PPP material disposed and collected for recycling for each subsector was calculated. This was done by averaging the percentage of PPP (by each PPP material type -i.e., fibre, plastic, metal, and glass) disposed and collected for recycling as it was reported in the waste audits for each business in each subsector.
4. The quantity of PPP disposed and collected for recycling by material was then calculated for each ICI subsector (**Table 12**) by province or region. To do this, the average quantity of waste disposed and collected for recycling per FTE was multiplied

by the total number of FTEs by province or region and by the average proportion of the waste stream that is PPP material.

5. The amount of PPP generated for each ICI subsector by province or region was calculated by adding the amount disposed and the amount collected for recycling.
6. The quantity of ICI PPP sorted by province or region was calculated based on the equivalent ratio of residential plus DRS sorted to recycling collection for rigid and flexible.
7. To calculate the material finally recycled, the recycling yield used was 75% for low, 80% for average, and 85% for high (**Table 13**).

The calculation for the C&D and agricultural subsectors varied slightly:

- For the C&D subsector:
 - The quantity of waste disposed and PPP collected for recycling per FTE was calculated by taking Québec's C&D waste composition tonnage data (i.e., for disposal and collected for recycling) and dividing that by the number of Québec construction workers (FTEs). This provided tonnes/construction worker FTE. This metric was then multiplied by the total number of construction worker FTEs across each region. This provided tonnes C&D disposed and collected for recycling for each region.
 - The average composition of C&D disposed, including PPP, was then calculated by averaging data collected from 14 regional C&D waste audits across Canada.
 - Then we multiplied the number of construction worker FTEs per province/region by the quantity of waste generated per FTE for disposal and collected for recycling by the PPP composition. This provided the final quantity of PPP disposed and collected for recycling for this subsector.
- For the agricultural subsector:
 - Cleanfarms provided the total quantity of agricultural plastic PPP generated by material and by province and region, the national quantity of agricultural plastic PPP material collected for recycling, and the availability of agricultural recycling programs by province and region.
 - The national quantity of agricultural PPP plastic collected for recycling by material was then apportioned across provinces and regions based on generation of materials and recycling program availability.

Population and FTE statistics were obtained from Statistics Canada. **Table 8** provides the number of FTEs per jurisdiction Canada-wide. Of the waste audit reports collected, only 30% included normalization factors (**Table 6** and **Table 8**). **Appendix C** includes a breakdown of data by ICI subsector.

Table 12: Summary of ICI subsectors reviewed and their NAICS Codes.

| ICI Subsector Reviewed | NAICS Codes |
|---|-------------|
| Agriculture, forestry, fishing, and hunting. (Crop production, animal production and aquaculture.) | 111, 112 |
| Construction | 23 |
| Manufacturing | 31-33 |

| ICI Subsector Reviewed | NAICS Codes |
|-------------------------------------|---------------------------------------|
| Trade | 41 Wholesale trade |
| | 44-45 Retail trade |
| Administration and office | 51-56, 81, 91 |
| Transportation & warehousing | 48-49 |
| Educational services | 6111 Elementary and Secondary Schools |
| | 6112, 6113 Colleges and Universities |
| Health care and social assistance | 62 |
| Arts, entertainment, and recreation | 71 |
| Accommodation and food services | 722 Food services |
| | 721 Accommodation |

Table 13: Yield factor applied to estimate the quantity recycled for plastic packaging managed in ICI PPP systems.

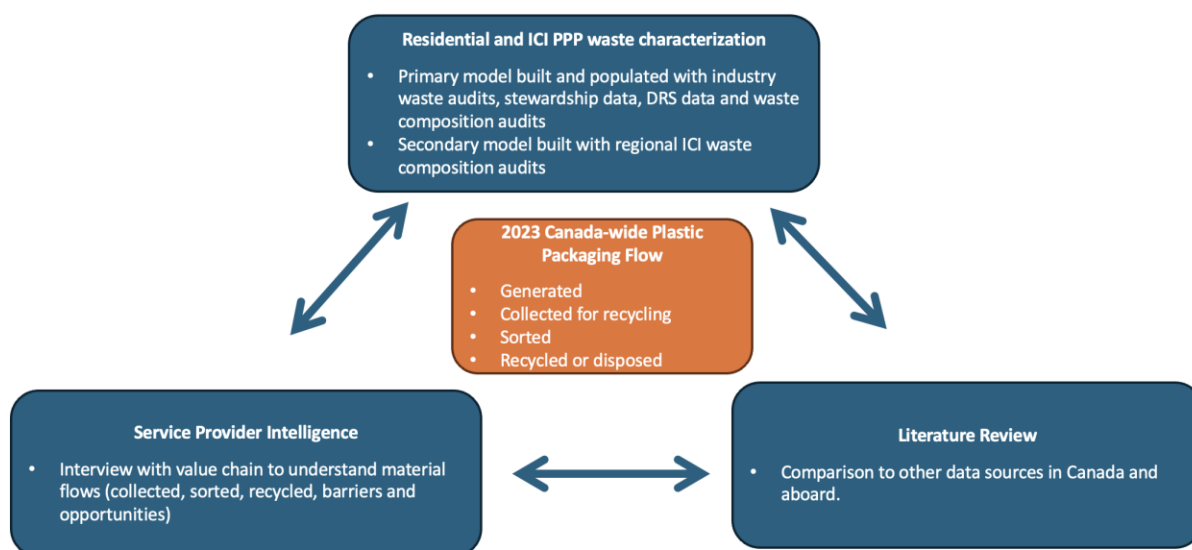
| Bale | Low estimate of yield | High estimate of yield |
|---------------------------|-----------------------|------------------------|
| PET | 75% | 85% |
| HDPE, PP, Tubs & lids, PS | 75% | 85% |
| MRP | 75% | 85% |
| Film plastic | 75% | 85% |

4.2.3 Assessing the ICI Model Output –The Method of Triangulation

Triangulation is the process of taking multiple approaches to investigate the same question. In doing so, there is a form of built in peer-review of the results (**Figure 1**). Triangulation can increase validity in reporting. If the results from these different techniques are similar, this provides greater confidence in the potential accuracy of the findings. If results from these different techniques diverge, this would temper the accuracy of findings and indicate the need for further analysis or more data collection.

The findings of this report were confirmed using triangulation. The modelled data (i.e., proposed ICI plastic packaging baseline for 2022) were compared to 1) service provider intelligence and 2) the results of comparable studies. Research teams reached out and interviewed PPP waste service providers, including haulers, end-markets (e.g., materials recovery facilities or MRFs), and reprocessing facilities (e.g., plastic recyclers that converts plastic waste into PCR). Additionally, the model findings were compared to similar studies generated with other data sources in Canada and abroad. Findings from these interviews and the literature review are summarized in **Section 6**.

Figure 1: Triangulation of Canada's PPP waste flow.



4.3 Challenges & Limitations

While this baseline report is the most robust and well-informed plastic packaging baseline yet established in Canada, data limitations still hamper optimal results. In general, data from municipalities were more difficult to obtain for this 2023 Progress Report than they were for the Foundational Report. Historically, municipalities have been the ‘holders’ of residential sector recycling and other waste stream data. If their communities offer recycling systems to their residents, then they are the entities who set up recycling collection systems, arrange for the material to be sorted, and arrange for it to be ultimately sold or delivered to end-markets (e.g., plastics reprocessors). However, municipalities’ control over residential recycling system delivery, and therefore residential recycling system data, is beginning to shift.

Since 2019, ten jurisdictions (i.e., Alberta,³⁷ Saskatchewan,³⁸ Manitoba,³⁹ Ontario,⁴⁰ Québec,⁴¹ New Brunswick,⁴² Nova Scotia,⁴³ Newfoundland and Labrador,⁴⁴ the Yukon Territory,⁴⁵ and the Northwest Territories⁴⁶) have either already regulated or signaled a transition from

³⁷ Government of Alberta. Extended Producer Responsibility Regulation. Available at: https://kings-printer.alberta.ca/570.cfm?frm_isbn=9780779848157&search_by=link

³⁸ Government of Saskatchewan. The Household Packaging and Paper Stewardship Program Regulations, 2023. Available at: <https://publications.saskatchewan.ca/api/v1/products/120617/formats/139477/download>

³⁹ Multi-Material Stewardship Manitoba. n.d. Full EPR Transition Plan Development. Available at: <https://stewardshipmanitoba.org/mmsm/full-epr-plan-development/>

⁴⁰ Government of Ontario. O. Reg. 391/21: Blue Box. Available at: <https://www.ontario.ca/laws/regulation/r21391>

⁴¹ Government of Québec. Regulation respecting a system of selective collection of certain residual materials. Available at: <https://www.legisquebec.gouv.qc.ca/en/document/cr/Q-2.%20r.%2046.01>

⁴² Government of New Brunswick. Designated Materials Regulation. 2008-54. Available at: <https://laws.gnb.ca/en/pdf/cr/2008-54.pdf>

⁴³ Government of Nova Scotia. Extended Producer Responsibility for Packaging, Paper Products and Packaging-Like Products Regulations. Available at: <https://novascotia.ca/just/regulations/regs/envpppextproducer.htm>

⁴⁴ Multi-Material Stewardship Board. 2023. 2023-26 Strategic Plan. Available at: <https://www.gov.nl.ca/ecc/files/MMSB-Strategic-Plan-2023-26.pdf>

⁴⁵ Government of Yukon. Extended Producer Responsibility Regulation. Available at: https://laws.yukon.ca/cms/images/LEGISLATION/SUBORDINATE/2024/2024-0019/2024-0019_1.pdf

⁴⁶ Government of Northwest Territories. 2023. Plain Language Summary for Bill 78: Waste Reduction and Resource Recovery Act. Available at: https://www.ntlegislativeassembly.ca/sites/default/files/legacy/td_908-192.pdf

municipally operated PPP collection and recycling systems to PRO operated systems under an EPR framework. In most cases, except Québec, the EPR framework provides municipalities with no guaranteed or optional role in the future systems (e.g., first right of refusal to act as the collection service provider). Instead, if municipalities wish to continue to be the collection service provider or materials recycling facility (MRF) operator serving the future PPP system, then they will be required to 'compete' with the private sector for available PRO contracts. The uncertainty caused by this period of transition to full EPR systems has created a climate where municipalities are more concerned about data confidentiality and how access to their data might affect their ability to negotiate with the future PROs and the private sector in a competitive marketplace.

There are also many specific challenges associated with the measurement of ICI waste streams. First, there is a wide array of different types of ICI entities that generate plastic packaging and this diversity in activity results in highly heterogenous waste streams. Examples of ICI entities that generate plastic packaging waste include:

- institutions, such as hospitals, long term care homes, and universities, where people may live for short or longer periods of time;⁴⁷
- commercial entities, whether for-profit or not-for-profit, whether situated in a fixed location or whether mobile and generating waste in diverse locations (e.g., companies that carry out their work at their customer's location such as a plumbing or other repair company);
- construction and demolition (C&D) companies working on new builds, renovations, or demolitions;
- manufacturing sites;
- agricultural entities such as farms and nurseries;
- commercial accommodations (e.g., resorts, hotel, motels); and
- workcamps, where people may also live for short or longer periods of time.

The diverse nature of the activities undertaken by these sites results in significant differences in the types, sizes, and amounts of waste being generated.

Second, ICI waste data and information is more difficult to acquire because the materials are generally managed by the private sector and the resulting data are often considered commercial confidential. Finally, governments in Canada have often provided a greater focus on reporting requirements related to residential waste as opposed to ICI waste.

Other limitations include:

- A lack of a consistency in how waste audits are undertaken, the data reported, and how it is categorized.
- A lack of data from specific provinces and territories.
- A lack of harmonized reporting standards across EPR systems and from waste service providers to their customers.
- The lack of tracking of compostable plastic packaging by compost facilities.
- Limited data related to the waste generated and managed by ICI entities.

⁴⁷ In Canada, the legal definition of the term 'non-residential waste' includes waste from institutions (hospitals, nursing homes) and what are considered to be other non-permanent accommodations (e.g., hotels, motels, university dorms), where people may live for shorter or longer periods of time. See Statistics Canada. Table 38-10-0032-01 Disposal of waste, by source. Available at: <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3810003201>

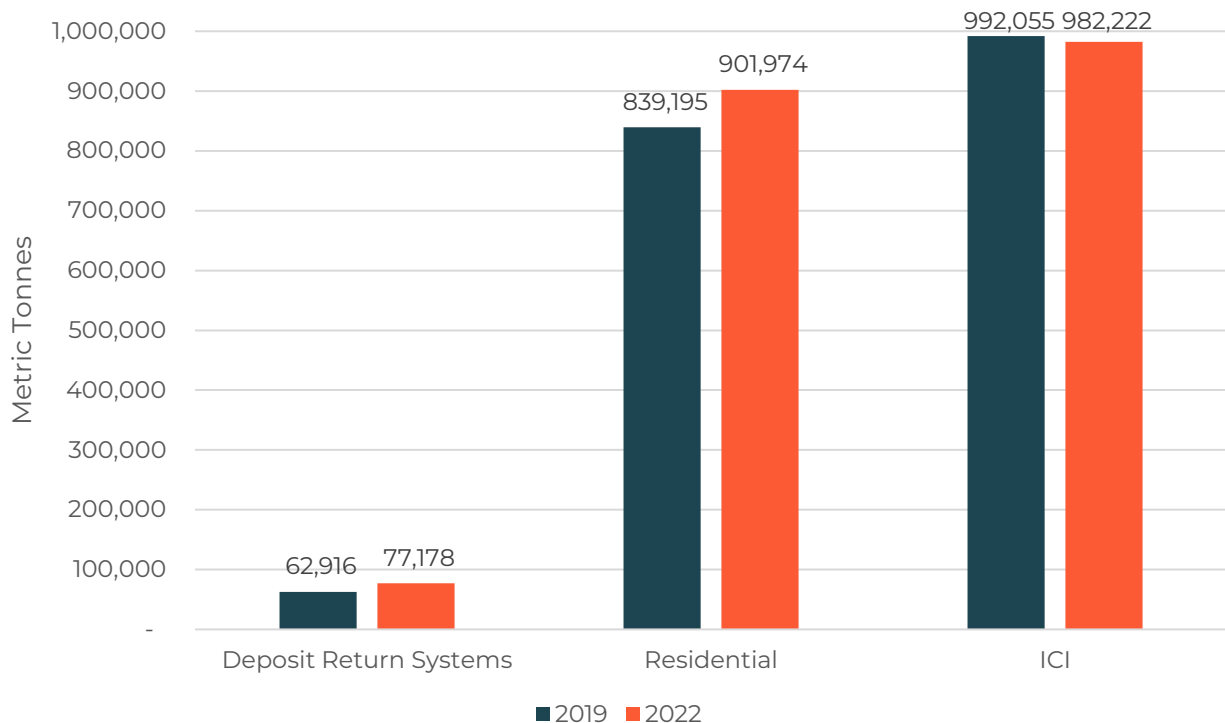
5 MODEL RESULTS: CURRENT LANDSCAPE & CHANGE SINCE 2019

The following section provides estimates of the amount of plastic packaging generated, supplied, collected, sorted, and ultimately recycled for the residential sector (i.e., households), deposit return systems, and the ICI sector for the year 2022. It begins with outlining and comparing plastics generation across all sectors. Then, each sector's generation and collection rates are reported on separately beginning with DRS, then residential, and finally ICI, which generates the largest amount of waste materials.

5.1 Plastic Packaging Flow Across All Sectors: Relative Contribution

Figure 2 provides a breakdown of the amount of plastic packaging generated by the DRS, residential (i.e., single-family and multi-unit households), and ICI sectors. Of all the plastic packaging generated, DRSs account for 4%, the residential sector accounts for 46%, and the ICI sector accounts for 50%.

Figure 2: Plastic packaging generated by sector.



Of the plastic packaging generated by all the sectors, 41% is flexible plastic and 59% is rigid plastic (**Figure 3**). This is similar to the findings in 2019 report, but the proportion of rigid plastics has grown by 6%.

Figure 3: Proportion of rigid versus flexible plastics generated in all sectors.

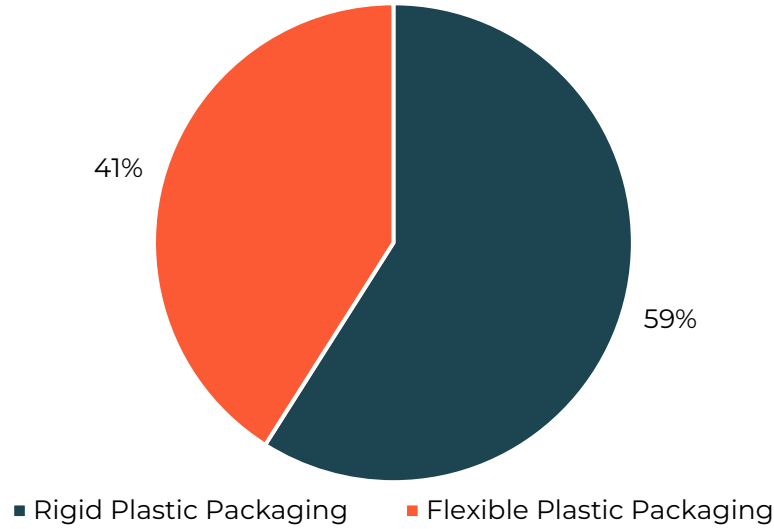


Figure 4, Figure 5, and Table 14 provide comparisons of plastic packaging flows Canada-wide in 2019 versus 2022. The data show that:

Generation:

- The generation of total rigid plastic packaging increased by 165,722 tonnes or 17% by weight.
- The generation of total flexible plastic packaging decreased by 98,515 tonnes or 11%.
- The generation of all plastic packaging increased by 67,207 tonnes or 4%.

Collection:

- There has been an increase of 140,268 tonnes of plastic packaging collected and a 6% increase in the collection rate.
- The amount of rigid plastics increased by 113,218 tonnes and flexible plastics increased by 27,050 tonnes.

Recycling:

- Recycling of plastic packaging has increased from 12% to 16% with a 3% increase in the recycling of rigid plastics and a 2% increase in flexible plastics.

Figure 4: Canada-wide rigid plastic packaging flow for all sectors.

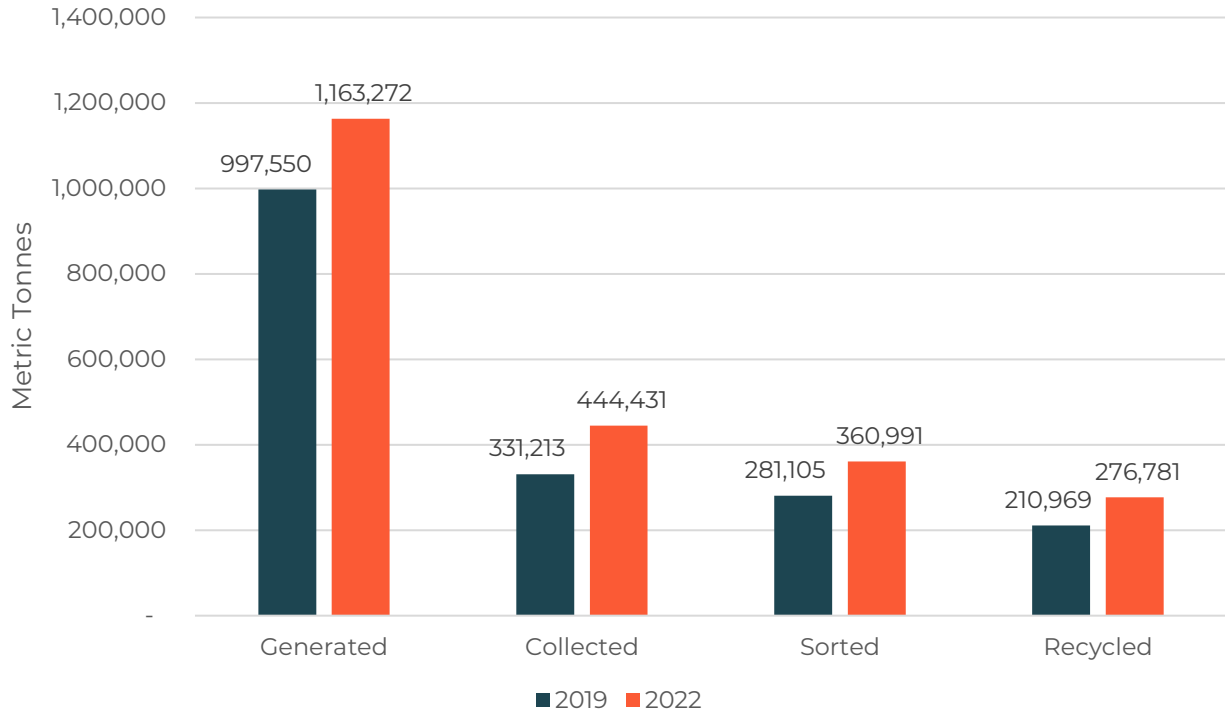


Figure 5: Canada-wide flexible plastic packaging flow for all sectors.

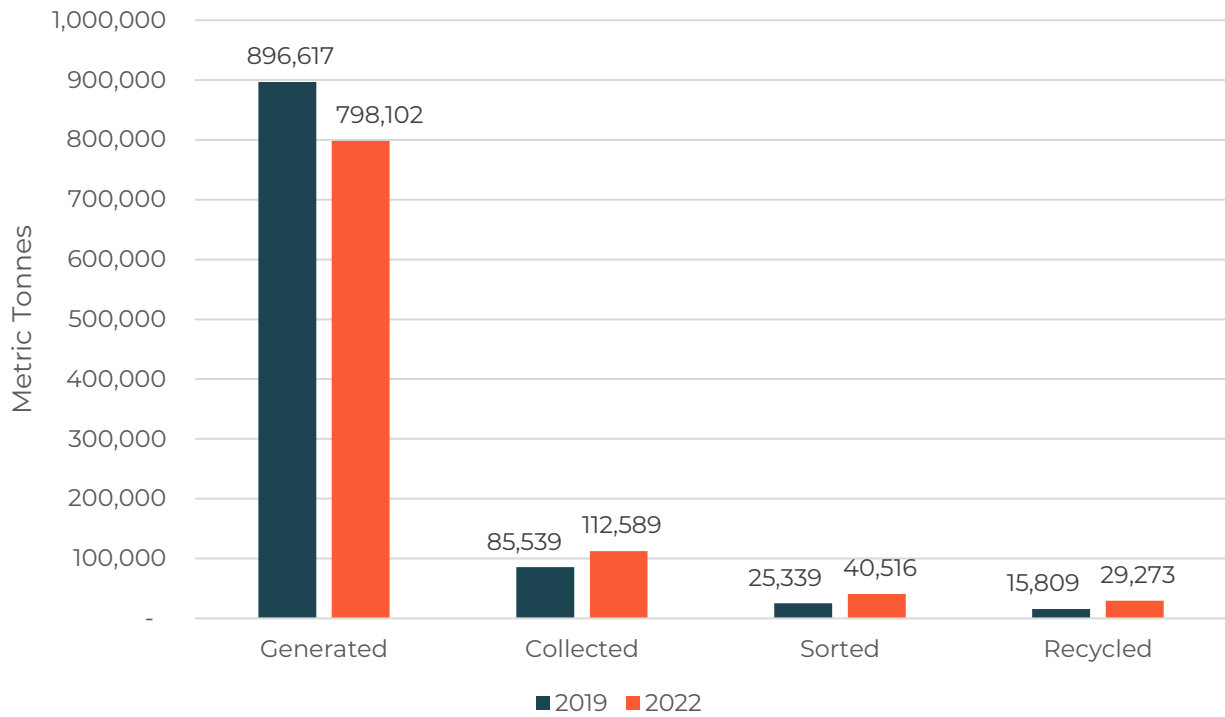


Table 14: Canada-wide plastic packaging flow from all sectors.

| | | Generated (MT) | | | Collected (MT) | | | Collected rate (%) | Sorted (MT) | | | Recycled (MT) | | | Recycled rate (%) |
|--------------|-------------------------|------------------|------------------|------------------|----------------|----------------|----------------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------------|
| | | Low | High | Average | Low | High | Average | | Low | High | Average | Low | High | Average | |
| 2019 | Rigid plastic | 890,681 | 1,104,418 | 997,550 | 300,773 | 361,656 | 331,213 | 33% | 272,531 | 289,679 | 281,105 | 190,985 | 230,955 | 210,969 | 21% |
| | PET | 197,402 | 226,931 | 212,167 | 119,606 | 138,383 | 128,994 | 61% | 124,404 | 124,404 | 124,404 | 90,768 | 105,743 | 98,256 | 46% |
| | HDPE | 70,173 | 79,552 | 74,863 | 42,739 | 48,448 | 45,593 | 61% | 49,390 | 49,390 | 49,390 | 37,453 | 41,983 | 39,717 | 53% |
| | PET/HDPE | 3,399 | 3,399 | 3,399 | 2,502 | 2,502 | 2,502 | 74% | 2,502 | 2,502 | 2,502 | 2,002 | 2,127 | 2,064 | 61% |
| | Other | 143,309 | 168,598 | 155,953 | 40,600 | 51,302 | 45,951 | 29% | 47,650 | 47,650 | 47,650 | 25,080 | 32,825 | 28,952 | 19% |
| | Unclassified | 476,398 | 625,938 | 551,168 | 95,325 | 121,020 | 108,173 | 20% | 48,586 | 65,734 | 57,160 | 35,683 | 48,277 | 41,980 | 8% |
| | Flexible plastic | 784,695 | 1,008,541 | 896,617 | 74,985 | 96,094 | 85,539 | 10% | 23,677 | 27,002 | 25,339 | 12,992 | 18,623 | 15,809 | 2% |
| | Film | 122,208 | 139,006 | 130,607 | 22,538 | 28,322 | 25,430 | 19% | 13,961 | 13,961 | 13,961 | 6,980 | 10,470 | 8,726 | 7% |
| | Laminates | 76,414 | 84,783 | 80,598 | 10,056 | 11,759 | 10,907 | 14% | 294 | 294 | 294 | 124 | 186 | 155 | 0% |
| | Unclassified | 586,073 | 784,752 | 685,412 | 42,391 | 56,013 | 49,202 | 7% | 9,422 | 12,747 | 11,084 | 5,888 | 7,967 | 6,928 | 1% |
| Total | 1,675,376 | 2,112,958 | 1,894,167 | 375,757 | 457,749 | 416,752 | 22% | 296,208 | 316,681 | 306,445 | 203,977 | 249,578 | 226,778 | 12% | |
| 2022 | Rigid plastic | 1,072,915 | 1,264,747 | 1,163,272 | 419,429 | 473,334 | 444,431 | 38% | 360,991 | 360,991 | 360,991 | 255,912 | 297,651 | 276,781 | 24% |
| | PET | 324,146 | 386,017 | 353,767 | 177,201 | 202,166 | 189,306 | 54% | 175,866 | 175,866 | 175,866 | 128,835 | 149,292 | 139,064 | 39% |
| | HDPE | 172,569 | 212,931 | 189,272 | 78,984 | 91,339 | 83,589 | 44% | 67,302 | 67,302 | 67,302 | 51,035 | 57,206 | 54,121 | 29% |
| | PET/HDPE | 4,106 | 4,106 | 4,106 | 3,277 | 3,277 | 3,277 | 80% | 3,277 | 3,277 | 3,277 | 2,622 | 2,786 | 2,704 | 66% |
| | Other | 450,080 | 495,749 | 472,914 | 120,608 | 133,026 | 126,817 | 27% | 114,546 | 114,546 | 114,546 | 73,421 | 88,366 | 80,893 | 17% |
| | Unclassified | 122,014 | 165,944 | 143,212 | 39,359 | 43,526 | 41,443 | 29% | - | - | - | - | - | - | 0% |
| | Flexible plastic | 758,750 | 838,332 | 798,102 | 105,915 | 119,262 | 112,589 | 14% | 40,516 | 40,516 | 40,516 | 25,920 | 32,626 | 29,273 | 4% |
| | Film | 568,183 | 594,613 | 581,398 | 79,691 | 87,443 | 83,567 | 14% | 40,208 | 40,208 | 40,208 | 25,790 | 32,431 | 29,111 | 5% |
| | Laminates | 88,189 | 110,506 | 99,348 | 14,538 | 17,762 | 16,150 | 16% | 308 | 308 | 308 | 130 | 195 | 163 | 0% |
| | Unclassified | 102,378 | 133,213 | 117,357 | 11,686 | 14,058 | 12,872 | 11% | - | - | - | - | - | - | 0% |
| Total | 1,831,665 | 2,103,078 | 1,961,374 | 525,344 | 592,596 | 557,020 | 28% | 401,507 | 401,507 | 401,507 | 281,833 | 330,276 | 306,055 | 16% | |

5.2 Plastic Packaging Flow – Deposit Return System

For the DRS sector, 99% of all beverage containers supplied to market are rigid plastic (**Figure 6**), which is consistent with the findings in the Foundational Report.

Figure 6: Proportion of rigid versus flexible plastics generated in deposit return systems.

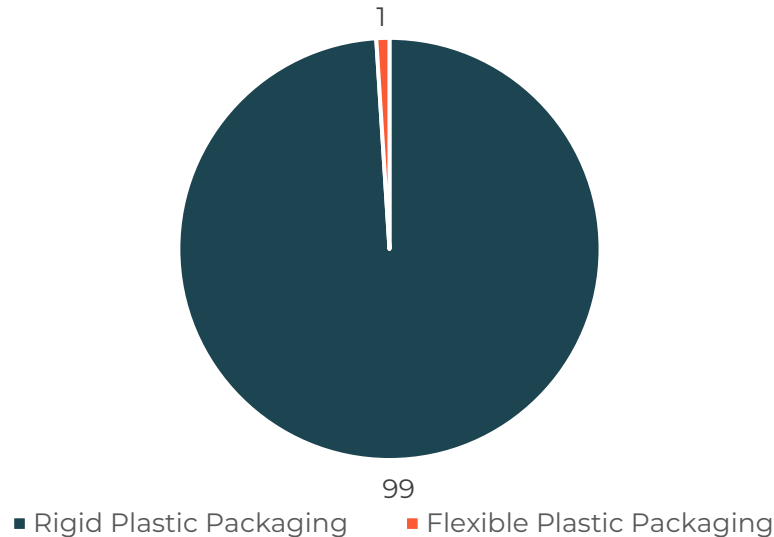


Figure 7, Figure 8 and Table 15 compare the flow of DRS systems Canada-wide in 2019 versus 2022. The data show that:

Generation:

- The total amount of plastic beverage containers increased by 14,261 tonnes or 23% by weight.
- Rigid plastic beverage containers increased by 14,178 tonnes or 23% by weight. This increase is mostly related to the expansion of the DRS in British Columbia to add all “ready -to-serve” milk and plant-based beverages (e.g., oat, soy, and almond milk) in February of 2022.
- Flexible plastic beverage containers generation increased 83 tonnes or 14% by weight.

Collected:

- While the amount of material collected increased by 8,166 tonnes, the collection rate fell slightly from 76% to 73% with similar collection rate decreases for both rigid and flexible plastics.

Recycled:

- While the overall amount of plastic beverage containers recycled increased by 6,545 tonnes, there was a decrease in the recycling rate from 63% to 60% with similar recycling rate decreases for both rigid and flexible plastics.

Figure 7: Canada-wide rigid plastic packaging flow in deposit return systems.

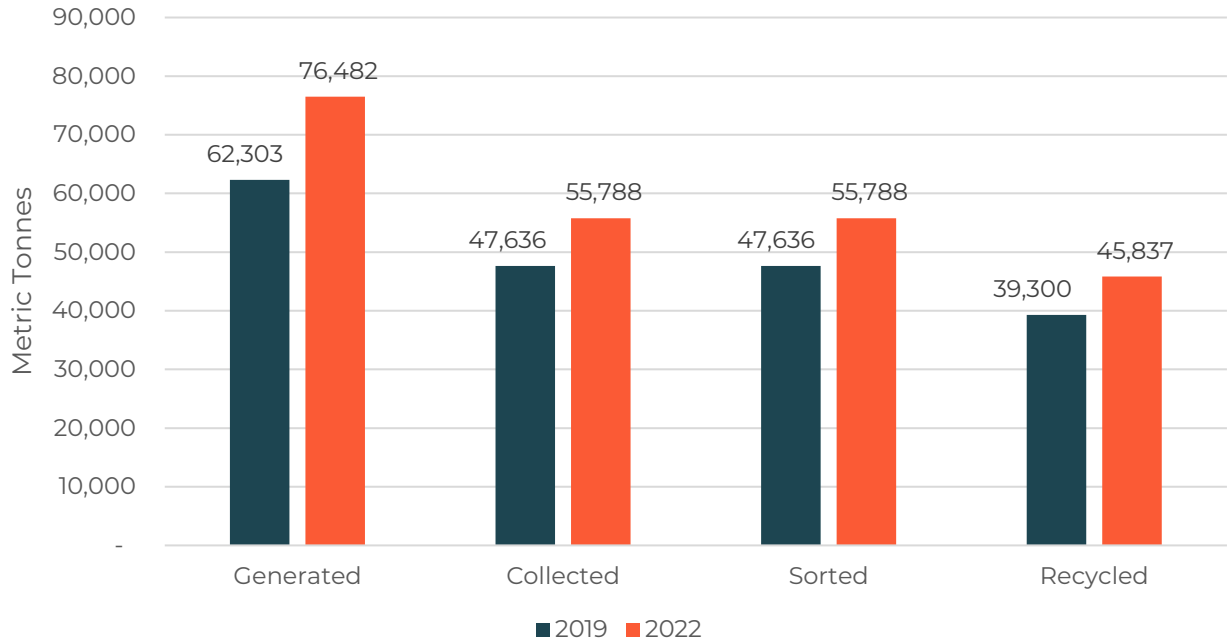


Figure 8: Canada-wide flexible plastic packaging flow in deposit return systems.

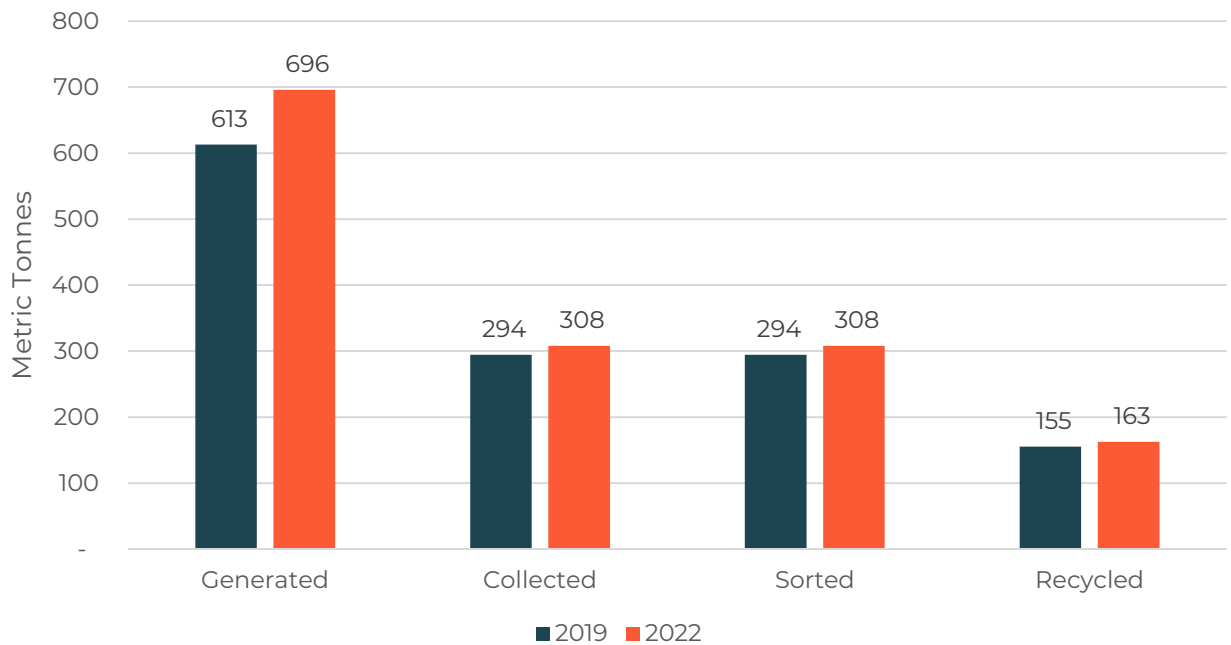


Table 15: Canada-wide plastic packaging flow from deposit return systems.

| | | Generated (MT) | Collected (MT) | Collected rate (%) | Sorted (tonnes) | Recycled (MT) | | | Recycled rate (%) |
|------|-------------------------|----------------|----------------|--------------------|-----------------|---------------|---------------|---------------|-------------------|
| | | | | | | Low | High | Average | |
| 2019 | Rigid plastic | 62,303 | 47,636 | 76% | 47,636 | 38,109 | 40,491 | 39,300 | 63% |
| | PET | 50,156 | 36,845 | 73% | 36,845 | 29,476 | 31,318 | 30,397 | 61% |
| | HDPE | 8,534 | 8,179 | 96% | 8,179 | 6,543 | 6,952 | 6,748 | 79% |
| | PET/HDPE | 3,399 | 2,502 | 74% | 2,502 | 2,002 | 2,127 | 2,064 | 61% |
| | Other | 214 | 110 | 52% | 110 | 88 | 94 | 91 | 42% |
| | Flexible plastic | 613 | 294 | 48% | 294 | 124 | 186 | 155 | 25% |
| | Film | - | - | - | - | - | - | - | - |
| | Laminates | 613 | 294 | 48% | 294 | 124 | 186 | 155 | 25% |
| | Total | 62,916 | 47,931 | 76% | 47,931 | 38,233 | 40,677 | 39,455 | 63% |
| 2022 | Rigid plastic | 76,482 | 55,788 | 73% | 55,788 | 44,448 | 47,226 | 45,837 | 60% |
| | PET | 60,529 | 41,171 | 68% | 41,171 | 32,755 | 34,802 | 33,778 | 56% |
| | HDPE | 11,414 | 11,178 | 98% | 11,178 | 8,942 | 9,501 | 9,222 | 81% |
| | PET/HDPE | 4,106 | 3,277 | 80% | 3,277 | 2,622 | 2,786 | 2,704 | 66% |
| | Other | 432 | 162 | 37% | 162 | 129 | 138 | 133 | 31% |
| | Flexible plastic | 696 | 308 | 44% | 308 | 130 | 195 | 163 | 23% |
| | Film | - | - | - | - | - | - | - | - |
| | Laminates | 696 | 308 | 44% | 308 | 130 | 195 | 163 | 23% |
| | | Total | 77,178 | 56,096 | 73% | 56,096 | 44,578 | 47,421 | 46,000 |

5.3 Plastic Packaging Flow – Residential Sector

For the residential sector, 66% of plastic packaging is rigid plastic (**Figure 9**) and 34% is flexible, which is a 5% shift from flexible to rigid plastics from the Foundational Report.

Figure 9: Proportion of rigid versus flexible plastics generated in the residential sector.

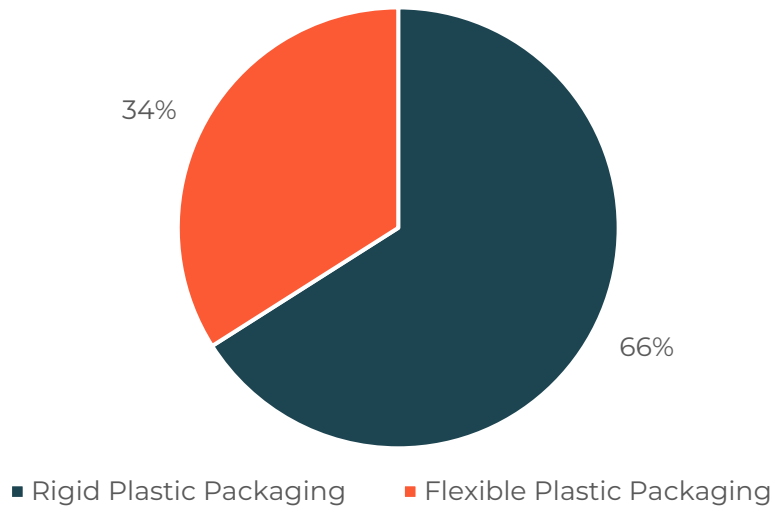


Figure 10, Figure 11, and Table 16 compare the flow of plastic packaging managed by residential sector Canada-wide in 2019 versus 2022. The data show that:

Generation:

- Rigid packaging increased by 81,292 tonnes or 16% by weight. The increase in rigid packaging could be the result of the growth of Canadian economic activity since the pandemic (i.e., +3.8% GDP growth in 2022 following +5.3% GDP growth in 2021),⁴⁸ and a transition in the use of certain materials (e.g., the recent ban on PS trays has led to a substitution of PET, which is a heavier resin).
- Flexible packaging decreased by 18,513 tonnes or 6%. The decrease in flexible plastic packaging since the Foundational Report could be the result of early implementation of the Government of Canada’s plastic shopping bag restrictions and retail shopping bag restrictions or bans taking effect in Prince Edward Island, Nova Scotia, Newfoundland and Labrador, the Yukon Territories, Northwest Territories, and many municipalities across Canada. There could also be a movement to shift from unrecyclable flexible packaging to other types of packaging, including rigid packaging.
- All residential PPP system plastic packaging increased by 62,779 tonnes or 7%.

Collection:

- The amount of plastic packaging collected increased by 33,957 tonnes and the collection rate increased from 31% to 33%. The collection rate increase was mainly related to an increase in flexible plastics collection.

⁴⁸ Statistics Canada. 2021. *Provincial and territorial economic accounts, 2022*. Available at: <https://www150.statcan.gc.ca/n1/daily-quotidien/231108/dq231108b-eng.htm>

Recycling:

- While the amount of plastic packaging recycled increased by 9,225 tonnes, the recycling rate remained consistent at 16%.

Figure 10: Canada-wide rigid plastic packaging flow in the residential sector.

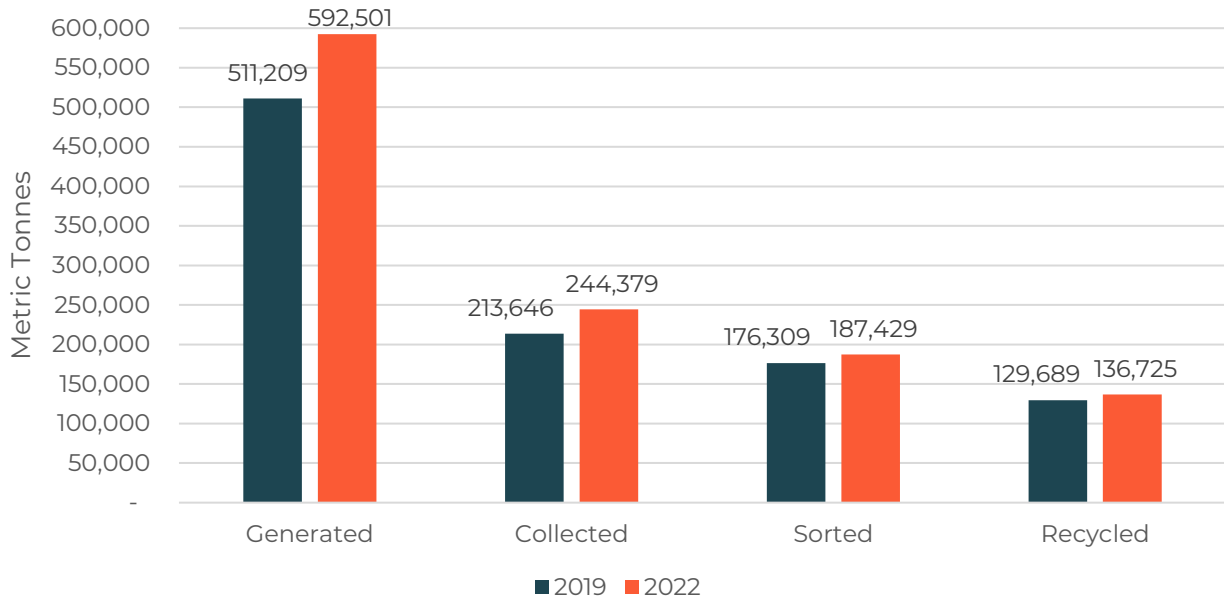


Figure 11: Canada-wide flexible plastic packaging flow in the residential sector.

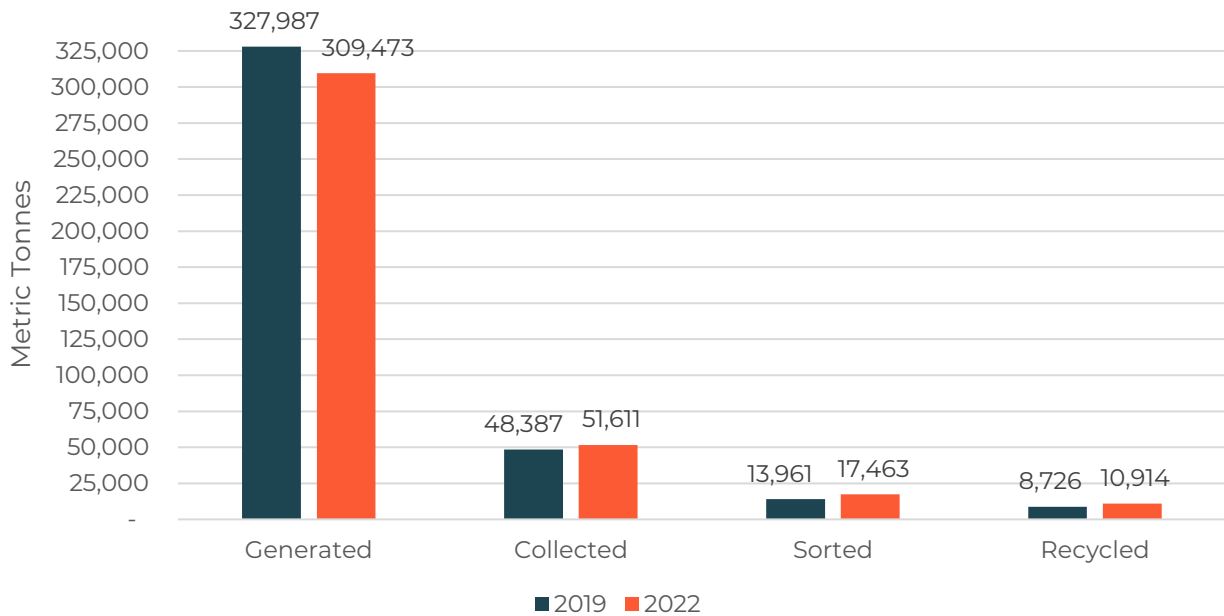


Table 16: Canada-wide plastic packaging flow in the residential sector.

| | | Generated (tonnes) | | | Collected (tonnes) | | | Collected rate (%) | Sorted (tonnes) | | | Recycled (tonnes) | | | Recycled rate (%) |
|------|-------------------------|--------------------|------------------|----------------|--------------------|----------------|----------------|--------------------|-----------------|----------------|----------------|-------------------|----------------|----------------|-------------------|
| | | Low | High | Average | Low | High | Average | | Low | High | Average | Low | High | Average | |
| 2019 | Rigid plastic | 467,946 | 554,471 | 511,209 | 193,695 | 233,599 | 213,646 | 42% | 176,309 | 176,309 | 176,309 | 117,193 | 142,186 | 129,689 | 25% |
| | PET | 147,245 | 176,774 | 162,010 | 82,761 | 101,538 | 92,149 | 57% | 87,559 | 87,559 | 87,559 | 61,292 | 74,425 | 67,859 | 42% |
| | HDPE | 61,639 | 71,018 | 66,329 | 34,560 | 40,269 | 37,414 | 56% | 41,211 | 41,211 | 41,211 | 30,909 | 35,030 | 32,969 | 50% |
| | PET/HDPE | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Other | 143,095 | 168,384 | 155,739 | 40,489 | 51,191 | 45,840 | 29% | 47,540 | 47,540 | 47,540 | 24,992 | 32,731 | 28,861 | 19% |
| | Unclassified | 115,967 | 138,295 | 127,130 | 35,884 | 40,600 | 38,242 | 0 | - | - | - | - | - | - | - |
| | Flexible plastic | 301,267 | 354,707 | 327,987 | 43,362 | 53,414 | 48,387 | 15% | 13,961 | 13,961 | 13,961 | 6,980 | 10,470 | 8,726 | 3% |
| | Film | 122,208 | 139,006 | 130,607 | 22,538 | 28,322 | 25,430 | 19% | 13,961 | 13,961 | 13,961 | 6,980 | 10,470 | 8,726 | 7% |
| | Laminates | 75,801 | 84,170 | 79,985 | 9,762 | 11,465 | 10,613 | 13% | - | - | - | - | - | - | 0% |
| | Unclassified | 103,258 | 131,531 | 117,395 | 11,062 | 13,627 | 12,345 | 11% | - | - | - | - | - | - | 0% |
| | Total | 769,213 | 909,179 | 839,195 | 237,057 | 287,012 | 262,033 | 31% | 190,270 | 190,270 | 190,270 | 124,172 | 152,657 | 138,414 | 16% |
| 2022 | Rigid plastic | 502,144 | 693,976 | 592,501 | 219,377 | 273,282 | 244,379 | 41% | 187,429 | 187,429 | 187,429 | 123,134 | 150,316 | 136,725 | 23% |
| | PET | 153,845 | 215,717 | 183,467 | 92,243 | 117,207 | 104,348 | 57% | 98,814 | 98,814 | 98,814 | 69,170 | 83,992 | 76,581 | 42% |
| | HDPE | 75,664 | 116,025 | 92,367 | 40,605 | 52,960 | 45,210 | 49% | 33,896 | 33,896 | 33,896 | 25,422 | 28,811 | 27,117 | 29% |
| | PET/HDPE | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Other | 150,621 | 196,290 | 173,456 | 47,170 | 59,588 | 53,379 | 31% | 54,719 | 54,719 | 54,719 | 28,542 | 37,513 | 33,027 | 19% |
| | Unclassified | 122,014 | 165,944 | 143,212 | 39,359 | 43,526 | 41,443 | 0 | - | - | - | - | - | - | - |
| | Flexible plastic | 270,122 | 349,703 | 309,473 | 44,937 | 58,284 | 51,611 | 17% | 17,463 | 17,463 | 17,463 | 8,731 | 13,097 | 10,914 | 4% |
| | Film | 80,250 | 106,680 | 93,465 | 19,021 | 26,773 | 22,897 | 24% | 17,463 | 17,463 | 17,463 | 8,731 | 13,097 | 10,914 | 12% |
| | Laminates | 87,493 | 109,810 | 98,651 | 14,230 | 17,454 | 15,842 | 16% | - | - | - | - | - | - | 0% |
| | Unclassified | 102,378 | 133,213 | 117,357 | 11,686 | 14,058 | 12,872 | 11% | - | - | - | - | - | - | 0% |
| | Total | 772,266 | 1,043,679 | 901,974 | 264,314 | 331,566 | 295,990 | 33% | 204,891 | 204,891 | 204,891 | 131,865 | 163,413 | 147,639 | 16% |

5.4 Plastic Packaging Flow – ICI Sector

The model estimates the total amount of ICI plastic packaging generated in 2022 at just under one million tonnes, consisting of a roughly 50% split between flexible plastics and rigid plastics (**Figure 12**). **Figure 13** further breaks down the generation rate on per province or region basis. Note: the plastic packaging generation data does not include reusable plastic packaging that is commonly used by the different ICI subsectors.

Figure 12: Proportion of rigid versus flexible plastics generated in the ICI sector.

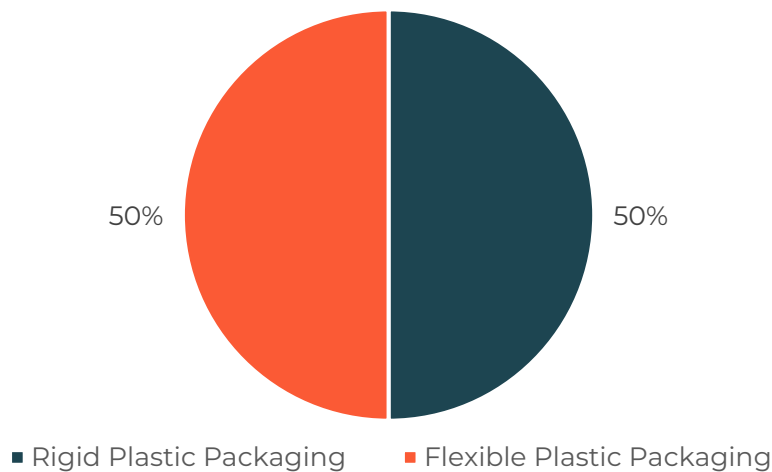


Figure 13: 2022 ICI plastic packaging generated by jurisdiction and by material category.

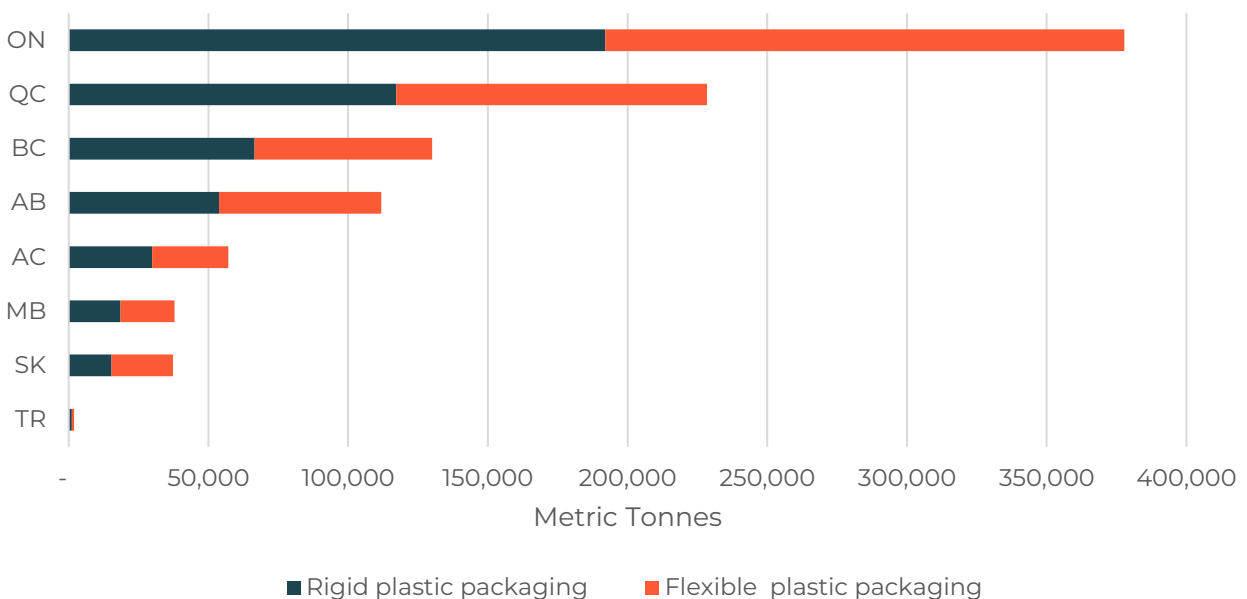


Figure 14, and **Figure 15**, and **Table 17** compare the flow of plastic packaging managed by the ICI sector Canada-wide in 2019 versus 2022. The data show that:

Generation:

- The overall amount of plastic packaging generated remained relatively stable, with an increase in rigid plastics of 70,251 tonnes and a decrease in flexible plastics of 80,085 tonnes.

Collection:

- The amount of plastic packaging collected has improved with an amount almost doubling from 106,788 to 204,934 tonnes.
- Both rigid and plastics had similar improvements with the rigid plastic collection rate improving from 16% to 29% and flexible plastics from 6% to 12%.
- However, it is not clear from the results the degree to which these improvements are due to better data capture and analysis in 2022 or to changes in sector activity.

Recycling:

- Overall, the ICI sector lags significantly behind the other sectors in recycling rates with 19% of rigid plastics recycled and 4% of flexible plastics (11% overall).
- There appears to be some improvements in recycling with the amount of 48,908 to 112,416 tonnes.
- The recycling rate increased from 5% to 11% with the recycling rate for rigid plastics increasing from 10% to 19% and flexible plastics from 1% to 4%.
- However, it is not clear from the results the degree to which these improvements are due to better data capture and analysis in 2022 or to changes in sector activity.

Figure 14: Canada-wide rigid plastic packaging flow in ICI sector.

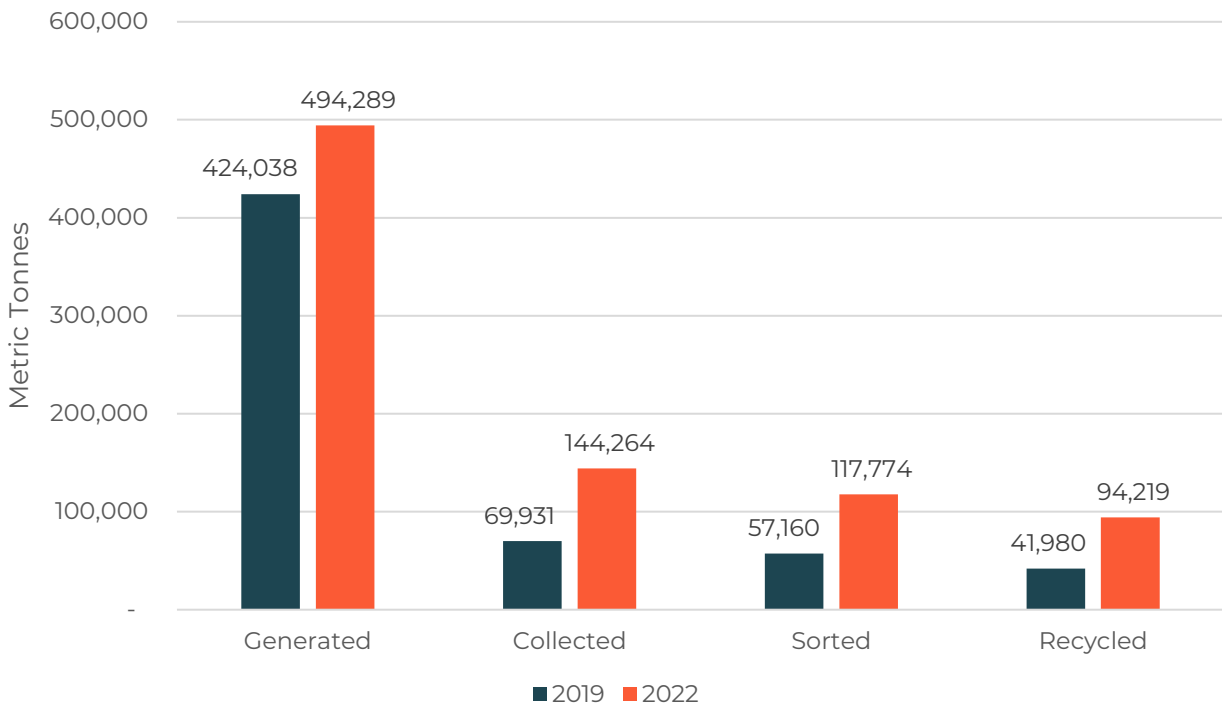


Figure 15: Canada-wide flexible plastic packaging flow in ICI sector.

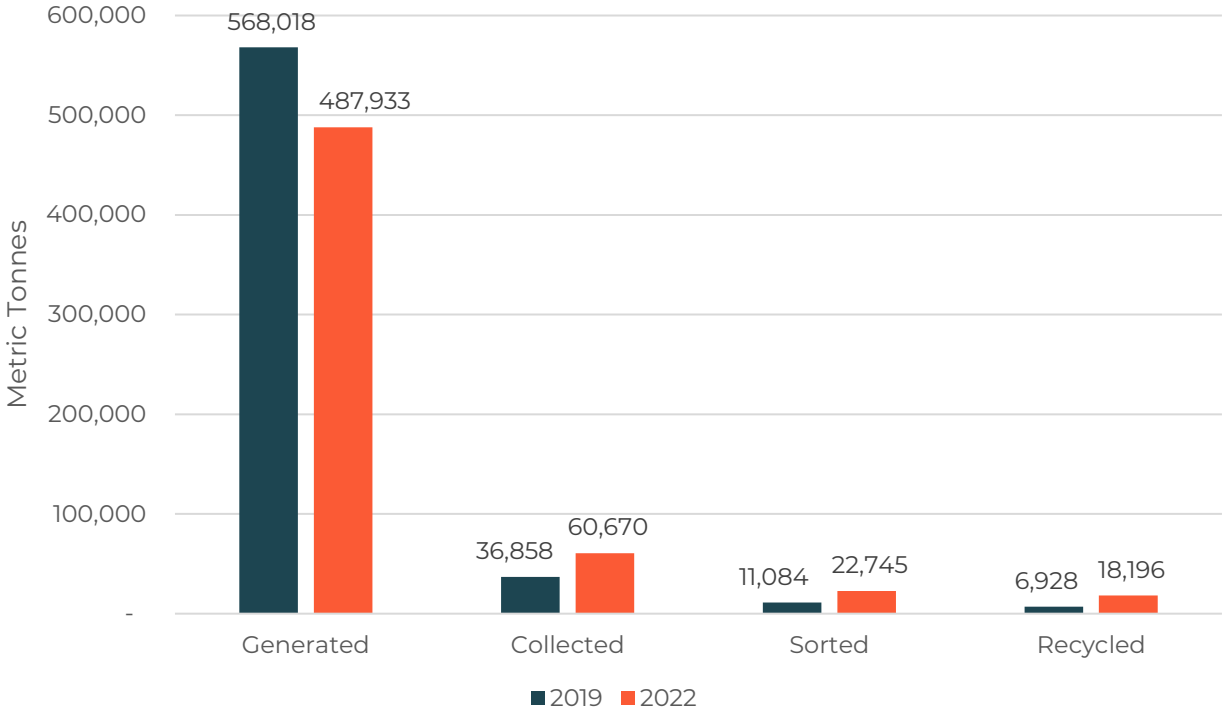


Table 17: ICI plastic packaging flow in 2019 versus 2022.

| Year | Plastic packaging | Generated (MT) | Collected (MT) | Collected rate (%) | Sorted (MT) | Recycled (MT) | | | Recycled rate (%) |
|------|-------------------------|----------------|----------------|--------------------|----------------|----------------|----------------|----------------|-------------------|
| | | | | | | Low | High | Average | |
| 2019 | Rigid plastic | 424,038 | 69,931 | 16% | 57,160 | 35,683 | 48,277 | 41,980 | 10% |
| | <i>Unclassified</i> | <i>424,038</i> | <i>69,931</i> | <i>16%</i> | <i>57,160</i> | <i>35,683</i> | <i>48,277</i> | <i>41,980</i> | <i>10%</i> |
| | Flexible plastic | 568,018 | 36,858 | 6% | 11,084 | 5,888 | 7,967 | 6,928 | 1% |
| | <i>Unclassified</i> | <i>568,018</i> | <i>36,858</i> | <i>6%</i> | <i>11,084</i> | <i>5,888</i> | <i>7,967</i> | <i>6,928</i> | <i>1%</i> |
| | Total | 992,055 | 106,788 | 11% | 68,244 | 41,572 | 56,244 | 48,908 | 5% |
| 2022 | Rigid plastic | 494,289 | 144,264 | 29% | 117,774 | 88,331 | 100,108 | 94,219 | 19% |
| | <i>PET</i> | <i>109,771</i> | <i>43,787</i> | <i>40%</i> | <i>35,880</i> | <i>26,910</i> | <i>30,498</i> | <i>28,704</i> | <i>26%</i> |
| | <i>HDPE</i> | <i>85,491</i> | <i>27,201</i> | <i>32%</i> | <i>22,228</i> | <i>16,671</i> | <i>18,894</i> | <i>17,783</i> | <i>21%</i> |
| | <i>Other</i> | <i>299,027</i> | <i>73,275</i> | <i>25%</i> | <i>59,666</i> | <i>44,749</i> | <i>50,716</i> | <i>47,732</i> | <i>16%</i> |
| | Flexible plastic | 487,933 | 60,670 | 12% | 22,745 | 17,059 | 19,334 | 18,196 | 4% |
| | <i>Film</i> | <i>487,933</i> | <i>60,670</i> | <i>12%</i> | <i>22,745</i> | <i>17,059</i> | <i>19,334</i> | <i>18,196</i> | <i>4%</i> |
| | Total | 982,222 | 204,934 | 21% | 140,520 | 105,390 | 119,442 | 112,416 | 11% |

Figure 16 and **Figure 17** show the amount of rigid and flexible plastic packaging respectively generated by the various ICI subsectors, as well as how the materials are managed. The manufacturing sector and the food services sector are the largest generators followed by trade.

Figure 16: 2022 ICI rigid plastic packaging generated by ICI subsector, excluding DRS.

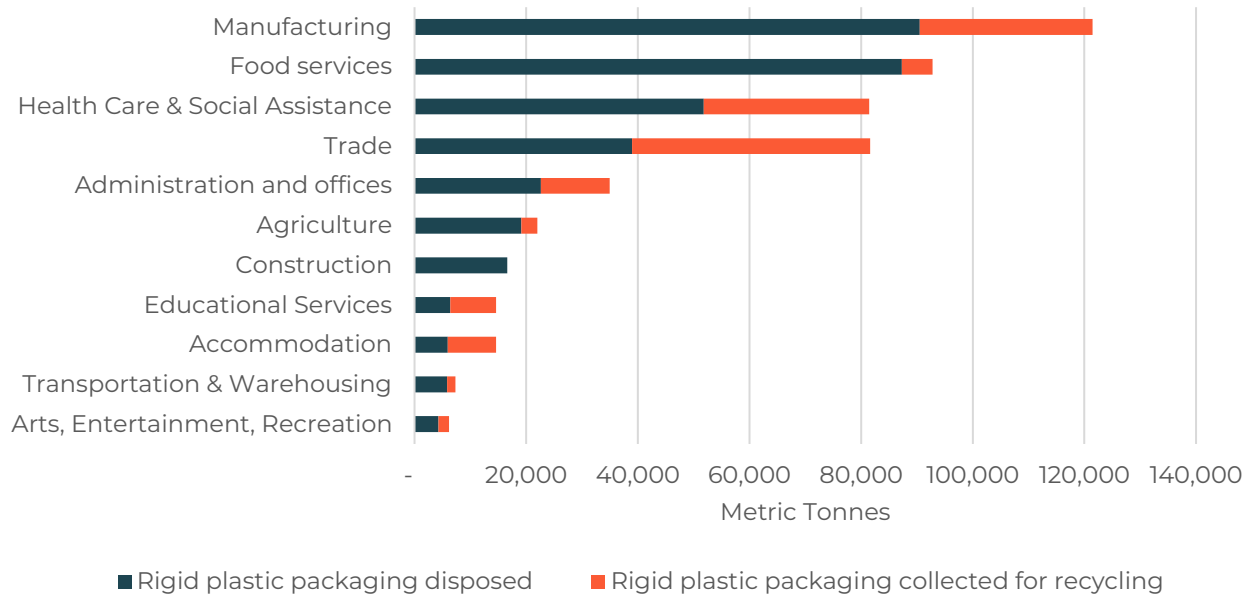
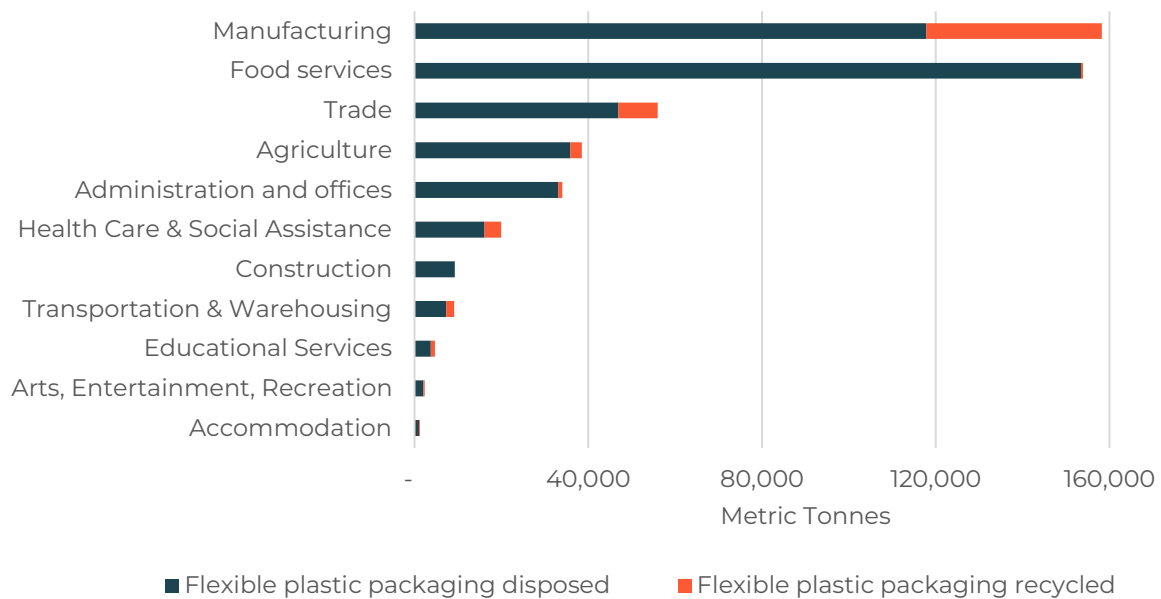


Figure 17: 2022 Flexible plastic packaging generated by ICI subsectors.

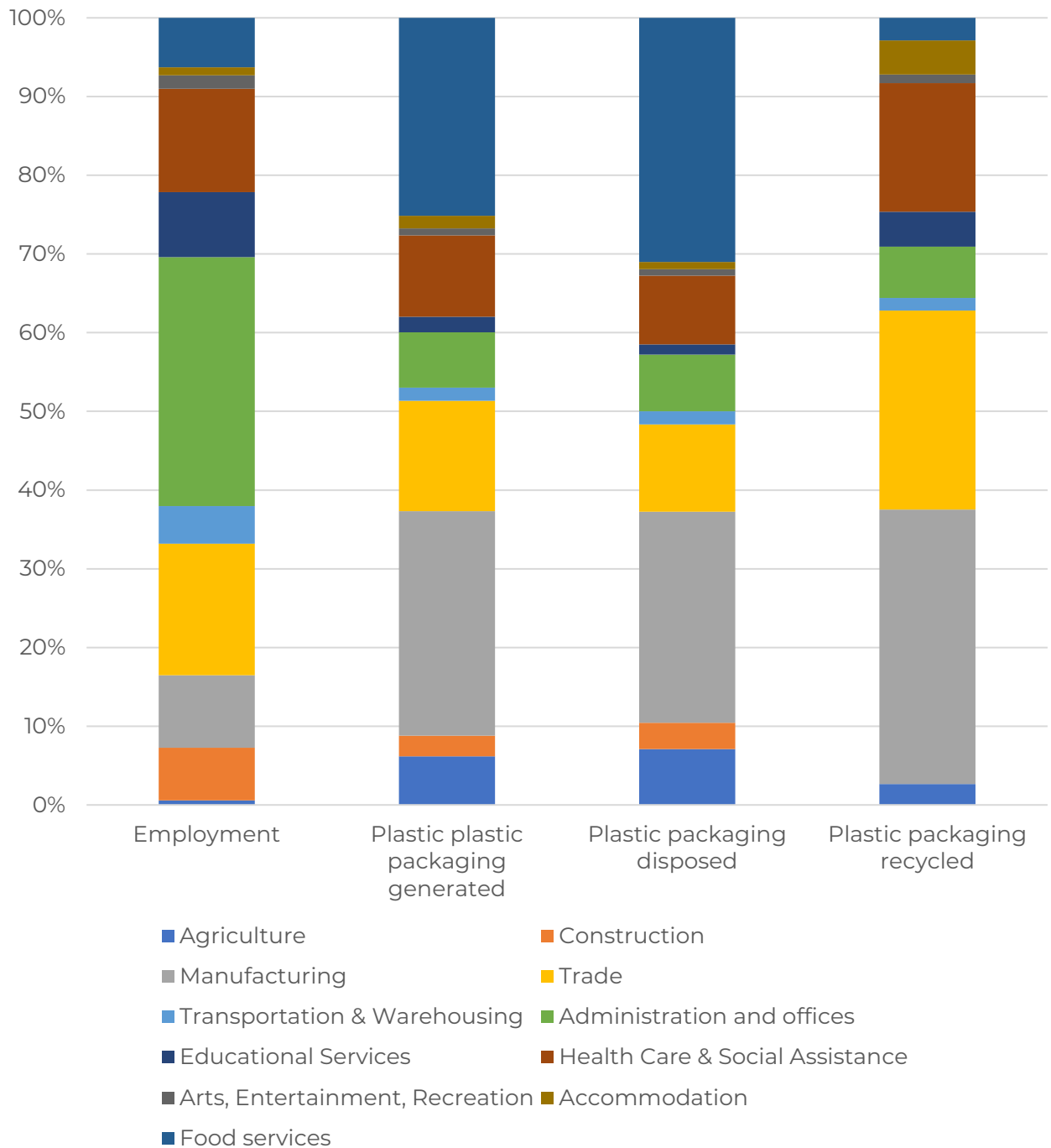


There are significant differences in the on-the-ground management of plastic packaging by ICI subsectors. Some are more proficient than others at collecting (or setting out) plastic packaging for recycling (e.g., accommodation, educational services, health care, manufacturing, and trade). However, while some might be more effective at source separating their recyclables on a percentage basis, the overall contribution of their efforts to the amount of plastic packaging recycled across the ICI sector could be smaller or larger depending on the size of the subsector and the amount of plastic packaging it generates.

Figure 18 provides a graphic to improve context and understanding of key opportunities to target improvements ICI plastic packaging flow that increase diversion, based on the waste audit data analysis. This illustration compares subsectors across three criteria: employment, plastic packaging disposed, and plastic packaging collected for recycling. Key targets for efforts to reduce plastic packaging disposal those that contribute relatively higher levels of FTEs and disposal.

This figure shows that while the largest contributor to employment is the Administrative and Offices subsector, this sector is also a relatively small contributor to plastic packaging generation and disposal. This figure also shows that while manufacturing is a relatively small contributor to employment, they are a larger contributor to plastic packaging generation and disposal. Based on these results, key targets for efforts to reduce plastic packaging disposal the Trade, Manufacturing, Food Services, and Construction subsectors. results, key targets for efforts to reduce plastic packaging disposal the Trade, Manufacturing, Food Services, and Construction subsectors.

Figure 18: Relative contribution of ICI subsectors to employment, ICI plastic packaging waste disposal, and collected for recycling in Canada.



6 TRIANGULATING THE ICI PLASTIC FLOW

The first step of triangulation was to model the ICI data, which was provided in the previous section of the report and **APPENDIX C**. From here forward, we will refer to this as the 'CPP ICI 2022 Estimate'. This section of the report presents the next steps in the triangulation process: comparing the CPP ICI 2022 Estimate with additional data sources, including evidence gathered from service provider interviewers and literature reviews. The result of this triangulation process provides greater certainty to CPP ICI 2022 Estimate and to the broader findings of the report.

6.1 Service Provider Intelligence and Interviews

This section of the report provides the second step in the process of triangulating the CPP ICI 2022 Estimate: collecting service provider evidence -i.e., ground truthing the model results with experts in the field. The industry waste audit data collected to inform this report is one indicator of a generator's intention to collect materials for the purpose of recycling. Each waste audit provides evidence that an ICI PPP waste generator 'set out' materials in appropriate collection containers so that those materials could be transported by a hauler to an end-market. However, the actual management of those materials that were 'collected for recycling' by generators, and then transported by haulers to their end-fate, could be markedly different than the generator's intent (e.g., materials are disposed instead of recycled).

Collected materials can be lost from the recycling stream and sent to disposal at various points along the value chain, and this can happen for several reasons: e.g., poor source separation causing contamination issues, a lack of end-markets, operator error, processor operational issues, or due to cost considerations. As a result, the purpose of this section of the report is to use service provider intelligence to challenge and (if appropriate) validate the model findings by ground-truthing the data inputs and model outputs with experts.

Plastics reprocessors, haulers, and brokers were contacted to better understand the ICI plastics market. The project team has undertaken a series of discussions and interviews with downstream entities to better understand the flow of materials. All the major post-consumer plastic recyclers in Canada have been reached out to directly or indirectly. In addition, to better understand some market dynamics, and to cross check data gathered through waste audit or trade sector studies, interviews were also held with four major material brokers or facilities dedicated to sorting ICI materials. Finally, information was also gathered from specific recovery programs run by converters or individual private companies, such as plastic pallets, pallet wrap, transport block polystyrene or bulk containers.

It is important to note that service providers are often reticent to provide detailed data on estimates of PPP collected for recycling or ultimately recycled either because they consider this information to be commercially sensitive or simply because they do not track these data as part of their operations. Using information gathered from their intelligence, an estimate of ICI plastics recycling is provided in **Table 18**.

Table 18: Extrapolation of plastics recycling based on industry intelligence.

| Category | Extrapolation Based on Industry Intelligence (MT 2022) | CPP ICI 2022 Estimate for Plastic Packaging |
|---------------------|--|---|
| Pallet wrap | 68,300 | |
| FIBCs | 9,600 | |
| EPS | 11,400 | |
| Pails and buckets | 15,300 | |
| Hospital PVC | 1,000 | |
| Plastic straps | 4,400 | |
| Other | 100 | |
| Ag small containers | 2,000 | |
| Ag bulk containers | 600 | |
| Ag Film & twine | 900 | |
| Ag bags & tote bags | 20 | |
| Ag grain bags | 1,400 | |
| HHW HDPE containers | 9,000 | |
| Total | 124,020 MT | 112,416 MT |

6.2 Literature Review – Comparing Estimates to Other Reports and Studies

This section of the report provides the final step in the process of triangulating the CPP ICI 2022 Estimate (i.e., comparing the modelled results to other studies). Theoretically, the amount of PPP in the disposal streams 'should' be relatively similar at a macro and a trend level between studies that were undertaken in areas with similar contexts. However, if there are different pressures on the system (e.g., market demand or legal pressures), then PPP disposal should differ. For example, where local disposal bans exist that are rigorously enforced for a specific type of PPP, there should be less of the banned material in the disposal stream. In addition to comparing data results to other studies and contexts, these data were also compared to data from an amalgamation of regional waste composition studies from across Canada. These studies help to ground truth the results to understand if the data are comparable when taking into account other pressures.

Clarifying Terminology

Before presenting the results, it is necessary to clarify certain terminology. The terms 'waste audit' and 'waste composition studies' are often used interchangeably; however, they tend to be used to refer to different activities in practice. For the purpose this report, we are distinguishing between 'industry waste audits' and 'waste composition studies'.

Industry waste audits measure the amount and type of material set out by a generator in one or more of its waste streams (i.e., disposal, recycling, or organics, as applicable). The result of industry waste auditing is an understanding of the proportion materials in 'out-bound' waste existing a generator's facility (i.e., what materials a generator is setting out for disposal, recycling, or organics processing). For added clarity, the term 'industry waste audit' is often used to refer to a 'point-in-time' activity that assesses one or more of a generator's waste streams -e.g., a quantity of waste that represents a day's or a week's worth of generation. The

results of a 'point-in-time' waste audit can be extrapolated to estimate annual waste stream generation.

In contrast to the term 'industry waste audit', the term 'waste composition studies' tends to be used to reflect a more detailed analysis of the inbound flow of waste materials into waste management systems (e.g., public disposal sites, transfer stations, MRFs, organics processing systems). Waste composition studies tend to be informed by undertaking multiple 'point-in-time' waste audits over a period of time or by taking other measures to ensure the samples taken are representative. The purpose of a 'regional waste composition study' is understand the inbound waste flow of waste into a public facility, including fluctuations through peak and non-peak seasons. As a result, 'waste composition studies' tends to be a more fulsome review of the overall waste stream, and often involves undertaking a number of point-in-time waste audits.

6.2.1 Comparing the CPP ICI 2022 Disposal Estimate to Regional Waste Composition Studies

The ICI model built for this report extrapolated site-specific industry waste audits to generate a CPP ICI 2022 Estimate for plastic packaging generation, disposal, collected for recycling, sorted, and finally recycled. In this section, the results of the CPP ICI 2022 Disposal Estimate generated by that model are compared to regional waste composition studies undertaken by provincial and local authorities in British Columbia, Alberta, Yukon Territory, New Brunswick, and Nova Scotia. These studies measured inbound waste at public waste disposal sites across Canada.

The CPP ICI 2022 Disposal Estimate – i.e., industry waste audit results (out-bound waste) and the regional waste composition studies (inbound waste) – show relative consistency (**Table 19**). Both show that for PPP, the major contributors to the disposal stream are fibre followed by plastic packaging. The regional composition studies show that there is approximately 4% more plastics and 10% more PPP in the disposal stream than the CPP ICI 2022 Estimate suggests, which was modelled based on industry audit results. This difference could be for three reasons:

- ICI businesses may be putting waste that is non-recyclable in their 'collected for recycling' stream and this contamination might be disposed post sorting at a MRF or due to additional processing undertaken by the end-market (e.g., plastics reprocessor).
- Haulers collecting materials ICI generators set out for recycling may end up sending that material to disposal facilities instead of recycling facilities (e.g., due to the level of contamination in the waste collected).⁴⁹
- Generators who undertake waste audits are more likely to be those most interested in understanding their waste stream to improve their recycling systems. As a result, the waste audit reports analyzed are more likely to be from generators that are better recycling actors and therefore result in an overestimation of the amount ultimately recycled.

⁴⁹ For a review on why this might be happening see Office of the Auditor General of Ontario. 2021. Value-for-Money Audit: Non-Hazardous Waste Reduction and Diversion in the Industrial, Commercial and Institutional (IC&I) Sector. p.4. Available at: https://www.auditor.on.ca/en/content/annualreports/arreports/en21/ENV_ICI_en21.pdf

Table 19: Estimated percentage of ICI PPP in Canada’s disposal stream using different methods.

| PPP Type | CPP ICI 2022 Disposal Estimate | Regional Waste Composition Studies Disposal Estimate |
|------------------|--------------------------------|--|
| Data Year | 2022 | 2022 |
| Fibre | 12% | 17% |
| Plastic | 7% | 11% |
| Metal | 1% | 1% |
| Glass | 0% | 1% |
| Total* | 20% | 30% |

* Rounded to the nearest 1 so might not add up

**Mixed container category so ranges applied to material categories

6.2.2 Comparing the CPP ICI 2022 Disposal Estimate to Other Studies

Table 20 provides a comparison of the CPP ICI 2022 Disposal Estimate to the results of a study that was undertaken by the Recycling Council of Ontario (RCO) in 2014, which audited 1,012 office and retail properties, owned by 17 organizations, and presented the results in a report entitled: *Canadian Office and Retail Waste Performance Report*.⁵⁰ Compared to the RCO’s results, the CPP ICI 2022 Disposal Estimate suggests there is:

- significantly lower amounts of fibre in the office disposal stream;
- significantly higher amounts of plastics in the office disposal stream;
- slightly lower amounts for the proportion of other PPP materials in the retail disposal stream,
- similar results in the proportion of fibre in the retail disposal stream;
- similar results in the proportion of plastics in the retail disposal stream; and
- lower proportion of other PPP materials in the retail disposal stream.

In part, the difference in the fibre results could be due to a difference in methodology. The CPP ICI 2022 Disposal Estimate excludes paper toweling generated in washrooms from fibre PPP quantities. Additionally, the difference in the fibre amount could be due to improved paper recycling practices in offices over the intervening eight years. The differences in the metal PPP and glass PPP could be the result of the fact that the RCO’s results are for Ontario offices only and, unlike Ontario, 11 of 13 jurisdictions Canada-wide have DRSs that would pull large quantities of non-alcohol beverage containers from the disposal stream in those provinces and territories.

Also, it should be noted that the amount of fibre collected in the recycling stream is lower in office recycling stream for CPP ICI 2022 Estimate (**Table 23**) and might explain why the

⁵⁰ Recycling Council of Ontario. 2015. *National Solid Waste Benchmarking Study: 2014 Canadian Office and Retail Waste Performance Report*. Available at: https://circularinnovation.ca/wp-content/uploads/RCO_NWBS_Report_March_2015_Final.pdf

disposal percentage is higher. The difference in plastic could be the result of a changing waste composition stream but could also be the result of the 2022 waste audits analyzed including more office buildings with other business operations co-located in the same buildings, such as retail trade.

Table 20: Comparing this report's estimates to RCO results for ICI PPP in the disposal stream.

| PPP Type | CPP 2022 ICI Estimate for Offices | RCO Baseline for Offices ⁵¹ | CPP 2022 ICI Estimate for Retail | RCO Baseline for Retail ⁵² |
|-----------|-----------------------------------|--|----------------------------------|---------------------------------------|
| Data Year | 2022 | 2013 | 2022 | 2013 |
| Fibre | 20% | 39% | 28% | 26% |
| Plastic | 18% | 6% | 5% | 6-10%** |
| Metal | >1% | 3% | >1% | 2-6%** |
| Glass | >1% | 4% | 1% | 1-5%** |
| Total* | 39% | 52% | 34% | 39% |

* Rounded to the nearest 1

**Mixed container category, so ranges applied to material category

Table 21 presents more comparisons between the CPP ICI 2022 Disposal Estimate and similar studies undertaken in other jurisdictions. The results appear consistent. Across all studies, fibre and plastic PPP are the most predominant PPP found in the disposal stream, with significantly lower levels of metal and glass PPP.

⁵¹ Ibid.

⁵² Ibid.

Table 21: Comparing estimates of ICI PPP in the disposal stream across studies.

| PPP Type | CPP ICI 2022 Estimate | British Columbia ⁵³ | Yukon ⁵⁴ | Québec ⁵⁵ | California ⁵⁶ | Australia ⁵⁷ | Iowa ⁵⁸ | Vermont ⁵⁹ |
|----------------|-----------------------|--------------------------------|---------------------|----------------------|--------------------------|-------------------------|--------------------|-----------------------|
| Data year | 2022 | 2019 | 2017-2018 | 2019-2020 | 2014 | 2010-2011 | 2022 | 2018 |
| Fibre | 12% | 12% | 12% | 18% | 27% | 21% | 18% | 14% |
| Plastic | 7% | 12% | 13% | 11% | 2% | 10% | 13% | 10% |
| Metal | 1% | 2% | 1% | 1% | 1% | 3% | 1% | 2% |
| Glass | <1% | 1% | 1% | 2% | 2% | 1% | 1% | 1% |
| Total* | 20% | 26% | 27% | 32% | 31% | 35% | 33% | 27% |

* Rounded to the nearest 1

⁵³ Canada Plastics Pact. 2022. *British Columbia Industrial, Commercial and Institutional Packaging and Paper Products Baseline Report: Waste Flows Study*. Available at https://plasticspact.ca/wp-content/uploads/2023/04/PPP_BC-ICI-Baseline-Report.pdf.

⁵⁴ Yukon Government. 2022. *Yukon Industrial, Commercial and Institutional Packaging and Paper Products Baseline Report: Waste Flows Study*. Available at: <https://emrlibrary.gov.yk.ca/environment/yukon-industrial-commercial-institutional-packaging-paper-products-baseline-report-waste-flows-study-2023.pdf>.

⁵⁵ RECYC-QUÉBEC. 2021. *Étude de caractérisation à l'élimination 2019-2020*. Available at: <https://www.recyc-quebec.gouv.qc.ca/sites/default/files/documents/caracterisation-elimination2019-2020.pdf>.

⁵⁶ CalRecycle. 2014. *Generator-Based Characterization of Commercial Sector Disposal and Diversion, September 2015*. Available at: <https://www2.calrecycle.ca.gov/WasteCharacterization/PubExtracts/2014/GenSummary.pdf>.

⁵⁷ Australian Government. 2013. *A Study into Commercial and Industrial Waste and Recycling in Australia by Industry Division*. Available at: <https://www.awe.gov.au/sites/default/files/documents/commercial-industrial-waste.pdf>.

⁵⁸ Iowa Department of Natural Resources. 2022. *2022 Iowa Statewide Material Characterization Study*. Available at: https://www.iowadnr.gov/Portals/idnr/uploads/waste/faba_wastecharacterization2022.pdf.

⁵⁹ Vermont DEC. 2018. *2018 Vermont Waste Characterization*. Available at: <https://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/2018-VT-Waste-Characterization.pdf>.

6.2.3 Comparing CPP ICI 2022 Collected for Recycling Estimate to Other Studies

Table 22 provides a comparison between the CPP ICI 2022 Collected for Recycling Estimate to findings from similar studies. The results show the estimated percentage of PPP in the collected for recycling stream is proportionally similar across material categories, with fibre contributing to the vast majority of material collected for recycling. However, the CPP ICI 2022 Collected for Recycling Estimate for all PPP was found to be higher. Note that the CPP ICI 2022 Collected for Recycling Estimate is 10% to 11% higher in the proportion of PPP in the collected for recycling stream than the California and Australia studies, while they are 11% to 14% higher in the proportion of PPP in the disposal stream. From a mass balance perspective, there is similar generation of PPP.

Table 22: Comparing estimates of ICI PPP in the collected for recycling stream across studies.

| PPP Type | CPP ICI 2022 Collected for Recycling Estimate | California ⁶⁰ Collected for Recycling Estimate | Australia Collected for Recycling Estimate |
|------------------|---|---|--|
| Data Year | 2022 | 2014 | 2010-2011 |
| Fibre | 53% | 43% | 49% |
| Plastic | 5% | 2% | 1% |
| Metal | 1% | 1% | n/a |
| Glass | 2% | 4% | 1% |
| Total* | 61% | 50% | 51% |

*Rounded to the nearest 1 so might not add up

Table 23 provides a comparison of the Collected for Recycling Estimate to work undertaken by the RCO in their *Canadian Office and Retail Waste Performance Report (2014)*.⁶¹ Compared to the RCO's results, the CPP 2022 Collected for Recycling Estimate is:

- similar results in the proportion of plastic, metal and glass PPP in the office and retail streams; and
- significantly higher amounts of fibre PPP in the office stream.

Note that while there are higher percentage of paper in the recycling system, the overall percentage of fibre PPP in the disposal stream is also much lower for offices in 2022 (**Table 20**), which could explain the difference.

⁶⁰ CalRecycle. 2014. *Generator-Based Characterization of Commercial Sector Disposal and Diversion, September 2015*. Available at: <https://www2.calrecycle.ca.gov/WasteCharacterization/PubExtracts/2014/GenSummary.pdf>.

⁶¹ Recycling Council of Ontario. 2014. *National Solid Waste Benchmarking Study: Canadian Office and Retail Waste Performance Report*. https://circularinnovation.ca/wp-content/uploads/RCO_NWBS_Report_March_2015_Final.pdf

Table 23: Comparing CPP ICI 2022 collected for recycling estimate to RCO results.

| PPP Type | CPP 2022 Estimate Collected for Recycling Offices | RCO Estimate Collected for Recycling Offices ⁶² | CPP 2022 Estimate Collected for Recycling Retail | RCO Estimate Collected for Recycling Retail ⁶³ |
|------------------|---|--|--|---|
| Data Year | 2022 | 2014 | 2022 | 2014 |
| PPP Fibre | 71% | 39% | 61% | 73% |
| PPP Plastic | 6% | 6% | 4% | 2-6%** |
| PPP Metal | 2% | 3% | 1% | 2-6%** |
| PPP Glass | 3% | 4% | 1% | 1-5%** |
| Total* | 82% | 52% | 77% | 80% |

* Rounded to the nearest 1 so might not add up

**Mixed container category so ranges applied to material categories

Although not the main focus of this report, analyses were also undertaken to compare ICI fibre, metal, and glass PPP to other studies. **Table 24** compares the amounts of PPP estimated as collected for recycling from this report to Statistics Canada's *Waste Management Industry Survey* diversion report.⁶⁴ For fibre and glass, there is congruency in the numbers. The glass numbers are higher in the Statistics Canada survey, but these data likely include some non-packaging glass. The metals numbers are significantly different; however, these are more difficult to compare given the amount of non-PPP based metals that are recycled.

Table 24: Comparison of ICI PPP generation and management reports.

| Report | Baseline Year | Total ICI Fibre PPP Collected for Recycling (MT) | Total ICI Metal PPP Collected for Recycling (MT) | Total ICI Glass PPP Collected for Recycling (MT) |
|---|---------------|--|--|--|
| CPP 2022 Estimate (All sectors) | 2022 | 2,221,368 | 40,741 | 64,168 |
| Statistics Canada Waste Management Industry Survey | 2020 | 1,954,655 | 626,519 (includes non-PPP metal) | 119,785 (includes non-PPP glass) |

⁶² Recycling Council of Ontario. 2015. *National Solid Waste Benchmarking Study: 2014 Canadian Office and Retail Waste Performance Report*. Available at: https://circularinnovation.ca/wp-content/uploads/RCO_NWBS_Report_March_2015_Final.pdf.

⁶³ Ibid.

⁶⁴ Statistics Canada. 2021. *Waste Management Industry Survey*. Available at: <https://www150.statcan.gc.ca/t1/tbl/en/tv.action?pid=3810013801>.

6.2.4 Comparing CPP 2022 Generation and Management Estimate to Other Studies

Table 25 provides a comparison of CPP ICI 2022 Generation and Management Estimate to four other recent Canada-wide reports regarding PPP generation and management. It is important to note the differences in audit methodologies used, including the data year used to establish the baseline in each study (i.e., 2016, 2018, 2019 and 2020).

The estimates of the quantity of plastic packaging generated ranges from a low of 1.55 million tonnes to a high of 2.2 million tonnes, with the CPP 2022 Generation and Management Estimate (all sectors) aligning closely with the estimate provided by Statistics Canada Physical Flow Account for Plastic Material for 2020 (all sectors). This range in data across the studies can be somewhat explained by the differences in the methodologies used.

Environment and Climate Change Canada's (ECCC) report took a top-down approach in calculating plastic packaging generation (i.e., by extrapolating based on product sales), while this Progress Report used a bottom-up approach. While all methodologies have inherent challenges, the most significant challenge of the bottom-up approach is the widespread lack of data on plastic packaging generated by business and institutions. Significant work has been undertaken in this report to address that data gap.

Table 25 shows there is significant consistency in estimates of the amount of plastic packaging generated, collected, sorted, and recycled across the five other Canada-wide reports.

Table 25: Comparing CPP ICI 2022 generation and management estimate of plastic packaging to other studies.

| Report | Baseline Year | Total Generated (MT) | Total Collected (MT) | Total Sorted (MT) | Total Recycled (MT) |
|---|---------------|--|----------------------|-------------------|---------------------|
| CPP ICI 2022 Generation and Management Estimate (All sectors) | 2022 | 1,961,374 | 557,020 | 401,507 | 306,055 |
| 2019 CPP Foundational Report ⁶⁵ | 2019 | 1,894,167 | 416,752 | 306,445 | 226,778 |
| Statistics Canada Physical Flow Account for Plastic Material ⁶⁶ | 2020 | 2,220,375 (including agricultural film) | 440,177 | 381,405 | 320,692 |
| ECCC Plastic Study ⁶⁷ | 2016 | 1,553,000 | 346,000 | 295,000 | 233,000 |
| Post-Consumer Plastics Recycling in Canada ⁶⁸ | 2018 | n/a | 306,600 | n/a | n/a |

⁶⁵ Canada Plastics Pact. 2021. *Foundational Research and Study: Canadian Plastic Packaging Flows*. Available at: <https://plasticspact.ca/wp-content/uploads/2021/10/CPP-Foundational-Research-on-Canadian-Plastics-Packaging-Flows-May-2021-final.pdf>.

⁶⁶ Statistics Canada. 2024. *Table 38-10-0150-01 Physical Flow Account for Plastic Material, by product category*. Available at: <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3810015001>

⁶⁷ Environment and Climate Change Canada. 2019. *Economic Study of the Canadian Plastic Industry, Markets and Waste*. Available at: http://publications.gc.ca/collections/collection_2019/eccc/En4-366-1-2019-eng.pdf.

⁶⁸ More Recycling. 2020. *2018 Post-Consumer Plastics Recycling in Canada*. Available at: https://www.plasticmarkets.org/jsfcontent/CanadaReport18_jsf_1.pdf.

7 REUSABLE PPP IN THE ICI SECTOR

The study also explored reuse systems used in the ICI sector. In Canada, it is common for the ICI to use reusable trays, crates, pallets, drums, and buckets, especially in the retail sector. Types of reusable PPP that prevent single-use plastic wastes were discussed in British Columbia *Industrial, Commercial, and Institutional Packaging and Paper Products Baseline Report: Waste Flows Study* (2023).⁶⁹

Like recycling, reuse activity is also market value driven. Many of the companies interviewed note that the choice to use reusable PPP was choice that was made decades ago and was driven by function and cost, not a desire to be more sustainable. Those companies interviewed also report that because reusables are 'just part of the way they do business' they often don't track the lifespan of the reusable PPP nor the number of trips that it takes. They purchase or lease PPP that is designed to be reusable such as FIBCs and plastic pallets.

While data in Canada is lacking on reusable items in the ICI PPP sector, data from Belgium, where the ICI PPP PRO, Valipac, must report on the amount of reusable versus single-use PPP managed in that country, they report:

- 98% of metal drums supplied by weight to domestic markets are reusable and 92% of those supplied by import market are reusable;
- 94% of plastic drums supplied by domestic markets are reusable and 84% of those supplied by import market are reusable;
- 93% of pallets supplied by weight to domestic markets are reusable and 86% of those supplied by import market are reusable; and
- 3% of boxes supplied by weight to domestic markets are reusable and 2% of those supplied by import market are reusable.⁷⁰

The reusable data from the import markets are especially telling and hint towards the amount of reuse occurring globally in the ICI sector. In fact, pallet reuse pooling systems are known to operate at a global scale.⁷¹

Several examples of reuse in Canada's ICI sector are provided below.

⁶⁹ Canada Plastics Pact. 2023. British Columbia Industrial, Commercial, and Institutional Packaging and Paper Products Baseline Report: Waste Flows Study. Available at: <https://plasticspact.ca/british-columbia-industrial-commercial-and-institutional-packaging-and-paper-products-baseline-report-waste-flows-study/>

⁷⁰ Valipac. 2022. Ratio of single-use packaging / reusable packaging placed on the Belgian market by companies that package goods. Ratio of single-use packaging / reusable packaging placed on the Belgian market by companies importing packaged goods. Available at: <https://activityreport.valipac.be/notre-mission-de-base/> and <https://www.linkedin.com/pulse/facts-ci-packaging-part-2-reuse-rate-commercial-industrial/?trackingId=uPxtYSa%2FT3WHKiYqNJaPog%3D%3D>.

⁷¹ CHEP: A Brambles Company. N.d. What is pallet pooling and what are the advantages. Available at: <https://www.chep.com/be/en/what-is-pallet-pooling>

Enviro Containers & Recycling®, A Canadian Reuse/Recycling Company⁷²

Enviro Containers collects, reconditions, and recycles 1000L and 1200L industrial bulk containers (IBCs, also called IBC totes), steel drums, and plastic drums from the industrial and agricultural sectors operating in British Columbia, Alberta, Manitoba, Saskatchewan, and Ontario. They purchase containers in reusable condition and accept all other containers free of charge. Enviro Container claims to manages approximately 10,000 drums per month.

Container reconditioning involves using hot water shot blasting to clean residue and sanitize the containers. The steel drums are then coated with a fresh coat of paint in either black, blue, or red. The poly drums are available in white, blue, or black. The drums are pressure tested to ensure they meet Transport Canada standards. Approximately 30-40% of the drums fail the pressure test and are not suitable for reuse. These drums are shredded, and blow moulded into a new drum.

Barriers experienced include a decline in customer interest in reconditioning drums and relatively inexpensive disposal.

Alberta Beverage Container Recycling Corporation (ABCRC)⁷³, A PRO using Reusable Totes and Pallets

ABCRC is a producer responsibility organization operating the DRS for non-refillable beverage containers in Alberta. In 2022, it managed the collection and recycling of 2,077,237,000 beverage containers that collectively weighed 87,908.88 MT. To collect the containers, FIBCs (flexible industry bulk containers or totes) provided to bottle depots. The totes are then transported to a MRF, where containers are consolidated and shipped to market.

In its 2023 Sustainability Report, it noted that using the following reusable PPP:

- It had invested in new 'blue mega bags' (or FIBCs) that were hardier to collect glass beverage containers.
- It has repurposed 15,334 pallets, repaired 38,603 pallets, and had sent an additional 18,182 pallets for repair.

ABCRC states that its FIBCs last an average lifespan of 5-years.⁷⁴

For recycling, in addition to the beverage containers, it reported:

- sending 130,678 kg of damaged white and blue FIBCs to Merlin Plastics in 2022; and
- accepting more than 96,391 kg of unused, defective, or off-spec, pre-consumer beverage containers (i.e., non-DRS containers from manufacturing plants) who did not have another viable recycling option for the beverage containers, so that these containers could be recycled alongside their post-consumer containers.

⁷² Personal communication, Enviro Containers, March 2024.

⁷³ Alberta Beverage Container Recycling Corporation. 2023. Leave no trace: sustainability report 2022. Available at: <https://www.abcrc.com/assets/Uploads/ABCRC-2022-Sustainability-Report.pdf>

⁷⁴ Personal Communication, Guy West, ABCRC, March 2024.

Purolator Inc.^{75,76}, Uses Reusable Skid Wrap

Purolator reported that it set a target to divert 70% non-hazardous from landfill, and that in 2022, it:

- achieved a diversion rate of 63%;
- reduced waste by 670 tonnes;
- recycled 1,500 tonnes of cardboard;
- recycled over 2,200 tonnes of scrap wood;
- recycled over 123 tonnes of plastic film (pallet wrap);
- recycled over 331 tonnes of mixed recycling; and
- began working with suppliers to increase recycled content in their packaging.

Purolator also reports:

- its Express Pak contains 25% recycled content;
- its Purolator Express® Envelope is made from 100% recycled, 'biodegradable', and recyclable content;
- its Return Box Project packaging is fully recyclable, is made from 72% recycled content, and is marked with water-based inks;
- it initiated a package-free returns program for Amazon shipments that allows customers to return unwanted products without shipping packaging by bringing them back to drop-off locations that consolidate items from multiple customers into one box for shipment back to Amazon; and
- it is working with select customers to design and create reusable packaging solutions.

In 2023, Purolator received a YVR Green Excellence Award for its work in Salt Island, BC to use reusable skid wrap.⁷⁷ It claims the shift has not only reduced waste but is a cost-effective solution because it takes longer to wrap the skids with disposable shrink wrap than with the reusable wrap. Key details include:

- One roll of disposable shrink wrap is enough to wrap five skids. Reusable packaging can be used multiple times.
- It is using reusable skid wrap in British Columbia, Alberta, and Ontario terminals.

⁷⁵ Purolator Inc., 2023. 2022 Sustainability report. Available at: <https://www.purolator.com/en/about-purolator/our-commitment-environmental-sustainability>

⁷⁶ Purolator Inc, April 19, 2023. Delivering for our planet by conserving energy and reducing waste. Available at: <https://www.purolator.com/en/articles/delivering-our-planet-conserving-energy-and-reducing-waste>

⁷⁷ Purolator Inc. 2023. *Purolator receives 2023 YVR Green Excellence Award*. Available at: <https://www.purolator.com/en/articles/purolator-receives-2023-yvr-green-excellence-award#:~:text=Green%20Excellence%20Award-,Purolator%20is%20thrilled%20to%20once%20again%20be%20a%20recipient%20of,and%20innovation%20in%20green%20initiatives>

8 CONCLUSIONS

This section summarizes the main conclusions.

8.1 There are Continued Barriers to ICI Plastics Recycling

Even with 'higher demand' materials, barriers to their recycling in the ICI sector remain, including:

1. **Lack of market demand** – fluctuations in market demand for PCR and low market value can mean there is not enough value creation to pull materials from the disposal stream, particularly where disposal costs are low. For certain materials, there is consistently low market value, such as plastic bladders used in the food manufacturing process, and polyurethane or silicone plastic cartridges used in the construction sector.
2. **High contamination rates** – including contamination due to inks, labels, and attachments that affect recyclability, and contamination due to how the materials are collected (e.g., the higher contamination rates seen in public facing recycling bins). Contamination impacts the value associated with potential commodity streams and can make it difficult for materials to be separated sufficiently for them to become inputs into new products.
3. **Lack of infrastructure** – ICI generators and collection system operators lack basic infrastructure that would be needed to effectively recycle ICI plastic packaging (e.g., washing facilities, transfer capacity for recyclables). Having a wash line is not common for ICI recyclers, so if packaging is filled with residue, it will be more difficult to process (e.g., mayonnaise bucket from restaurants or food processors). In some parts of Canada, transfer stations also lack the space to separate and consolidate recyclables from general waste.
4. **An imbalance of information and controls** – ICI generators lack the information necessary from their service providers to reduce waste they generate and to increase the amount being recycled. They lack the information about recycling opportunities and the controls to ensure the materials they send to recycling are being recycled.
5. **Lack of economies of scale** – In order to achieve efficiency in recycling collection routes, service providers need density in collection - i.e., less distance between stops, more materials collected at stops and less distance to unload materials. This density is what allows service providers to offer cost-effective services and encourage ICI recycling. As a result, smaller generators of recyclables that are situated in less populated, remote areas, or who may be isolated in a residential areas often struggle to source cost-effective recycling services. This is why many local governments have chosen to fill this gap by providing certain small ICI generators the ability to be collected along residential recycling (e.g., churches, community centres).

In contrast, larger ICI generators often generate enough material to create their own economies of scale. This can be observed in big box retailers and manufacturers that generate large amounts of pallet wrap that can be source separated and collected for recycling.

One unintended consequence of the implementation of EPR for residential PPP is that it can disrupt these joint collection systems that build economics of scale as producers are generally only required to collect from residential sources. As a result,

once EPR for residential PPP is implemented, smaller ICI entities that might have otherwise been serviced need to establish new relationships with service providers to collect their recyclables. The efficiencies of collection routes are diminished, making it more challenging to obtain cost effective servicing.

6. **Economic instability** and unprecedented market conditions. There have been unprecedented market conditions over the last seven years that have made it difficult to make investments into new recycling systems, including:
- trade embargoes;
 - Covid-related challenges (e.g., strained labour markets, supply chain issues);
 - weather (e.g., fires, “atmospheric rivers”);
 - inflation and potential recessionary challenges;
 - virgin plastic dumping;
 - legislative and regulatory uncertainty;
 - labour challenges, which existed pre-pandemic, but were exacerbated by the pandemic; and
 - supply chain challenges that make purchasing vehicles and machinery multi-year processors.

There are signs of optimism as companies continue to innovate and offer opportunities to address barriers and eliminate plastics waste by ensuring that plastic packaging is used within a circular economy.

Better Buckets®, A Fledgling Canadian Reuse/Recycling Company⁷⁸

Better Buckets is a reuse, recycling, and injection molding company located in Chilliwack, BC.

Its aim to improve the sustainability of the food processing industry. BC is home to large amount of food processors, which import raw ingredients (e.g., unprocessed fruit puree, lemon juice) from California, Mexico, and other places abroad to make their products. BC is also home to plant greenhouses and nurseries that use nursery pots to propagate their plants.

The food grade buckets imported into BC are four- and five-gallon white pails made from HDPE. According to Better Buckets, almost all of the pails and pots generated in the British Columbia are disposed of in landfill. Traditional large-scale recyclers have not wanted the buckets because food processing companies are not willing to clean them, even though the buckets are disposed in large source segregated loads. Better Buckets estimates that hundreds of thousands of these pails and pots are disposed each year.

Better Buckets receives the buckets and nursery pots, maintaining a chain of custody for the food grade pails, pressure washes them, and makes them available for either reuse or recycling. The buckets and pots destined for recycling are ground into plastic flakes. Washing the buckets is labour intensive, but the result is a food grade bucket that has a chain of custody. The buckets meet CFIA or FDA regulations for reuse.

⁷⁸ Personal communication, Matt Klootwyk, Better Buckets, February 2024.

Barriers experienced to expand the reuse of buckets include fear of changing workflows (e.g., in changing from round pails to square pails), the risk of taking on new suppliers, lack of sufficient washing facilities. Barriers to expansion of recycling is capital cost of establishing new recycling facilities – land is expensive in BC and as a result, it is currently cheaper to landfill than to clean the buckets for recycling – and a lack of 'matchmaking' between facilities like his and the buyers of the buckets in Canada.

Green Circle Salons⁷⁹

A turnkey solution designed to help hair salons reduce their environmental impact. They offer collection programs for hair clippings, excess hair colour, used metals, single-use items (like nail files, waxing strips and cotton swabs), and paper and plastics (for salons that don't have local recycling options), and personal protective equipment (PPE), including:

- nitrile gloves;
- latex gloves;
- vinyl gloves;
- disposable shoe covers;
- face shields;
- disposable capes and gowns;
- plastic ink cups used in tattoo parlours;
- masks;
- barrier film; and
- non-woven hand wipes.

The program offers a PPE Recovery Kit that enables salons to pack up their waste and have it managed in a value recovery stream. It offers smaller businesses an opportunity to achieve greater economies of scale in how they manage their recyclables. They have over 16,000 member salons with some of the larger salons diverting 2-3 tonnes of material per year.

CannaGreen Packaging, Canadian Cannabis Packaging Manufacturer⁸⁰

CannaGreen is an Airdrie, Alberta based manufacturer of cannabis and vape food grade packaging, i.e., plastic packs, tubes, and jars (tubs), and pouches. It adheres to Responsible Manufacturing Practices and is a CSA certified facility. CannaGreen provides an example of both pre-consumer plastics recycling (which is a common practice) and post-consumer plastics recyclability planning.

CannaGreen claims that:

- its packaging is 100% recyclable or reusable;
- its packaging is made from 30% recycled materials;
- in 2023, they
 - manufactured 118,700 pounds of Health Canada required and regulated packaging,

⁷⁹ Green Circle Salons. n.d. *Create Beauty, Not Waste*. Available at: <https://greencirclesalons.com/>

⁸⁰ CannaGreen Packaging. n.d. *Our Home, Our Responsibility*. Available at: <https://cannagreenpak.com/sustainability/>

- accepted 6820 pounds of failed packaging from other suppliers for reprocessing, which would have otherwise been disposed in landfill, and
- they only generated 9.85 pounds of non-recyclable waste for the whole year from their manufacturing plant.

Onsite, CannaGreen collects its plastic offcuts / off spec materials and either runs those materials back through its own manufacturing processes or sends them offsite for recycling (e.g., film).

It also works with its clients (the licenced producers) to ensure their containers are used sustainably. For example, because labelling can affect container recyclability, they require their clients to co-purchase their packaging with BOPP (Biaxially-Oriented Polypropylene) labels; this ensures the labels used are 100% recyclable along with the package.

CannaGreen states that 70% of the pre-consumer container waste from packaging is because of recalls and that this is often due to labelling -e.g., change in name, change in logos, change in branding. When CannaGreen tubes are recalled, they can be reground and reprocessed with the labels.

8.2 There are Opportunities to Target Recycling System Improvements in Specific ICI Subsectors

ICI entities across all of the targeted ICI subsectors provided considerable assistance to enable the completion of this report. The level of support received is an indicator of their strong desire for improvements that better enable a circular economy for ICI PPP, including plastic packaging. While individual businesses may face different challenges and barriers to improving the outcomes of their plastics flows, there also appears to be common issues across the ICI sector hindering improved performance where new focussed guidance, programs, or regulatory interventions could be applied.

At present, the ICI sector is the largest generator of plastic packaging amongst the three sectors; it also has the lowest collection and recycling rates. Despite this, far less attention has been paid to improving ICI sector performance by actively removing barriers and increasing incentives to enable improved recycling rates.

The CPP 2022 ICI PPP Estimate established in this Progress Report shows that four of the ICI subsectors (i.e., food services, manufacturing, trade, and health care and social assistance) generate 78% of all ICI plastic packaging disposed. It is important to highlight that while these subsectors contribute significantly to disposal, the raw waste audit data obtained also showed that there were individual organizations within each of these subsectors that were achieving high levels of recycling. This suggests that focussed attention could significantly improve current recycling rates by helping poorly performing recycling actors to overcome current barriers to improved performance.

As discussed in **Section 3**, Definitions and other Context, ICI PPP recycling is organized and incented differently than residential and DRS flows, and it is typically managed through B2B relationships. As a result, for this Progress report, ICI plastic packaging flows were studied in relation to ICI PPP flows to better understand how recycling, in general, is organized across the ICI sector. Studying ICI PPP flows as a whole also helped to identify where recycling systems are working well, and to see if lessons learned about those well-functioning systems could be applied to improve ICI plastic packaging recycling.

The results of the ICI PPP sector and subsector modelling shows that there are strong drivers to collect and recycle fibre streams across most subsectors, especially where large volumes are generated and can be source separated. The same appears to be true for plastic packaging, where plastics can be collected in source separated systems (e.g., pallet wrap). In other words, high recycling rates can be achieved without the regulations necessary to incent DRS and residential plastic packaging diversion. However, not every ICI entity generates large volumes of plastic packaging, nor do they have the ability to easily source separate their ICI PPP materials (e.g., based on the type of activities, the ability to store materials). The data also highlights that if the success in ICI recycling is only measured by weight, then high recycling rates can be achieved with fibre alone, and that ICI plastic packaging recycling will be an unlikely a target of focused improvement. If ICI diversion targets are developed to encourage ICI PPP diversion, then those targets should be material specific to encourage more plastic packaging diversion.

8.3 There are Early Signs of Improvement for Flexible Packaging, but More Work is Needed

Flexible packaging continues to be recycled at significantly lower rates than rigid packaging due to the complexity involved in recycling this material, including challenges with its collection, sorting, and ultimate recycling. However, a switch from flexible to the more recyclable rigid packaging is not likely to solve this issue. CPP has documented that flexible packaging is the preferred packaging option for many producers because it:

- "provides a high product-to-packaging ratio;
- does not dent or shatter when dropped;
- is lighter weight than rigids (e.g., jars, cans, bottles);
- can reduce GHG emissions over heavier packaging materials and formats due to space savings granted during transport of flexible packaging (e.g., one truckload of product in flexible packaging accomplishes the same as 26 truckloads of rigid containers);
- has an ability to transport a substantial amount more of empty flexible packaging than what is possible with rigid packaging;
- requires less energy and water to produce flexible packaging than some other types of packaging materials and formats, therefore creates fewer GHG emissions; and
- can have its labeling information printed directly on the package as opposed to having an adhesive label added which (*sic*) may contaminate the recyclability of the package because it is lightweight".⁸¹

As a result, in 2023, CPP along with several partner organizations (i.e., Circular Materials, Circular Plastic Taskforce (CPT), Éco Entreprises Québec (ÉEQ), the Chemistry Industry Association of Canada (CIAC), The Recycling Partnership, and Recycle BC) launched its PRFLEX project,⁸² which is aimed at advancing the recycling of flexible plastics Canada-wide. This multi-year project has several phases. The first phase of this research identified the following issues, which the consortium is now working to overcome:

- Sorting facilities (e.g., MRFs) are unable to prepare the material for delivery to end-markets.

⁸¹ Canadian Plastics Pact. 2023. *Pathways to Mono-Material Plastic Packaging, Guidance Document – Version 1*. Available at: https://plasticspact.ca/wp-content/uploads/2023/04/PPP_Pathways-to-Mono-Material-Flexible-Plastic-Packaging--Guidance-Doc.pdf

⁸² GAPC CPT. n.d. Optimizing recycling of flexible plastic packaging in Canada. Available at: <https://gapc.ca/en/projects/prflex/>

- None of the existing plastics reprocessors currently have the capacity to recycle flexible PP.
- There is limited existing capability to recycle multi-material flexible packaging.
 - Multi-layer plastic packaging made of different resins or with incompatible barrier layers (e.g., metalized, nylon, PVDC) cannot be recycled with current technologies.
 - PVC, including in labels and inks contaminate, is not recyclable;
 - Plastic additives (e.g., degradable additives) impact the recycling process.
- Flexible packaging streams are often contaminated with paper, glass, and metal (i.e., either through attachments to flexible packaging or free floating in the recycling streams due to insufficient sortation) and this affects recycling yields.

8.4 Changes are Being Implemented Whose Impacts are Not Yet Realized -i.e., There Has Been Significant Expansion of Regulated Recycling Systems

Since the Foundational Report, there has been a significant expansion of EPR systems for PPP and for beverage containers. However, as these changes have not been fully implemented and their impact has yet to be seen in the data. The Canada-wide expansion of EPR for PPP and beverage containers will enable producers to harmonize the materials collected for recycling and build economies of scale to support recycling systems. In anticipation of these changes, PROs for residential PPP systems in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Québec, New Brunswick, and Nova Scotia have signed an agreement to develop a nationally integrated approach enable their transition to EPR.⁸³

Table 26 provides an overview of the changes made to EPR systems that manage plastic packaging since the Foundational Report. In addition to the changes listed, Newfoundland and Labrador and the Northwest Territories are consulting on future EPR systems for residential PPP, and British Columbia is consulting on opportunities to further divert ICI PPP.⁸⁴

The shift in policies across Canada will bring improvements to the collection and management of plastic packaging in the residential sector as well as DRS. This includes providing greater access to recycling for households and creating better economies of scale for the recycling of more difficult to manage materials like flexible plastics. However, it will be important to monitor to the implementation of these new policies to ensure they are achieving the intended objectives. As well, there may be opportunities to better align policies and oversight to:

- Reduce the amount of producers who may not be reporting or are underreporting the materials they supply into the market; and
- Rationalize the current data that is reported in by different entities to PROs or government entities, and the consolidated data that is posted publicly; and
- Ensure more consistency in the materials designated and the exemptions included.

⁸³ Circular Materials. 2023. *National integration for blue box in Canada*. Available at <https://www.circularmaterials.ca/news/national-integration/>

⁸⁴ Clean BC. 2024. Preventing Waste in British Columbia: Non-Residential Packaging & Paper Products Discussion Paper. Available at: https://engage.gov.bc.ca/app/uploads/sites/121/2024/04/Preventing-Waste-in-British-Columbia_Non-Residential-Packaging-and-Paper-Products_Discussion-Paper.pdf

Table 26: Expansion of provincial and territorial EPR systems managing plastic packaging since the Foundational Report, which looked at the 2019 data year.

| Province or Territory | EPR System | Change | Implementation Date |
|--|------------------------------|---|--|
| British Columbia ^{85, 86, 87} | Residential PPP | Amended Recycling Regulation to expand PPP system to include packaging-like products (e.g., food storage, sandwich, and freezer bags; plastic shrink film wrap; LDPE and HDPE drop sheets, bubble wrap, plastic plant pots and saucers) and short-term use and single-use products (e.g., disposable food storage containers). | EPR system in place since 2014. Updated system to include single-use plastics June 29, 2020 |
| | Residual products | Amended Recycling Regulation to require products to manage all empty containers whether used in the residential or ICI sector. | June 29, 2020 |
| | Beverage containers | Amended Recycling Regulation to add milk and plant-based beverages (e.g., soy, oat, and almond milk) to the DRS. Continues to exclude milk products that are included in Alberta, Saskatchewan, the territories (e.g., kefir, buttermilk). | February 1, 2022 |
| | Single-use plastic reduction | Single-Use and Plastic Waste Prevention Regulation passed. <ul style="list-style-type: none"> • Bans single-use plastic shopping bags. • Bans plastic disposable bundled food service accessories (e.g., fork, knife, napkins), restricts other accessories to by request, • Bans food service ware made from difficult to recycle plastics like compostable plastics, biodegradable plastics, PVC, EPS, and PVDC. • Bans oxo-degradable plastic packaging. | Effective December 20, 2023, with some implementation staggered. |

⁸⁵ Government of British Columbia, 2020. *2020 Amendments to the Recycling Regulation*. Available at: https://www2.gov.bc.ca/assets/gov/environment/waste-management/recycling/recycle/2020-06-29_explanatory_notes_to_reg_amendments.pdf

⁸⁶ Government of British Columbia. 2023. *Single-Use Plastic Waste Prevention Regulation*. Available at: https://www.bclaws.gov.bc.ca/civix/document/id/oic/oic_cur/0461_2023

⁸⁷ Government of British Columbia. 2024. *Preventing Waste in British Columbia: Non-Residential Packaging & Paper Products Discussion Paper*. Available at: https://engage.gov.bc.ca/app/uploads/sites/121/2024/04/Preventing-Waste-in-British-Columbia_Non-Residential-Packaging-and-Paper-Products_Discussion-Paper.pdf

| Province or Territory | EPR System | Change | Implementation Date |
|--------------------------------------|--|--|--|
| | ICI PPP | BC is consulting on actions to reduce ICI PPP disposal. The policy options include: 1) listing designated materials for recycling and supporting actions, 2) disposal bans, 3) reuse requirements, 4) standardized waste prevention and management actions for businesses and institutions, and 5) provincial standardized data and sharing. | Consulting on opportunities to improve ICI PPP collection and diversion. |
| Alberta ⁸⁸ | Residential PPP | Shifting from municipally controlled to EPR system. | Implementation complete by October 1, 2026 |
| | Hazardous and Special Products | Shifting from municipally controlled to EPR system. | Implementation complete by April 1, 2025 |
| Saskatchewan ^{89,90} | Residential PPP | Shifting from shared responsibility system to EPR system. | Implementation complete by 2027. |
| Manitoba ⁹¹ | Residential PPP + primary and secondary schools | Shifting from shared responsibility system to EPR system. | Regulation not yet amended. Transition to be determined |
| Ontario ⁹² | Residential PPP + long term care + nursing homes + primary and secondary schools + streetscape | Shifting from shared responsibility system to EPR system. | Implementation complete by 2026. |

⁸⁸ Government of Alberta. 2022. *Extended Producer Responsibility Regulation*. AR 194/2022. Available at: https://kings-printer.alberta.ca/1266.cfm?page=2022_194.cfm&leg_type=Regs&isbncln=9780779832873

⁸⁹ Government of Saskatchewan. 2023. *Household Packaging and Paper Stewardship Program Regulations*. E-10.22 Reg 9. Available at: <https://publications.saskatchewan.ca/#/products/120617>

⁹⁰ Multi-Material Stewardship Western. 2024. *Household Packaging and Paper Stewardship Plan*. Available at: <https://www.mmsk.ca/full-epr/>

⁹¹ Multi-Material Stewardship Manitoba. 2024. *Full EPR Transition Plan Development*. Available at: <https://stewardshipmanitoba.org/mmsm/full-epr-plan-development/#:~:text=Revised%20Draft%20Transition%20Plan%20%2D%20June%203%2C%202022&text=MMSM%20r%20submitted%20its%20draft%20Transition,Parcs%20on%20June%203%2C%202022>

⁹² Government of Ontario. 2021. *Blue Box Regulation*. Available at: <https://www.ontario.ca/laws/regulation/r21391>

| Province or Territory | EPR System | Change | Implementation Date |
|---|-------------------------|--|---|
| Québec ^{93, 94, 95, 96} | Residential + ICI PPP | Shifting from shared responsibility system for residential PPP to a full EPR system for all PPP regardless of the sector it is generated in. | The system must service the education sector as of 2025, other institutions and the commercial sector no later than 2027, and the industrial sector no later than 2032. |
| | Beverage containers DRS | Shifting to full EPR DRS to include all ready-to-serve beverage containers except flexible beverage packaging and packaging under 100ml and over 2L. | Phased implementation and Phase II will include new plastic containers. Phase II: March 1, 2025: adds containers made from glass, other breakables materials, plastic, ferrous metals, multilayered (e.g., cartons, juice boxes), bio-sourced). |
| | Agricultural Plastics | Amended Regulation respecting the recovery and reclamation of products by enterprises to include agricultural plastics. This regulation includes the widest array of agricultural plastics in Canada (e.g., maple syrup tubing). | June 30, 2023 (phase I) and June 30, 2025 (phase II). |

⁹³ Government of Québec. 2023. *Modernized Deposit-Refund*. Available at: <https://www.environnement.gouv.qc.ca/matieres/consigne-collecte/modernisation-consigne-en.htm>

⁹⁴ Dussault, M. 2022. *A Look at EPR across Canada the Evolution of EPR in Québec*. Available at: <https://swananorthernlights.org/wp-content/uploads/2022/04/2A-Marie-Dussault-EPR-in-Quebec.pdf>

⁹⁵ Government of Québec. 2024. *Regulation respecting the recovery and reclamation of products by enterprises. c Q-2, r. 40.1*. Available at: <https://www.legisquebec.gouv.qc.ca/en/document/cr/q-2,%20r.%2040.1>

⁹⁶ Government of Québec. 2024. *Regulation respecting the recovery and reclamation of products by enterprises*. Available at: <https://www.legisquebec.gouv.qc.ca/en/document/cr/q-2,%20r.%2040.1>

| Province or Territory | EPR System | Change | Implementation Date |
|--|--|---|--|
| New Brunswick ^{97, 98} | Residential PPP + primary and secondary schools | Shifting from municipally controlled to EPR system. | Implementation complete by 2026 |
| Nova Scotia ⁹⁹ | Residential PPP | Shifting from municipally controlled to EPR system. | Implementation complete by 2027 |
| Yukon Territory ^{100, 101} | Residential PPP + primary and secondary schools + small businesses | Shifting from municipally controlled to EPR system. | Regulation released. Transition to be determined |

8.5 There are Significant Barriers and Opportunities to Improve the Data Related to Plastic Packaging Flows

Data availability and discrepancies remain major challenges to properly assess plastic packaging flows across Canada.

- Data availability – While a substantial amount of data are available across the plastics packaging value chain, it does not necessarily mean that the data are accessible. Data accessibility in plastic packaging value chain is hindered by lack of:
 - incentives to openly share data, which is considered a commercially valuable asset;
 - consensus on which format data should be collected; and
 - clarity on which data are relevant at a system-level.
- Data discrepancies - When there is a void of common standards, formats, and systems to collect data, combining that data often requires significant expenditures of resources and there are challenges with transforming it into useable format. Canada’s current data collection and management approach is disjointed with:
 - Regulations (e.g., EPR and DRS) that lack consistency in standard data requirements, conversion factors, definitions, and material categories.

⁹⁷ Government of New Brunswick. Designated Materials Regulation. Available at: <https://laws.gnb.ca/en/tdm/cr/2008-54>

⁹⁸ Circular Materials, 2023. New Brunswick Stewardship Plan for Packaging and Paper. Available at: <https://www.recyclenb.com/static/site-content/files/management-plans/circular-materials/cm-nb-stewardship-plan-for-packaging-paper-new.pdf>

⁹⁹ Government of Nova Scotia. Extended Producer Responsibility for Packaging, Paper Products and Packaging-Like Products Regulations. NS Regulation 139/2023. Available at: <https://novascotia.ca/just/regulations/regs/envpppextproducer.htm>

¹⁰⁰ Government of Yukon, 2023. Extended Producer Responsibility (EPR) in the Yukon. Available at: <https://yukon.ca/en/engagements/extended-producer-responsibility-epr-yukon>

¹⁰¹ Government of Yukon. Extended Producer Responsibility Regulation. Available at: <https://laws.yukon.ca/cms/images/LEGISLATION/SUBORDINATE/2024/2024-0019/2024-0019.pdf>

- Waste composition studies and waste audits that are undertaken by different entities (i.e., governments and ICI) that lack consistency in scope and definitions.
- A lack of a standard to guide the reporting provided by waste service providers to generators to ensure the data received by generators is in a form that provides information in a form capable of informing improvements in generator waste management systems, and especially recycling rates.

This issue will be addressed in a separate report (CPP Data Current State Review and Roadmap Forward) in more detail.

APPENDIX A: ACRONYMS

| Acronyms | Meaning |
|--------------|---|
| AB | Alberta |
| AC | Atlantic Canada |
| ABCRC | Alberta Beverage Container Recycling Corporation |
| B2B | Business to business |
| BC | British Columbia |
| CBCRA | Canadian Beverage Container Recycling Association |
| CIAC | Chemistry Industry Association of Canada |
| CIF | Continuous Improvement Fund |
| CPP | Canada Plastics Pact |
| CPT | Circular Plastic Taskforce |
| DRS | Deposit return system |
| ECCC | Environment and Climate Change Canada |
| ÉEQ | Éco Entreprises Québec |
| EPR | Extended producer responsibility |
| EPS | Expanded polystyrene |
| FIBC | Flexible intermediate bulk container |
| FTE | Fulltime equivalent |
| HDPE | High density polyethylene |
| LDPE | Low-density polyethylene |
| ICI | Industrial, commercial, and institutional |
| MB | Manitoba |
| MRF | Materials recovery facility |
| MRP | Mixed rigid plastic |
| MT | Metric tonne |
| NAICS | North American Industry Classification System |
| OCC | Old corrugated cardboard or old corrugated carton |
| ON | Ontario |
| PCR | Post-consumer recycled content |
| PET | Polyethylene terephthalate |
| PLA | Polylactic acid |
| PP | Polypropylene |

| Acronyms | Meaning |
|---------------|--|
| PRFLEX | Perfecting The Recycling System for Flexible Plastic Packaging in Canada |
| PRO | Producer responsibility organization |
| PS | Polystyrene |
| PVC | Polyvinyl chloride |
| PVDC | Polyvinylidene chloride, or polyvinylidene dichloride |
| TR | Territories |
| QC | Québec |
| RPRA | Resource Recovery Productivity Authority |
| SK | Saskatchewan |
| SO | Stewardship Ontario |

APPENDIX B: TERMS & DEFINITIONS

| Terms | Definitions |
|--------------------------------------|---|
| Anaerobic digestion | The breakdown of an organic chemical compound by micro-organisms in the absence of oxygen to carbon dioxide, methane, mineral salts, and new biomass. |
| Chemical recycling | “Chemical recycling techniques can be broadly separated into three categories: solvent purification, decomposition (chemical depolymerization), and conversion (thermal depolymerization). Solvent purification is like mechanical recycling in that the polymers making up the plastic feedstock remain in their original state. The depolymerization techniques, however, aim to break down the polymers within the plastic feedstock into shorter “monomers” (single unit) or “oligomers” (several monomer units), before restoring them back into their polymer chains.” ¹⁰² |
| Collected | Plastic packaging received from a consumer, whether residential, business, or institutional, following the consumer’s use. <ul style="list-style-type: none"> • Referred as collection of plastic waste.¹⁰³ |
| Collection rate | Materials collected as a percentage of materials generated. |
| Composted | The breakdown of an organic chemical compound by micro-organisms in the presence of oxygen to carbon dioxide, water, and mineral salts of any other elements present (mineralization) and new biomass. |
| End-market | A facility that receives sorted material as feedstock for the manufacture of products, packaging, materials, or substances. This is often otherwise referred to as the secondary or downstream processor. In this report, an end-market for plastics is referred to as a reprocessor . |
| Generated | Plastic packaging supplied to consumers and available for collection from consumers. |
| Inbound | Plastic packaging received by a processing facility. |
| Marketed | Has the same meaning as sorted. |
| Other rigid plastic packaging | Means non-bottle rigid plastic packaging made from resins other than PET and HDPE such as EPS, PP, PS, and PVC. |
| Outbound | Means plastic packaging as shipped from a processing facility. |
| Plastic packaging | All products made of plastic used for the containment, protection, handling, delivery, and presentation of goods, from |

¹⁰² CSA Group, 2021. Defining Recycling in the Context of Plastics. Available at: <https://www.csagroup.org/wp-content/uploads/CSA-Group-Research-Defining-Recycling-in-the-Context-of-Plastics.pdf>

¹⁰³ Environment and Climate Change Canada (ECCC). 2019. Economic study of the Canadian plastic industry, markets and waste: summary report to Environment and Climate Change Canada. Available at: <https://publications.gc.ca/site/eng/9.871296/publication.html>

| Terms | Definitions |
|---------------------------------------|---|
| | raw materials to processed goods, from the producer to the user or the consumer. ¹⁰⁴ This includes packaging-like products (e.g., cups or bags sold as a product to the consumer) and other single-use plastics (e.g., plastic cutlery, straws, plastic drop sheet or covering). |
| Processor | Includes both primary processors that sort plastic packaging (i.e., MRF) and secondary or downstream processors that recycle the sorted plastics (i.e., plastics reprocessor). Note some materials may bypass the primary processor if they are already segregated. |
| Recycled | Means plastic packaging that is reprocessed into products, packaging, materials, or substances whether for the original or other purposes but excluding energy recovery. Whether packaging was recycled in a closed or open loop was not assessed. This is also referred to as reprocessing yield. ¹⁰⁵ |
| Recycling rate | Materials recycled as a percentage of materials generated. |
| Reprocessor | See end-market. |
| Sorted | Means plastic packaging that is sorted and prepared for shipment to an end-market. Note that shipments typically include a proportion of contamination. Referred to in the ECCC plastic study (2019) as the sorting yield. |
| Sorting rate | Materials sorted as a percentage of materials collected. |
| Supplied | Means plastic packaging that is sold, leased, donated, disposed of, used, transferred the possession of or title of, or otherwise made available to a consumer or distributed for use by a consumer. Producers report on packaging supplied as part of deposit return system and producer responsibility requirements. Note that the amount of materials generated may be different than supplied due to regulatory exemptions (e.g., de minimis), failure of obligated producers to report (e.g., free-riders) or producer reporting errors. |
| Unclassified plastic packaging | Means plastic packaging for which data by resin was not available. |

¹⁰⁴ Adapted from <https://wrap.org.uk/sites/default/files/2020-12/European-Plastics-Pact-Roadmap.pdf>

¹⁰⁵ Environment and Climate Change Canada (ECCC), 2019. Economic study of the Canadian plastic industry, markets and waste: summary report to Environment and Climate Change Canada. Available at: <https://publications.gc.ca/site/eng/9.871296/publication.html>

APPENDIX C: ICI PPP FLOW BY JURISDICTION AND BY SUBSECTOR

Appendix C provides a summary of the modelled outputs of the CPP ICI 2022 Estimate for packaging, packaging-like products, and paper products (i.e., fibre, plastic, metal, and glass PPP), including:

- generation;
- disposed;
- collected for recycling; and
- detail for each ICI subsector.

ICI PPP Flow – Generated by Jurisdiction

Table 27 provides a modelled estimate of ICI PPP waste generation by material sub-category Canada-wide. The relative contribution of the major categories of PPP is estimated as follows:

- 74% fibre;
- 21% plastic, including 10% film and 10% rigid plastic;
- 2% metal; and
- 2% glass.

The table also shows, not surprisingly given Canada's population dispersion, that on an absolute weight basis Ontario and Québec generate the most ICI PPP waste and the Territories and Atlantic Canada generate the least.

Table 27: Quantity of PPP generated by jurisdiction.

| | Fibre PPP (MT) | | Plastic PPP (MT) | | | | Metal PPP (MT) | | Glass PPP (MT) | Total (MT) |
|-----------|----------------|-------------|------------------|--------|--------|-------------|----------------|-------|----------------|------------|
| | OCC/ Boxboard | Mixed Paper | Film | HDPE | PET | Other Rigid | Aluminum | Steel | Bottles | |
| BC | 228,095 | 237,825 | 63,561 | 11,664 | 15,290 | 39,598 | 8,682 | 8,422 | 17,706 | 630,842 |
| AB | 193,124 | 197,180 | 58,016 | 9,959 | 12,185 | 31,651 | 6,659 | 6,267 | 14,267 | 529,308 |
| SK | 44,392 | 47,251 | 22,023 | 3,648 | 2,963 | 8,652 | 1,610 | 1,560 | 3,301 | 135,399 |

| | Fibre PPP (MT) | | Plastic PPP (MT) | | | | Metal PPP (MT) | | Glass PPP (MT) | Total (MT) |
|-----------|----------------|-------------|------------------|--------|---------|-------------|----------------|--------|----------------|------------|
| | OCC/ Boxboard | Mixed Paper | Film | HDPE | PET | Other Rigid | Aluminum | Steel | Bottles | |
| MB | 62,717 | 62,391 | 19,402 | 3,487 | 3,975 | 11,025 | 2,086 | 1,997 | 4,203 | 171,284 |
| ON | 686,289 | 685,910 | 185,728 | 32,007 | 42,838 | 117,146 | 22,612 | 20,735 | 41,771 | 1,835,037 |
| QC | 417,846 | 407,047 | 111,173 | 19,336 | 25,461 | 72,419 | 13,210 | 12,220 | 24,266 | 1,102,980 |
| AC | 103,980 | 106,676 | 27,251 | 5,200 | 6,744 | 17,905 | 3,635 | 3,549 | 7,181 | 282,123 |
| TR | 4,373 | 4,706 | 779 | 191 | 313 | 629 | 148 | 130 | 518 | 11,787 |
| CA | 1,740,816 | 1,748,986 | 487,287 | 85,374 | 109,771 | 298,519 | 58,641 | 54,880 | 113,214 | 4,697,489 |

ICI PPP Flow – Disposed by Jurisdiction and by Subsectors

Table 28 provides a modelled estimate of ICI PPP waste disposed by material sub-category Canada-wide. The relative contribution of the major categories of PPP is estimated as follows:

- 59% fibre;
- 36% plastic, including 20% film and 16% rigid plastic;
- 3% metal; and
- 2% glass.

Consistent with the ICI PPP generation, the relative contributions for absolute tonnage of ICI PPP disposed Canada-wide follow the order of most to least populous provinces and regions.

Table 28: Quantity of ICI PPP disposed by jurisdiction.

| | Fibre PPP (MT) | | Plastic PPP (MT) | | | | Metal PPP (MT) | | Glass PPP (MT) | Total (MT) |
|-----------|----------------|-------------|------------------|--------|--------|---------------|----------------|--------|----------------|------------|
| | OCC / Boxboard | Mixed Paper | Film | HDPE | PET | Other - Rigid | Aluminum | Steel | Bottles | |
| BC | 39,973 | 138,017 | 57,116 | 8,074 | 9,242 | 30,359 | 5,943 | 5,568 | 7,429 | 301,721 |
| AB | 33,280 | 113,994 | 51,920 | 6,805 | 7,085 | 23,731 | 4,418 | 4,011 | 5,839 | 251,083 |
| SK | 7,049 | 27,810 | 19,617 | 2,680 | 1,691 | 6,070 | 1,042 | 932 | 1,364 | 68,254 |
| MB | 9,891 | 34,084 | 16,970 | 2,465 | 2,377 | 8,046 | 1,336 | 1,182 | 1,719 | 78,070 |
| ON | 108,818 | 382,937 | 161,374 | 21,585 | 25,953 | 88,948 | 14,676 | 13,137 | 18,633 | 836,061 |
| QC | 65,935 | 225,578 | 95,553 | 13,074 | 15,512 | 54,803 | 8,451 | 7,454 | 10,893 | 497,252 |
| AC | 16,710 | 61,144 | 23,990 | 3,492 | 3,985 | 13,334 | 2,356 | 2,125 | 3,031 | 130,166 |
| TR | 705 | 2,510 | 724 | 115 | 139 | 460 | 83 | 67 | 138 | 4,940 |
| CA | 282,361 | 986,074 | 426,617 | 58,173 | 65,984 | 225,244 | 38,304 | 34,476 | 49,046 | 2,166,278 |

Table 29 shows that PPP makes up an average of 21% of the total waste disposed in the ICI sector and ranges from 17-24% of the total ICI waste disposed Canada-wide. The relative contribution of the major categories of PPP is estimated as follows:

- 11% fibre, ranging from 10-12%;
- 7% plastic, ranging from a low of 4% in the territories to a high of 10% in Saskatchewan; and
- glass and metal contributing negligibly to the PPP disposal stream at 1% or less each.

Table 29: Proportion of ICI disposal stream that is PPP by jurisdiction and material sub-category.

| | Fibre | | Plastic | | | | Metal | | Glass | Total |
|-----------|----------------|-------------|---------|------|------|-------------|----------|-------|---------|-------|
| | OCC / Boxboard | Mixed Paper | Film | HDPE | PET | Other Rigid | Aluminum | Steel | Bottles | |
| BC | 2.4% | 8.3% | 3.4% | 0.5% | 0.6% | 1.8% | 0.4% | 0.3% | 0.4% | 18.2% |
| AB | 2.3% | 7.9% | 3.6% | 0.5% | 0.5% | 1.6% | 0.3% | 0.3% | 0.4% | 17.3% |
| SK | 2.3% | 9.0% | 6.4% | 0.9% | 0.5% | 2.0% | 0.3% | 0.3% | 0.4% | 22.1% |
| MB | 2.5% | 8.8% | 4.4% | 0.6% | 0.6% | 2.1% | 0.3% | 0.3% | 0.4% | 20.1% |
| ON | 2.6% | 9.0% | 3.8% | 0.5% | 0.6% | 2.1% | 0.3% | 0.3% | 0.4% | 19.7% |
| QC | 2.6% | 8.9% | 3.8% | 0.5% | 0.6% | 2.2% | 0.3% | 0.3% | 0.4% | 19.5% |
| AC | 2.5% | 9.0% | 3.5% | 0.5% | 0.6% | 2.0% | 0.3% | 0.3% | 0.4% | 19.2% |
| TR | 2.1% | 7.5% | 2.2% | 0.3% | 0.4% | 1.4% | 0.2% | 0.2% | 0.4% | 14.7% |
| CA | 2.5% | 8.7% | 3.8% | 0.5% | 0.6% | 2.0% | 0.3% | 0.3% | 0.4% | 19.2% |

The lower amount of plastic PPP in the disposal stream in the territories and higher amount in Saskatchewan are a result of differences in economic activity (i.e., subsectors that contribute lower or higher amounts of plastic PPP to the disposal stream, such as agriculture, health care and trade).

Figure 19 shows that there is a fairly consistent percentage of PPP in the disposal stream across jurisdictions and there is also a high variability in the relative proportion of PPP disposed compared to non-PPP waste amongst businesses.

Figure 19: Proportion of the ICI disposal stream that is PPP by jurisdiction with data confidence intervals.

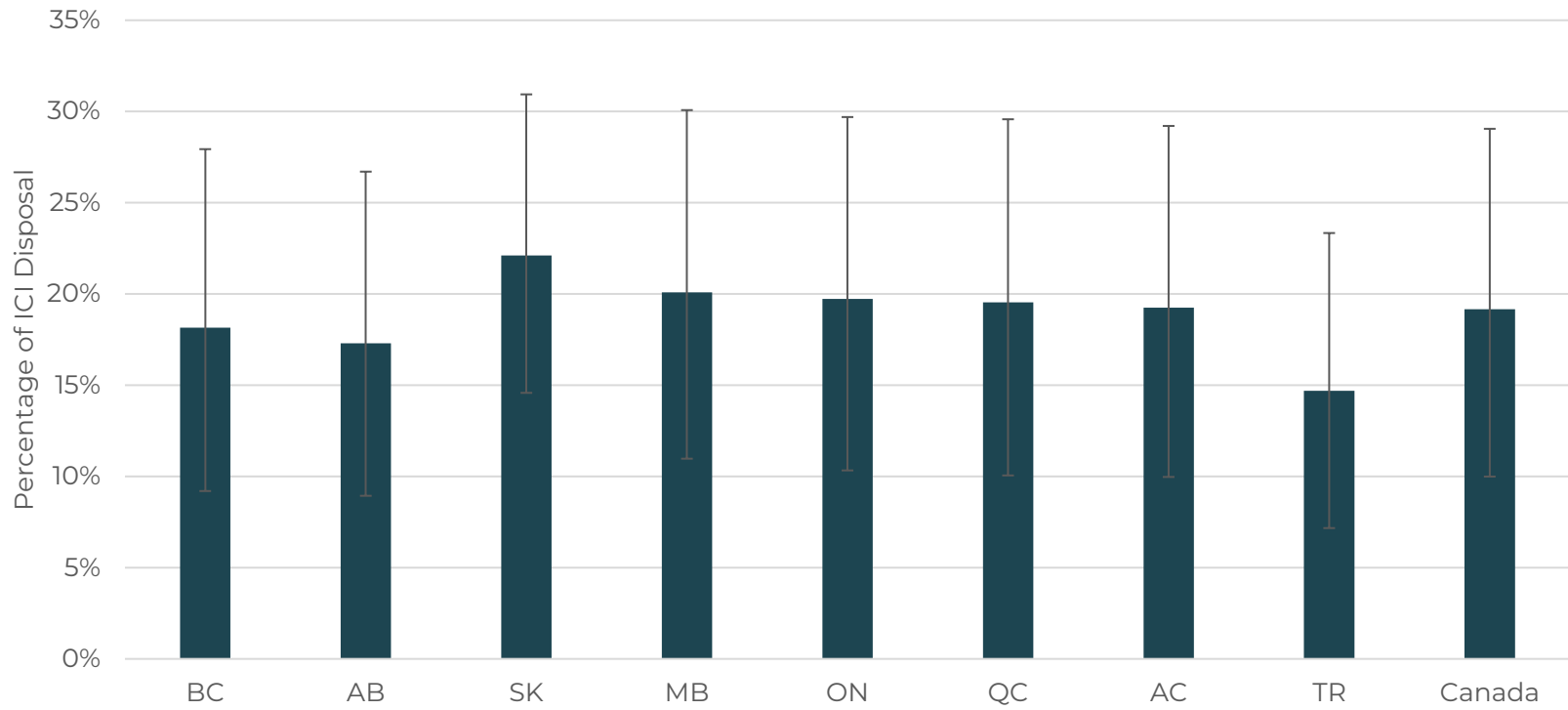


Figure 20 shows that there is high variability in the relative proportion of PPP disposed compared to non-PPP waste amongst businesses.

Figure 20: Proportion of ICI disposal stream that is PPP with data confidence intervals.

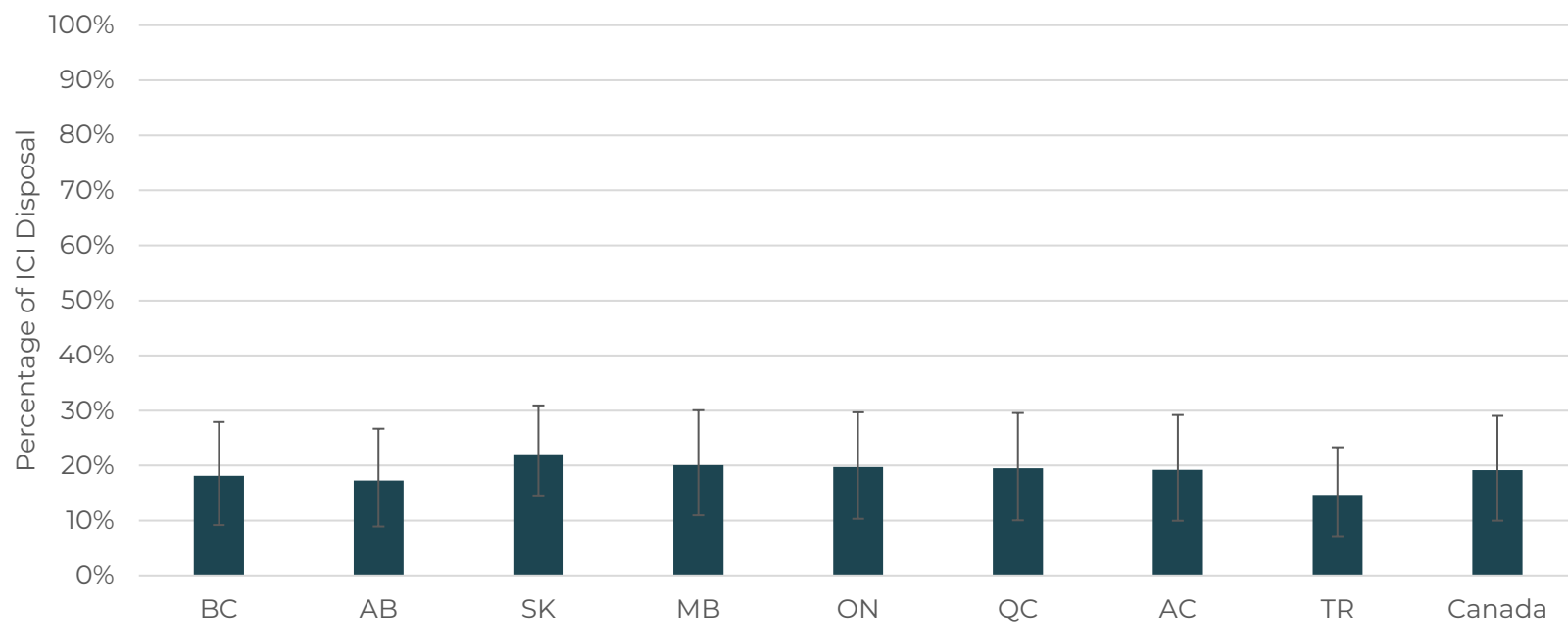


Table 30 shows the relative contribution of the major categories of PPP in the disposal stream, excluding the agriculture subsector, is estimated as follows:

- 59% fibre ranging from 42% in the Accommodation subsector to 83% in the Trade subsector;
- 36% plastic (20% flexible and 16% rigid) ranging from a low of 14% in the Trade subsector to a high of 47% in the Administration and Office subsector; and
- 4% metal; and
- 2% glass.

The high rate of plastic PPP in the disposal stream in the Administration and Office subsector may be the result of lower amounts of other materials like organic waste.

Note that the proportional data for the Agricultural subsector should not be compared directly to the other subsectors. These data were provided by Cleanfarms, which has the most comprehensive data set on agricultural PPP in Canada. However, Cleanfarms waste audits only assessed plastic waste, and so the proportion fibre, glass, and metal were not recorded.

Table 30 shows that in the Agricultural subsector, the vast majority (i.e., 65%) of the plastics collected are film.

Table 30: The relative proportion of ICI PPP in the disposal stream by material sub-category.

| ICI Subsector | Fibre | | Plastic packaging | | | | Metal packaging | | Glass | Total |
|--|----------------|-------------|-------------------|------|-----|-------------|-----------------|-------|---------------|-------|
| | OCC / Boxboard | Mixed Paper | Film | HDPE | PET | Other Rigid | Aluminum | Steel | Glass Bottles | |
| Agriculture* | 0% | 0% | 65% | 9% | 0% | 26% | 0% | 0% | 0% | 100% |
| Construction | 55% | 23% | 6% | 0% | 0% | 11% | 1% | 1% | 2% | 100% |
| Manufacturing | 18% | 29% | 28% | 3% | 5% | 14% | 1% | 1% | 1% | 100% |
| Trade | 4% | 79% | 8% | 1% | 1% | 4% | 1% | 0% | 2% | 100% |
| Transportation & Warehousing | 6% | 63% | 17% | 0% | 0% | 13% | 0% | 0% | 0% | 100% |
| Administration and offices | 10% | 41% | 28% | 2% | 2% | 15% | 1% | 0% | 1% | 100% |
| Educational Services | 12% | 46% | 14% | 2% | 8% | 12% | 3% | 2% | 2% | 100% |
| Health Care & Social Assistance | 14% | 39% | 10% | 3% | 4% | 25% | 2% | 1% | 2% | 100% |
| Arts, Entertainment, Recreation | 14% | 35% | 11% | 4% | 8% | 10% | 7% | 2% | 9% | 100% |
| Accommodation | 17% | 28% | 5% | 10% | 12% | 6% | 4% | 2% | 16% | 100% |
| Food services | 10% | 34% | 28% | 4% | 4% | 7% | 4% | 5% | 3% | 100% |
| Average** | 13% | 46% | 20% | 3% | 3% | 10% | 2% | 2% | 2% | 100% |

*Agriculture data were provided by Cleanfarms. Their audits did not measure fibre, glass, or metal.

**Average excludes the Agricultural subsector

ICI PPP Flow – Collected for Recycling Stream

Table 31 provides modelled estimate of PPP collected for recycling by material subcategory Canada-wide. The relative contribution of the major categories of PPP is estimated as follows:

- 88% fibre;
- 8% plastic, including 2% film and 6% rigid plastic;
- 2% metal; and
- 3% glass.

Table 31: Quantity of ICI PPP collected for recycling by jurisdiction.

| | Fibre | | Plastic | | | | Metal | | Glass | Total |
|-----------|----------------|-------------|---------|--------|--------|---------------|----------|--------|---------|-----------|
| | OCC / Boxboard | Mixed Paper | Film | HDPE | PET | Other - Rigid | Aluminum | Steel | Bottles | |
| BC | 188,121 | 99,808 | 6,445 | 3,590 | 6,048 | 9,238 | 2,739 | 2,854 | 10,277 | 329,121 |
| AB | 159,843 | 83,186 | 6,096 | 3,154 | 5,100 | 7,920 | 2,241 | 2,256 | 8,428 | 278,225 |
| SK | 37,343 | 19,441 | 2,406 | 968 | 1,273 | 2,582 | 568 | 627 | 1,937 | 67,145 |
| MB | 52,826 | 28,307 | 2,432 | 1,022 | 1,599 | 2,979 | 750 | 815 | 2,484 | 93,213 |
| ON | 577,471 | 302,973 | 24,354 | 10,422 | 16,886 | 28,197 | 7,936 | 7,599 | 23,138 | 998,976 |
| QC | 351,912 | 181,470 | 15,620 | 6,262 | 9,949 | 17,617 | 4,759 | 4,766 | 13,374 | 605,728 |
| AC | 87,270 | 45,531 | 3,262 | 1,708 | 2,760 | 4,572 | 1,280 | 1,424 | 4,150 | 151,957 |
| TR | 3,668 | 2,196 | 55 | 76 | 174 | 169 | 66 | 63 | 380 | 6,847 |
| CA | 1,458,455 | 762,912 | 60,670 | 27,201 | 43,787 | 73,275 | 20,337 | 20,404 | 64,168 | 2,531,211 |

Consistent with the PPP generation, the relative contributions for absolute tonnage of PPP collected for recycling Canada-wide follow the order of most to least populous provinces and regions. However, these results also show that unlike the data for disposal, fibre makes up a significantly greater relative share of the material in the collected for recycling stream. While plastic makes up 21% of the PPP generated and 36% of the PPP disposed, it only makes up 8% of the material collected for recycling.

Table 32 shows that PPP makes up an average of 61% of the waste collected for recycling with a range of 60-70% across the jurisdictions, with:

- fibre making up the majority of the PPP stream averaging 53% ranging from 53-60%;
- plastic making up an average of 5% ranging from a low of 5% to a high of 7%; and
- glass and metal contributing similar amounts to the PPP collected for recycling stream at 1-2% or less each.

Table 32: Proportion of ICI collected for recycling that is PPP by jurisdiction and material sub-category.

| | Fibre | | Plastic | | | | Metal | | Glass | Total |
|-----------|----------------|-------------|---------|------|------|-------------|----------|-------|---------------|-------|
| | OCC / Boxboard | Mixed Paper | Film | HDPE | PET | Other Rigid | Aluminum | Steel | Glass Bottles | |
| BC | 35.6% | 18.9% | 1.2% | 0.7% | 1.1% | 1.7% | 0.5% | 0.5% | 1.9% | 62.2% |
| AB | 36.1% | 18.8% | 1.4% | 0.7% | 1.2% | 1.8% | 0.5% | 0.5% | 1.9% | 62.9% |
| SK | 35.4% | 18.4% | 2.3% | 0.9% | 1.2% | 2.4% | 0.5% | 0.6% | 1.8% | 63.6% |
| MB | 34.4% | 18.5% | 1.6% | 0.7% | 1.0% | 1.9% | 0.5% | 0.5% | 1.6% | 60.8% |
| ON | 34.8% | 18.3% | 1.5% | 0.6% | 1.0% | 1.7% | 0.5% | 0.5% | 1.4% | 60.2% |
| QC | 34.6% | 17.9% | 1.5% | 0.6% | 1.0% | 1.7% | 0.5% | 0.5% | 1.3% | 59.6% |
| AC | 35.3% | 18.4% | 1.3% | 0.7% | 1.1% | 1.8% | 0.5% | 0.6% | 1.7% | 61.4% |
| TR | 37.2% | 22.3% | 0.6% | 0.8% | 1.8% | 1.7% | 0.7% | 0.6% | 3.9% | 69.5% |
| CA | 35.0% | 18.3% | 1.5% | 0.7% | 1.1% | 1.8% | 0.5% | 0.5% | 1.5% | 60.8% |

Figure 21: Proportion of the ICI collected for recycling stream that is PPP by jurisdiction with data confidence intervals.

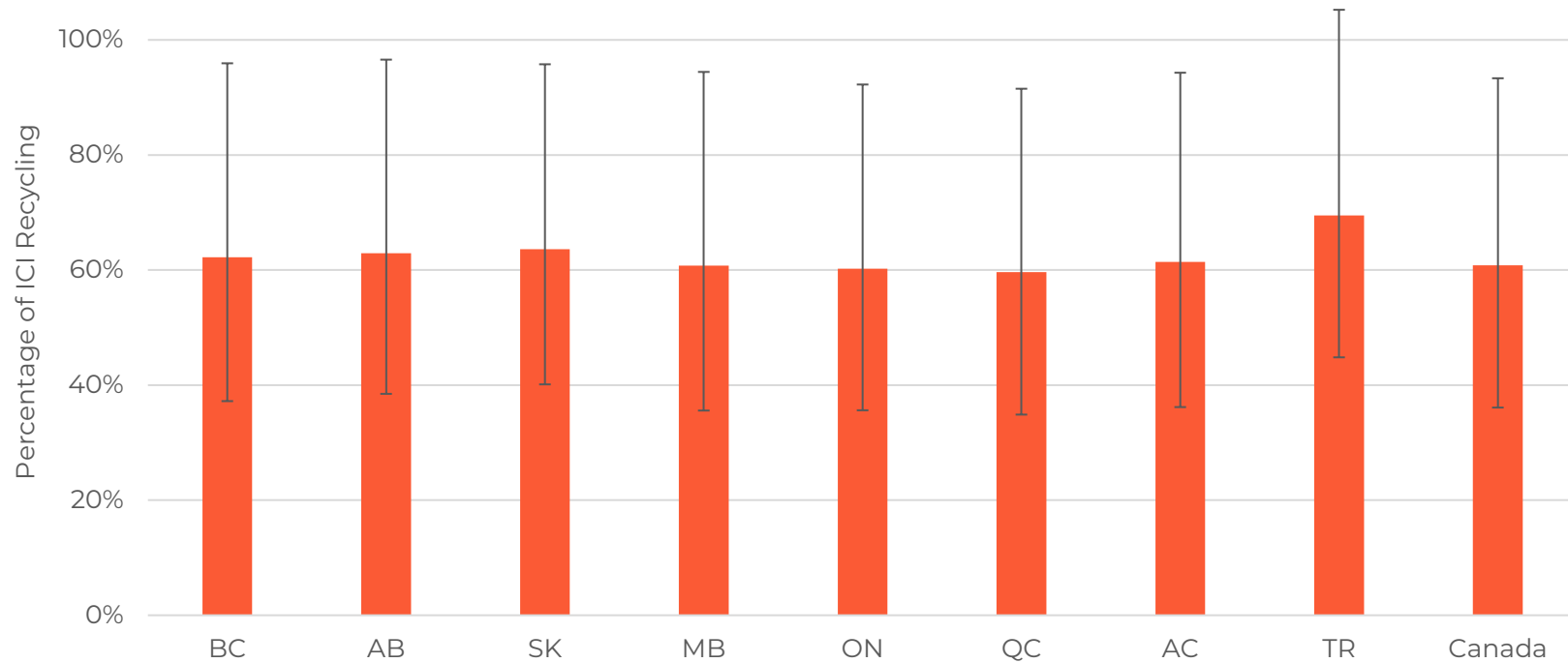


Figure 22 presents an overview of the percentage by weight of PPP, per material category, in the collected for recycling stream by jurisdiction. These results show that there is consistency in the relative contribution of each PPP category (i.e., fibre, plastic, metal, and glass) in the collected for recycling stream Canada-wide. In all cases, fibre and plastic comprise the majority of the PPP collected for recycling, followed by smaller amounts of metal and glass.

Figure 22: Proportion of the ICI collected for recycling stream that is PPP by material and ICI Subsector.

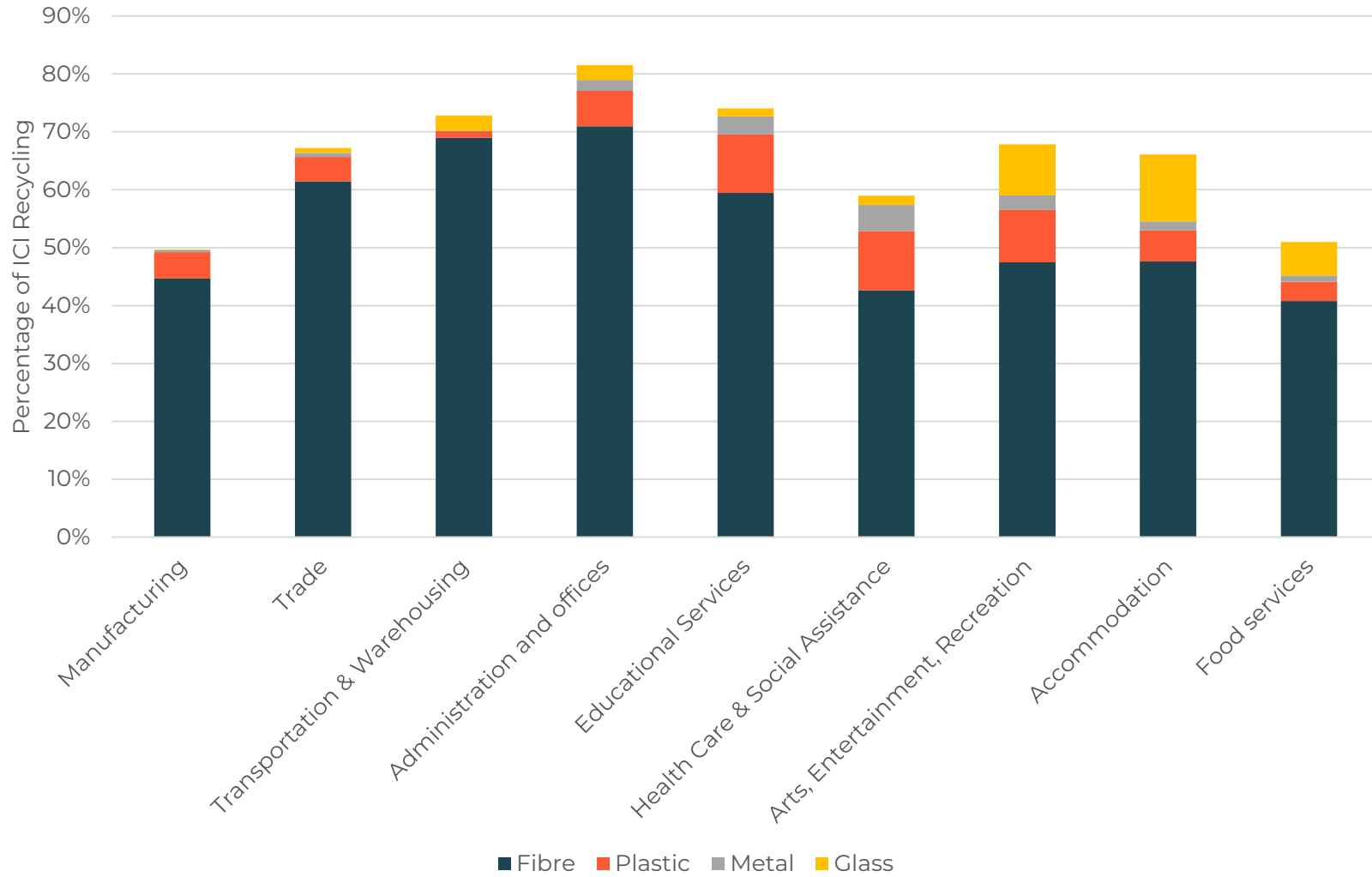


Table 33 shows the relative contribution of the major categories of PPP in the collected for recycling stream, excluding the Agriculture and Construction subsectors, is estimated as follows:

- 88% fibre ranging from 70% in the Arts, Entertainment, and Recreation subsector to 95% in the Transportation & Warehousing subsector;
- 8% plastic (2% film and 6% rigid) ranging from a low of 2% in the Transportation & Warehousing subsector to a high of 17% in the Health Care & Social Assistance subsector;
- 3% glass ranging from a low of under 1% in the Manufacturing subsector to a high of 17% in the Accommodation subsector; and
- 2% metal ranging from a low of under 1% in the Transportation & Warehousing subsector to a high of 8% in the Health Care & Social Assistance subsector.

The proportional data for the Agricultural and Construction subsectors should not be compared directly to the other subsectors. The Agriculture data were provided by Cleanfarms and is the most comprehensive dataset on agricultural PPP in Canada. However, their data only looked at plastic waste and so the proportion fibre, glass, and metal were not recorded and are not comparable. Likewise, the C&D waste audit data received did not contain a complete audit of the collected for recycling stream; only OCC was measured.

Table 33: The relative proportion PPP in the collected for recycling stream by material sub-category.

| | Paper | | Plastic | | | | Metal | | Glass | Sum of PPP |
|---|----------------|-------------|---------|------|-----|-------------|---------------------|------------------|--------------------------|------------|
| | OCC / Boxboard | Mixed Paper | Film | HDPE | PET | Other Rigid | Aluminum containers | Steel containers | Recyclable Glass Bottles | |
| Agriculture* | 0% | 0% | 48% | 12% | 0% | 40% | 0% | 0% | 0% | 100% |
| Construction** | 100% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| Manufacturing | 61% | 28% | 5% | 0% | 1% | 3% | 1% | 0% | 0% | 100% |
| Trade | 67% | 24% | 1% | 2% | 2% | 2% | 1% | 0% | 1% | 100% |
| Transportation & Warehousing | 50% | 44% | 1% | 0% | 0% | 1% | 0% | 0% | 4% | 100% |
| Administration and offices | 37% | 50% | 1% | 1% | 3% | 3% | 2% | 1% | 3% | 100% |
| Educational Services | 29% | 52% | 1% | 1% | 7% | 4% | 2% | 2% | 2% | 100% |

| | Paper | | Plastic | | | | Metal | | Glass | Sum of PPP |
|--|----------------|-------------|-----------|-----------|-----------|-------------|---------------------|------------------|--------------------------|-------------|
| | OCC / Boxboard | Mixed Paper | Film | HDPE | PET | Other Rigid | Aluminum containers | Steel containers | Recyclable Glass Bottles | |
| Health Care & Social Assistance | 43% | 29% | 2% | 2% | 3% | 10% | 2% | 6% | 3% | 100% |
| Arts, Entertainment, Recreation | 28% | 42% | 2% | 1% | 8% | 3% | 3% | 1% | 13% | 100% |
| Accommodation | 45% | 27% | 0% | 1% | 5% | 2% | 1% | 1% | 17% | 100% |
| Food services | 43% | 37% | 0% | 1% | 2% | 3% | 1% | 1% | 11% | 100% |
| Average*** | 58% | 30% | 2% | 1% | 2% | 3% | 1% | 1% | 3% | 100% |

*Agriculture data were provided by Cleanfarms. Their audits did not measure fibre, glass, or metal.

** Construction data received did not include a full PPP audit of the C&D stream. Only OCC was measured.

*** Average excludes the Agricultural and Construction subsectors.

Figure 23 shows that there is high variability in the relative proportion of PPP disposed compared to non-PPP waste amongst businesses in each ICI subsector.

Figure 23: Proportion of collected for recycling that is PPP with data confidence intervals.

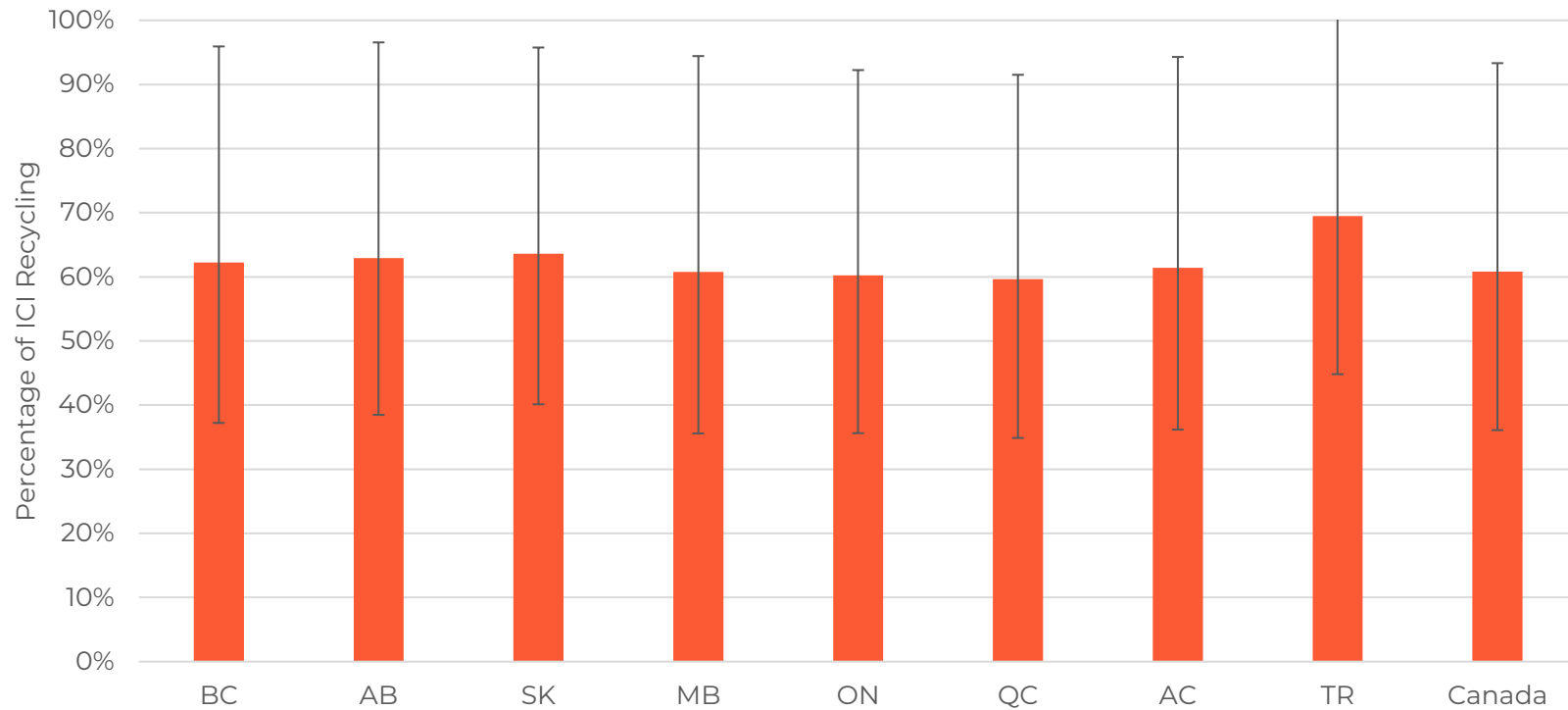


Table 34 shows the quantity of PPP makes up an average of 22% of the waste collected for recycling with a range of 19-24% of the ICI waste collected for recycling across the jurisdictions, with:

- an estimated 2,221,367 tonnes fibre PPP with over 65% being collected from the manufacturing and trade subsectors;
- an estimated 204,993 tonnes of plastic PPP with 60% being collected from the manufacturing and trade subsectors;
- an estimated 40,741 tonnes of metal PPP, which is relatively evenly collected across sectors.
- an estimated 64,168 tonnes of glass PPP with over 60% being collected from the accommodation, food service and retail trade subsectors.

Table 34: Quantity of PPP collected for recycling by subsector.

| | Fibre | | Plastic packaging | | | | Metal packaging | | Glass | Total |
|--|------------------|----------------|-------------------|--------|--------|----------------|-----------------|--------|------------------|-----------|
| | OCC/ Boxboard | Mixed Paper | Film | HDPE | PET | Other Rigid | Aluminum | Steel | Glass Bottles | |
| Agriculture | - | - | 2,621 | 634 | - | 2,204 | - | - | - | 5,459 |
| Construction | 60,180 | - | - | - | - | - | - | - | - | 60,180 |
| Manufacturing | 478,870 | 221,592 | 40,517 | 3,760 | 6,333 | 20,873 | 3,987 | 1,477 | 1,859 | 779,266 |
| Trade | 553,385 | 202,141 | 9,050 | 14,153 | 13,671 | 14,876 | 5,060 | 3,464 | 10,570 | 826,370 |
| Transportation & Warehousing | 106,462 | 94,204 | 1,851 | 90 | 214 | 1,176 | 114 | 44 | 7,658 | 211,812 |
| Administration and offices | 65,552 | 89,070 | 974 | 1,887 | 5,152 | 5,291 | 2,696 | 1,450 | 5,522 | 177,595 |
| Educational Services | 17,291 | 30,566 | 905 | 690 | 4,465 | 3,034 | 1,533 | 1,059 | 2,019 | 61,562 |
| Health Care & Social Assistance | 83,946 | 55,579 | 3,838 | 3,732 | 5,695 | 20,263 | 3,976 | 10,765 | 5,225 | 193,020 |
| Arts, Entertainment, Recreation | 4,750 | 7,066 | 318 | 157 | 1,357 | 424 | 450 | 177 | 2,190 | 16,888 |
| Accommodation | 48,591 | 29,534 | 200 | 746 | 5,514 | 2,380 | 1,450 | 1,077 | 18,913 | 108,404 |
| Food services | 39,428 | 33,160 | 396 | 1,352 | 1,385 | 2,755 | 1,073 | 891 | 10,213 | 90,653 |
| Sum of Subsectors | 1,458,455 | 762,912 | 60,670 | 27,201 | 43,787 | 73,275 | 20,337 | 20,404 | 64,168 | 2,531,211 |

ICI PPP Flow – Detail by Each Subsector

Administration and Office Subsector

Data analysis

Confidence in data: Low | **Medium** | High

The Administration and Office subsector represents a grouping of ICI entities with similar office settings and activities. The Administration and Office subsector averages 32% of Canada's FTEs, contributing the highest number of FTEs in the territories (46%) and the lowest in Atlantic Canada and Alberta (27%) (**Table 35**).

Table 35: Canada-wide economic activity by share of FTE for the administrative and office subsector.

| ICI Subsector | | BC | AB | SK | MB | ON | QC | AC | TR | Canada |
|--|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 51-56, 81, 91 Administration and office | 51 Information and cultural industries | 3% | 1% | 2% | 3% | 2% | 2% | 2% | 2% | 2% |
| | 52-53 Finance, insurance, real estate, and leasing | 4% | 3% | 4% | 5% | 6% | 4% | 4% | 2% | 5% |
| | 54 Professional, scientific, and technical services | 2% | 2% | 1% | 1% | 2% | 1% | <1% | 1% | 2% |
| | 55-56 Business, building, and other support services | 7% | 6% | 4% | 3% | 7% | 7% | 4% | 4% | 7% |
| | 55, 551, 5511 Management of companies and enterprises | <1% | <1% | <1% | <1% | <1% | <1% | <1% | <1% | <1% |
| | 56 Administrative and support, waste management and remediation service | 5% | 4% | 3% | 3% | 6% | 4% | 3% | 2% | 5% |
| | 81 Other services | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 2% | 3% |
| | 91 Public administration | 6% | 5% | 10% | 8% | 7% | 7% | 10% | 33% | 7% |
| | Sum of 51-56, 81, 91 Administration and office | 30% | 27% | 28% | 28% | 33% | 29% | 27% | 46% | 30% |

For this report, a total of 569 audits were collected for this subsector (**Table 36**). While the subsector represents a significant employer in Canada, the amount of PPP generated on per kg/FTE/yr basis is relatively lower than other subsectors, and as a result the subsector contributes only about 7% of the overall ICI PPP disposed and collected for recycling.

Table 36: Overview of the audits collected to inform modelling for the administrative and office subsector.

| NAICS Codes | Total Waste Audits | Waste Disposed | PPP Disposed | Material Recycled | PPP Collected for Recycling |
|----------------------|--------------------|----------------|--------------|-------------------|-----------------------------|
| | # | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr |
| 51-56, 81, 91 | 569 | 57 | 22 | 41 | 33 |

Results of the modelling include:

- **Figure 24** shows that for the disposal stream, there is an estimated average of 4% OCC/boxboard, 16% mixed paper, 11% film, 6% other rigid plastics, and less than 1% each of HDPE, PET, aluminum, steel, and glass. The total plastic PPP in the disposal stream is approximately 19%.
- **Figure 25** shows that for the collected for recycling stream there is an estimated average of 30% OCC/boxboard, 40% mixed paper, 3% glass, 2% PET and other rigid plastics, 1% aluminum, and less than 1% film, HDPE, and steel. The total plastic PPP in the collected for recycling stream is approximately 6%.

When assessing the results of this model, the following should be considered:

- Waste audits for this subsector, especially those done for large office buildings, could include some restaurant or small retail activities that cannot be separated out the waste audit data.
- It was not always clear as to whether confidential paper that is managed in a dedicated stream (i.e., by a shredding company) was captured in the recycling data. As many of the entities within this subsector would use these services, the PPP generation, particularly for mixed fibre, might be underestimated.

Figure 24: Disposal stream PPP contribution by material sub-category for the administrative and office subsector.

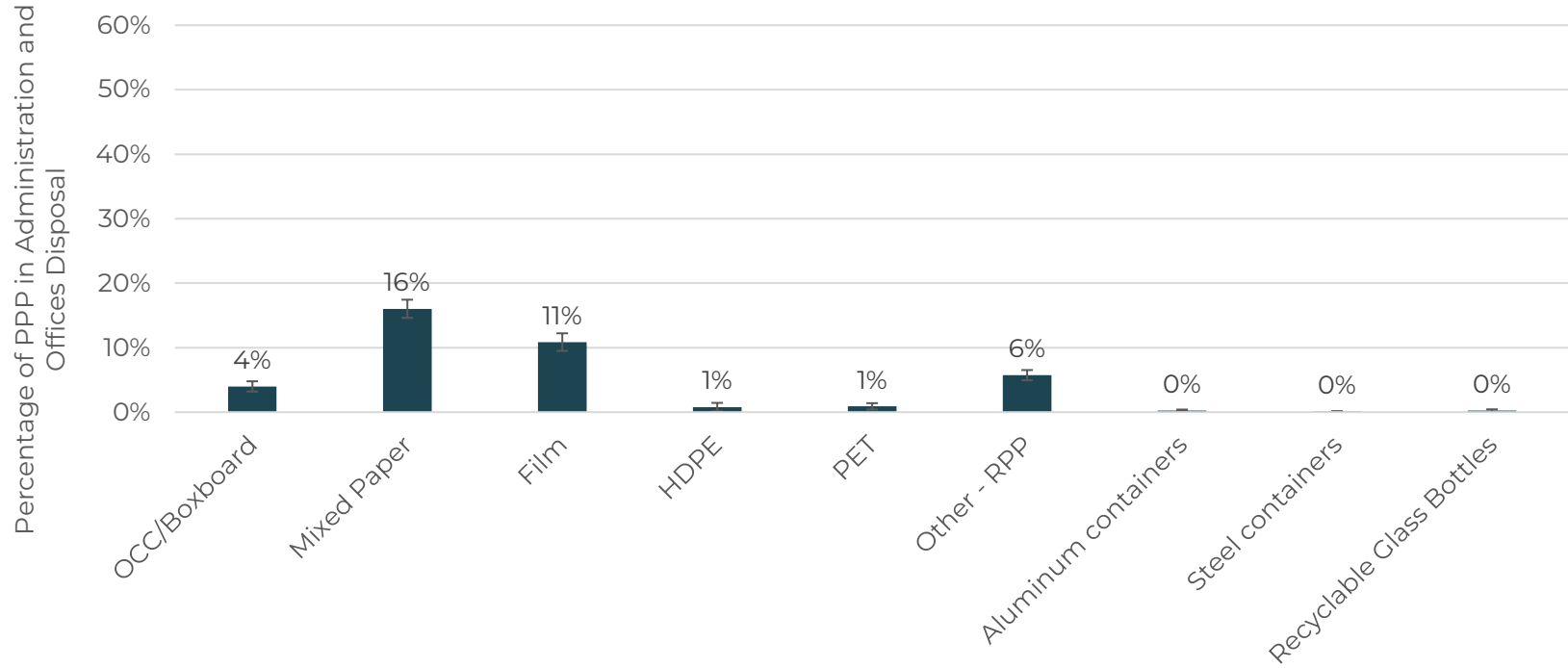
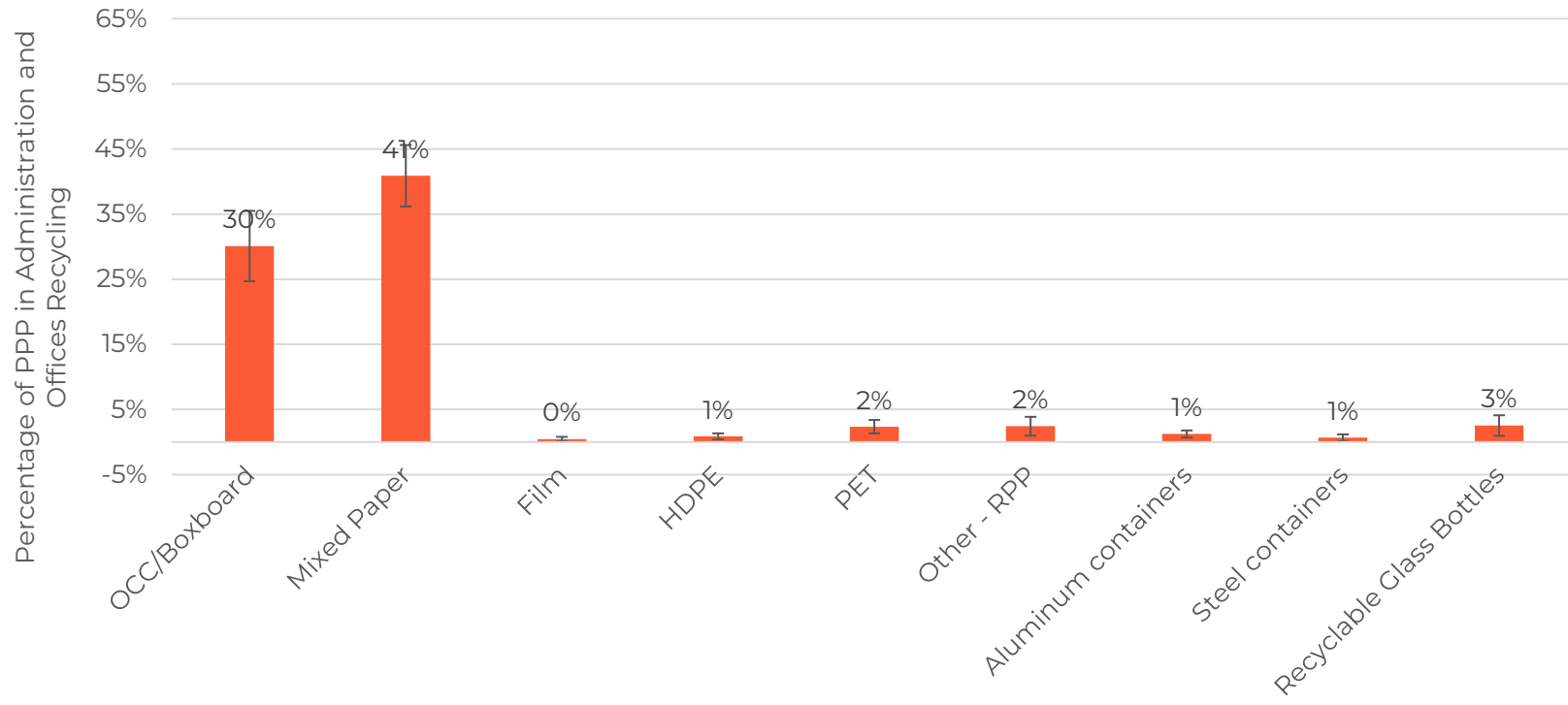


Figure 25: Collected for recycling stream PPP contribution by material sub-category for the administrative and office subsector.



Trade

Data analysis

Confidence in data: **Low | Medium | High**

The Trade subsector includes Wholesale Trade entities, which are entities distributing merchandise usually in large quantities to retailers and business and institutional clients, and Retail Trade entities, which are primarily engaged in the distribution of merchandise, both through operating bricks and mortar stores (e.g., grocers, retail goods, convenience) and those that interact with customers through a different means (e.g., vending machine, online sales, catalogues). The Trade subsector averages 16% of Canada's FTEs with an FTE spread that is relatively consistent across all jurisdictions (**Table 37**).

Table 37: Canada-wide economic activity by share of FTE for the trade subsector.

| ICI Subsector | BC | AB | SK | MB | ON | QC | AC | TR | Canada |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|--------|
| 41,44-45 Trade | 15% | 17% | 18% | 15% | 16% | 16% | 17% | 14% | 16% |

For this report, a total of 276 audits were collected for this subsector (**Table 38**). The subsector is a significant employer across the country and generates a higher amount of PPP on per kg/FTE/yr basis. As a result, this subsector is estimated to contribute 11% of the total ICI PPP disposed and 25% of the ICI PPP collected for recycling.

Table 38: Overview of the audits collected to inform modelling for the trade subsector.

| NAICS Codes | Total Waste Audits | Waste Disposed | PPP Disposed | Material Recycled | PPP Recycled |
|---------------------------|--------------------|----------------|--------------|-------------------|--------------|
| | # | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr |
| 41,44-45 Trade | 276 | 620 | 212 | 435 | 293 |
| 41 Wholesale trade | - | - | - | - | - |
| 44-45 Retail trade | 276 | 620 | 212 | 435 | 293 |

Results of the modelling include:

- **Figure 26** shows that for the disposal stream, there is an average of 1% OCC/boxboard, 27% mixed paper, 3% film, 2% other rigid plastics, less than 1% each of HDPE, PET, aluminum, steel, and glass. The total plastic in the disposal stream is approximately 5%.

- **Figure 27** shows that for the collected for recycling stream there is an average of 45% OCC/boxboard, 16% mixed paper, 3% film, 2% for other rigid plastics, and 1% or under for all other PPP materials. The total plastic PPP in the collected for recycling stream is approximately 5%.

When assessing the results of this model, the following practical factors should be considered about this subsector:

- There are significant differences between the operations that would impact the amounts and categories of PPP generated and how these materials are managed (e.g., a large format grocery store with perishables as compared to a small format specialty durable goods store).
- From the waste audit data, it is not possible to disaggregate the amount of plastic packaging that is generated by public foot traffic (e.g., at a mall) versus employees.

Figure 26: Disposal stream PPP contribution by material sub-category for the trade subsector.

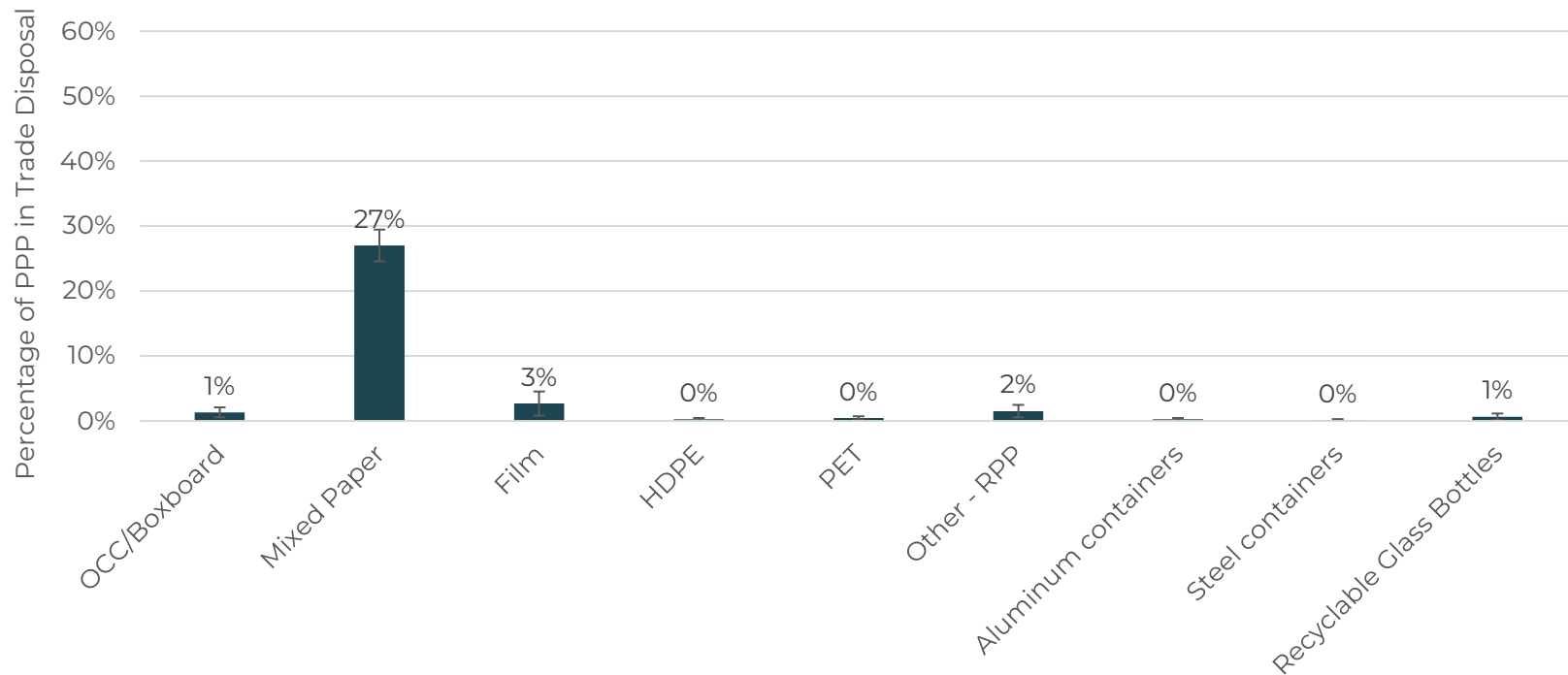
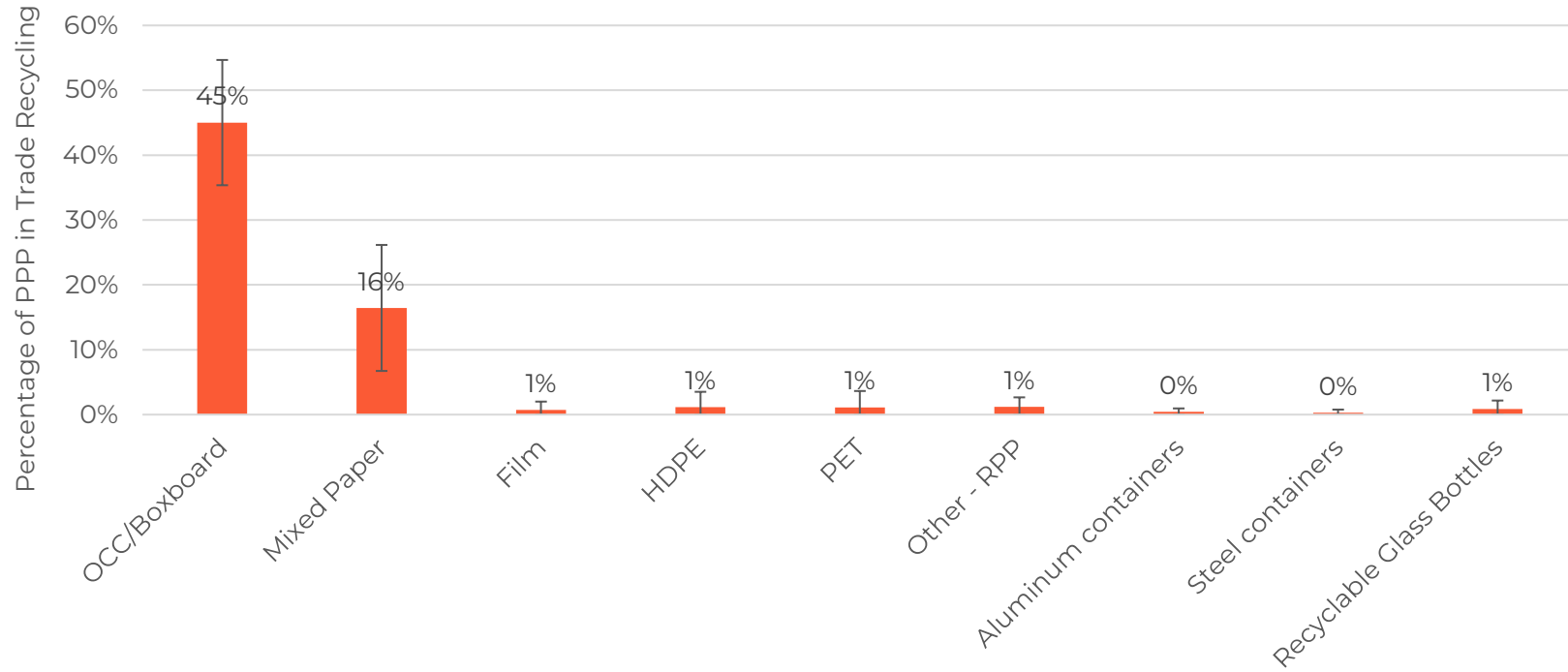


Figure 27: Collected for recycling stream PPP contribution by material sub-category for the trade subsector.



Health Care and Social Assistance

Data analysis

Confidence in data: **Low | Medium | High**

The Health Care and Social Assistance subsector is comprised of entities primarily engaged in providing health care by diagnosis and treatment, providing residential care for medical and social reasons, and providing social assistance, such as counselling, welfare, child protection, community housing and food services, vocational rehabilitation, and childcare, to those requiring such assistance. The Health Care and Social Assistance subsector averages 13% of Canada's FTEs with an FTE spread ranging from a low of 7% in the Territories to a high of 16% in Manitoba and Atlantic Canada (**Table 39**).

Table 39: Canada-wide economic activity by share of FTE for the health care and social assistance subsector.

| ICI Subsector | BC | AB | SK | MB | ON | QC | AC | TR | Canada |
|---|-----|-----|-----|-----|-----|-----|-----|----|--------|
| 62 Health care and social assistance | 13% | 11% | 15% | 16% | 12% | 13% | 16% | 7% | 13% |

For this report, a total of 35 audits were collected for this subsector (**Table 40**). The subsector is a small employer and generates a smaller amount of PPP on a per kg/FTE/yr basis. As a result, it represents 9% and 16% respectively of the total ICI PPP disposed and collected for recycling.

Table 40: Overview of the audits collected to inform modelling for the health care and social assistance subsector.

| NAICS Codes | Total Waste Audits | Waste Disposed | PPP Disposed | Material Recycled | PPP Recycled |
|---|--------------------|----------------|--------------|-------------------|--------------|
| | # | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr |
| 62 Health care and social assistance | 35 | 289 | 71 | 147 | 87 |

Results of the modelling include:

- **Figure 28** shows that for the disposal stream, there is an average of 3% OCC/boxboard, 9% mixed paper, 3% film, 6% Other Rigid Plastics, 1% PET, less than 1% each of HDPE, aluminum, steel, and glass. The total plastic in the disposal stream is approximately 11%.
- **Figure 29** shows that for the collected for recycling stream there is an average of 26% OCC/boxboard, 17% mixed paper, 6% other rigid, 3% steel, and <2% each of HDPE, PET, film, glass, and aluminum. The total plastic PPP in the collected for

recycling stream is approximately 12%.

When assessing the results of this model, the following practical factors should be considered about this subsector:

- There were relatively few audits available for this subsector.
- There is a great deal of variation in both the disposal and collected for recycling composition data received. This is likely due to the many heterogeneity of the activities that occur in individual businesses. An analysis undertaken of the Québec healthcare system shows there is a difference according to the type of facilities audited. For instance, there is much more printed paper generated in hospitals (12% of the total generated) compared to senior housing (6% of the total generated).¹⁰⁶
- Waste audits for this subsector could include some restaurant or small retail activities that cannot be separated out the waste audit data.
- It was not always clear as to whether confidential paper that is managed in a dedicated stream (i.e., by a shredding company) was captured in the recycling data. As many entities within this subsector would use these services, the PPP generation particularly for mixed fibre might be underestimated.
- The categorization of PPP and non-PPP materials might not be captured consistently in the waste audits completed. In health care facilities, there is a significant quantity of non-PPP type of products (i.e., paper towel, oxygen mask tubing). Regrettably, some waste auditors might capture these data as PPP material, and this could skew the data presented.
- Other recycling systems (e.g., needles and medical products) could influence results from the recycling data.

¹⁰⁶ SSE, 2022. Fiche matière Papier <https://gmr.synergiesanteenvironnement.org/papier/> (in French)

Figure 28: Disposal stream PPP contribution by material sub-category for the health care and social assistance subsector.

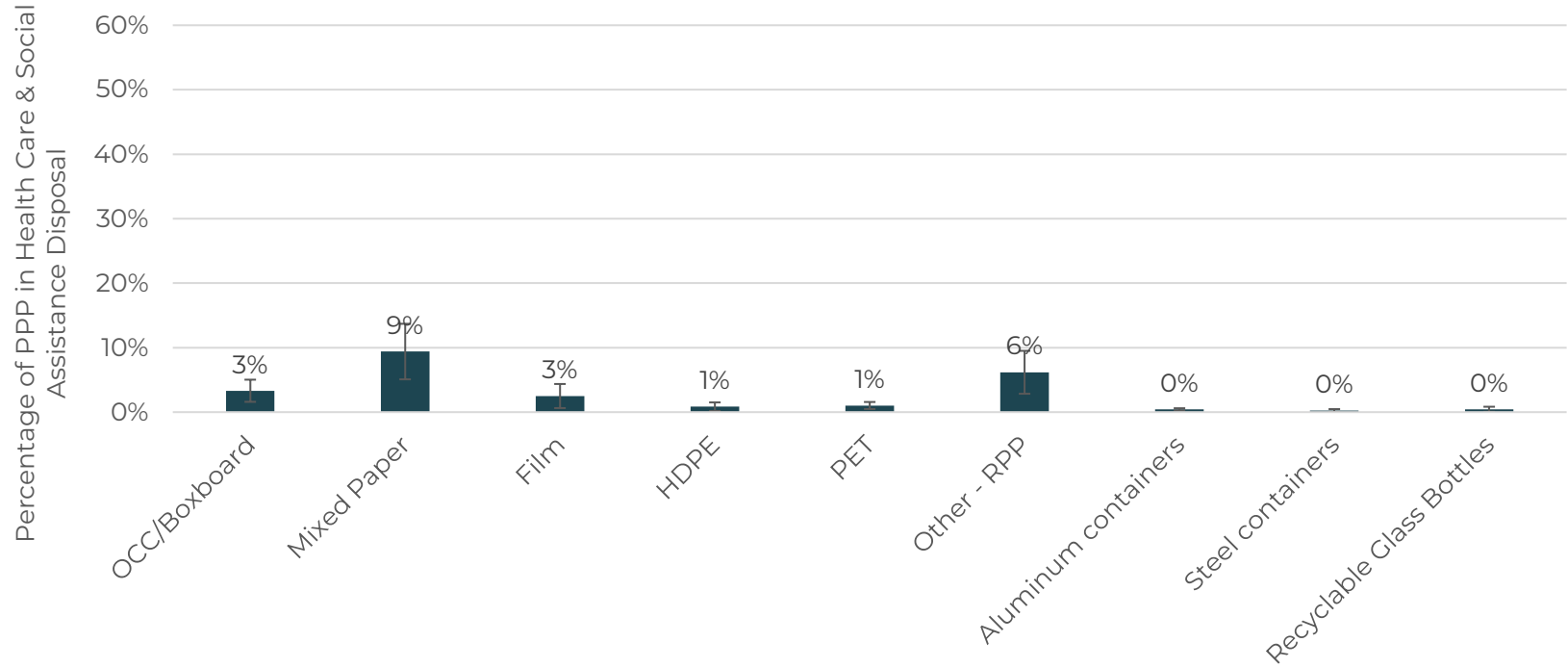
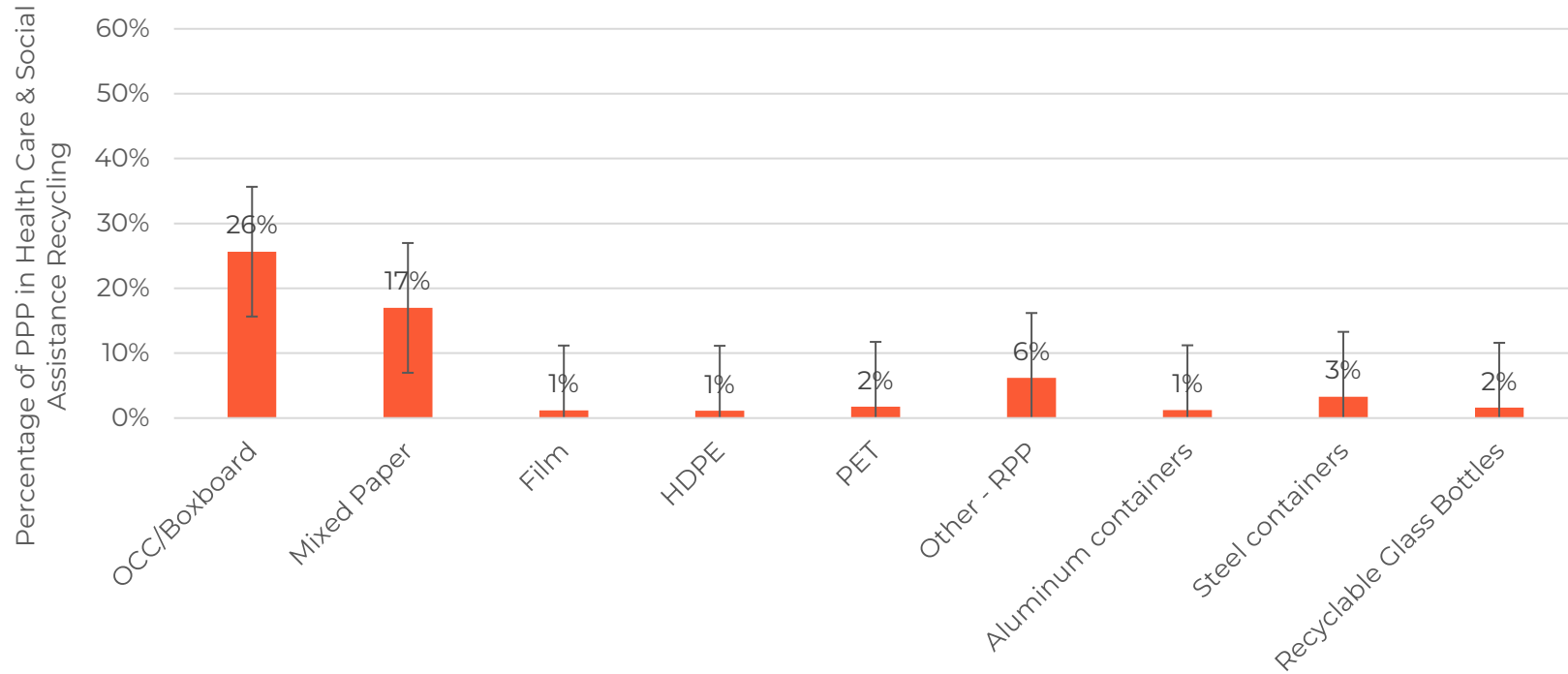


Figure 29: Collected for recycling stream PPP contribution by material sub-category for the health care and social assistance subsector.



Transportation & Warehousing

Data analysis

Confidence in data: **Low** | Medium | High

The Transportation and Warehousing subsector includes entities primarily engaged in transporting passengers and goods (e.g., trucking, transit, rail, water, air, and pipeline), warehousing and storing goods, and providing services to these establishments. This subsector includes couriers. The Transportation & Warehousing subsector averages 5% of Canada's FTEs an FTE spread that is relatively consistent across all jurisdictions (**Table 41**).

Table 41: Canada-wide economic activity by share of FTE for the transportation & warehousing subsector.

| ICI Subsector | BC | AB | SK | MB | ON | QC | AC | TR | Canada |
|---|----|----|----|----|----|----|----|----|--------|
| 48-49 Transportation & warehousing | 5% | 5% | 4% | 6% | 4% | 4% | 4% | 6% | 5% |

For this report, a total of 17 audits were collected for this subsector (**Table 42**). The subsector is a smaller employer and generates a moderate amount of PPP on per kg/FTE/yr. The subsector appears to be a more significant recycler of PPP based on its size. It represents 2% of the total ICI PPP for disposed and collected for recycling.

Table 42: Overview of the audits collected to inform modelling for the transportation & warehousing subsector.

| NAICS Codes | Total Waste Audits | Waste Disposed | PPP Disposed | Material Recycled | PPP Recycled |
|---|--------------------|----------------|--------------|-------------------|--------------|
| | # | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr |
| 48-49 Transportation & warehousing | 17 | 162 | 54 | 361 | 263 |

Results of the modelling include:

- **Figure 30** shows that for the disposal stream, there is an average of <2% OCC/boxboard, 21% mixed paper, 6% film, 4% other rigid plastics, less than 1% each of HDPE, PET, aluminum, steel, and glass. The total plastic in the disposal stream is approximately 10%.

- **Figure 31** shows that for the collected for recycling stream there is an average of 37% OCC/boxboard, 32% mixed paper, 3% glass, and less than 1% each of HDPE, PET, other rigid plastic, aluminum, and steel. The total plastic PPP in the collected for recycling stream is approximately 1%.

When assessing the results of this model, the following practical factors should be considered about this subsector:

- There were very few audits collected for this sector and the variability is high.

Figure 30: Disposal stream PPP contribution by material sub-category for the transportation & warehousing subsector.

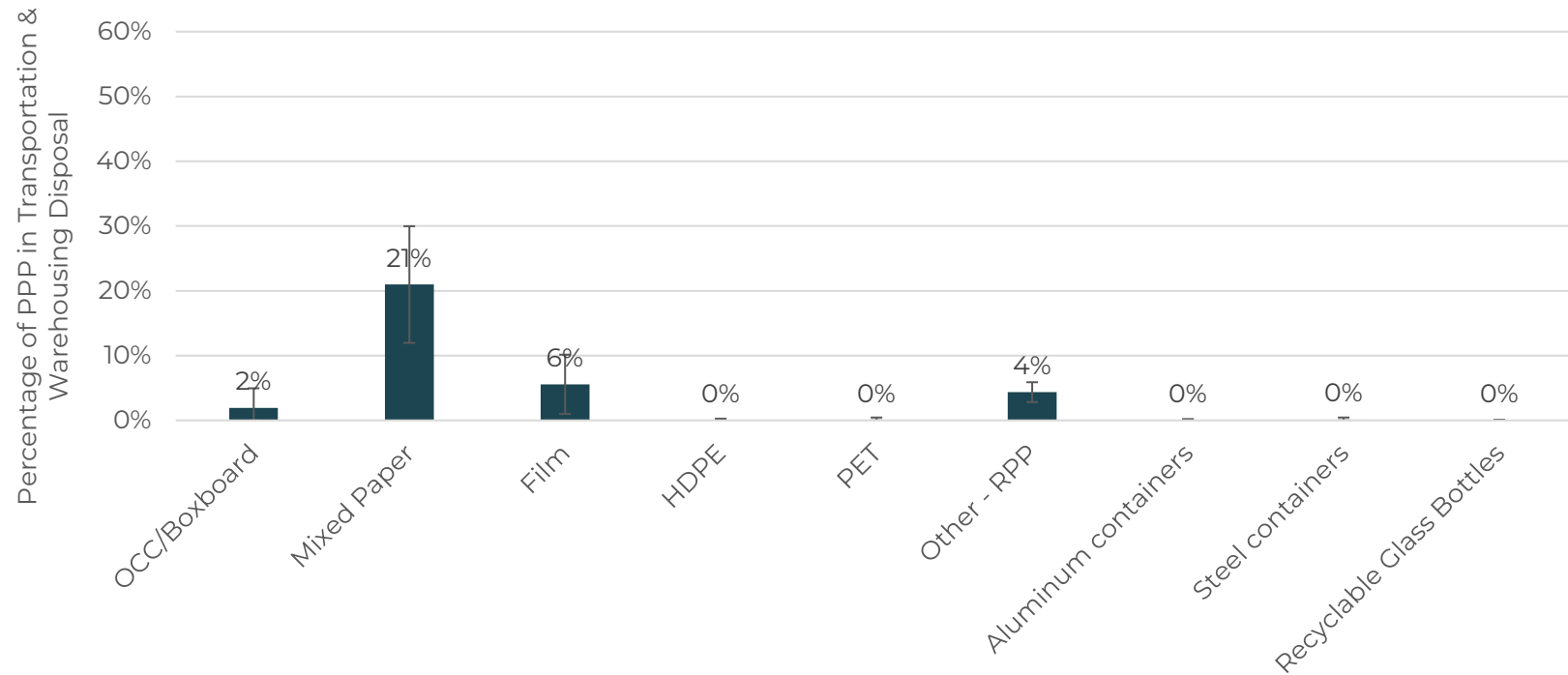
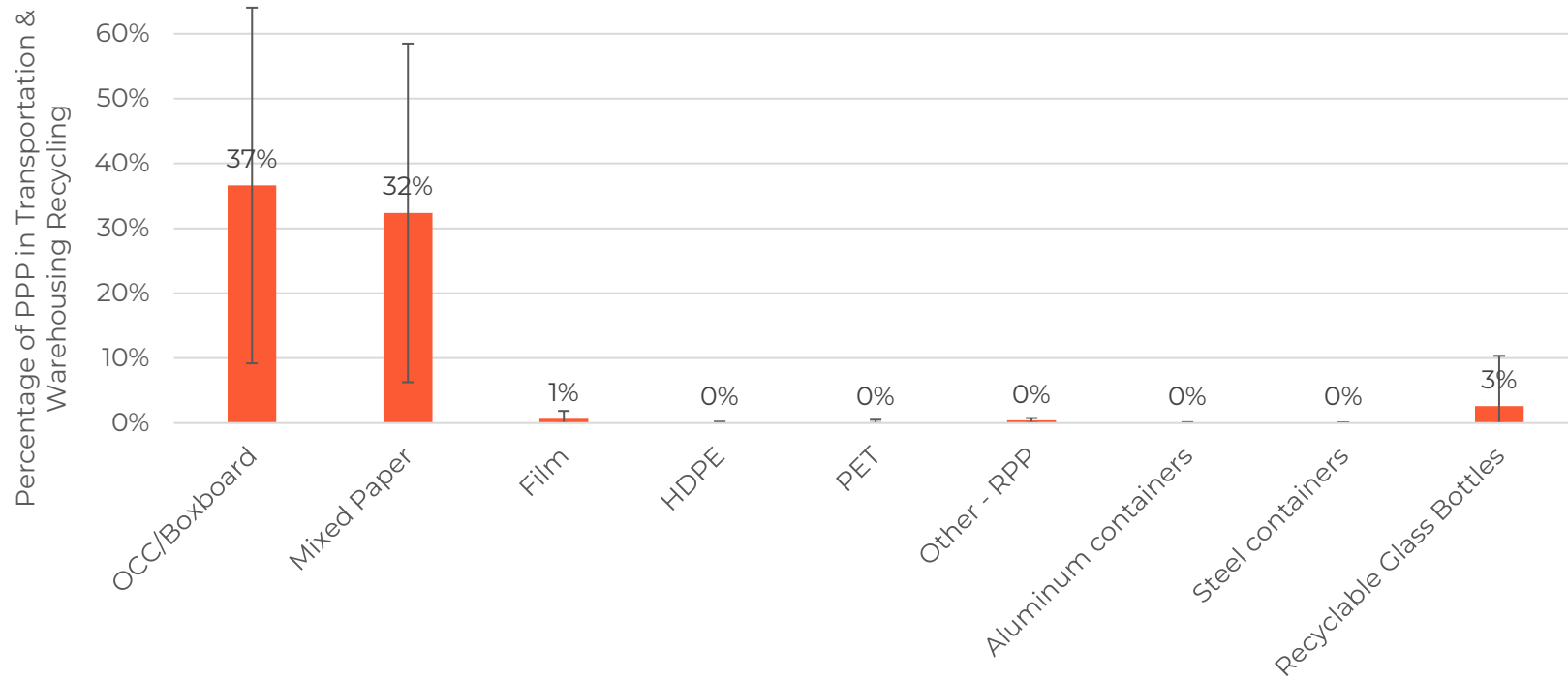


Figure 31: Collected for recycling stream PPP contribution by material sub-category for the transportation & warehousing subsector.



Educational Services

Data analysis

Confidence in data: Low | **Medium** | High

The Educational Services subsector include entities primarily engaged in providing instruction and training in a wide variety of subjects. This instruction and training are provided at specialized establishments, such as elementary/secondary schools, post-secondary institutions (e.g., colleges, universities), and training centres. The Educational Services subsector averages 8% of Canada's FTEs with an FTE spread that is relatively consistent across all jurisdictions (**Table 43**).

Table 43: Canada-wide economic activity by share of FTE or the educational services subsector.

| ICI Subsector | BC | AB | SK | MB | ON | QC | AC | TR | Canada |
|--------------------------------|----|----|----|----|----|----|----|----|--------|
| 61 Educational services | 7% | 7% | 9% | 8% | 8% | 9% | 9% | 7% | 8% |

For this report, a total of 101 audits were collected for this subsector (**Table 44**). The subsector is a smaller employer and generates less PPP per kg/FTE/yr basis. As a result, the subsector contributes only about 1% of the ICI PPP disposed of and 4% of collected for recycling.

Table 44: Overview of the audits collected to inform modelling for the educational services subsector.

| NAICS Codes | Total Waste Audits | Waste Disposed | PPP Disposed | Material Recycled | PPP Recycled |
|--|--------------------|----------------|---------------|-------------------|---------------|
| | # | kg/student/yr | kg/student/yr | kg/student/yr | kg/student/yr |
| 6111 Elementary and Secondary Schools | 44 | 12 | 3 | 8 | 6 |
| 6112, 6113 Colleges and Universities | 57 | 25 | 9 | 34 | 18 |

Results of the modelling include:

- **Figure 32** shows that for the disposal stream, there is an average of 3% OCC/boxboard, 12% mixed paper, 4% film, 3% other rigid plastics, 2% PET, and less than 1% each of HDPE, aluminum, steel, and glass. The total plastic in the disposal stream is approximately 10%.

- **Figure 33** shows that for the collected for recycling stream there is an average of 21% OCC/boxboard, 38% mixed paper, 5% PET, 3% other rigid, and <2% each of HDPE, film, glass, aluminum, and steel. The total plastic PPP in the collected for recycling stream is approximately 10%.

When assessing the results of this model, the following practical factors should be considered about this subsector:

- Schools across Canada differ in access to local recycling services offered. Some jurisdictions, such as Nova Scotia and Prince Edward Island have mandatory sorting requirements for specific PPP. Further, 10 of 13 jurisdictions have DRSs in place that could provide schools funding if containers were to be collected and returned.
- Some jurisdictions have not-for-profits offering dedicated recycling educational programs for schools (e.g., EcoSchools Canada,¹⁰⁷ Encorp Pacific,¹⁰⁸ Recycle BC,¹⁰⁹ Carton Council of Canada¹¹⁰). The effort to engage students and staff in the 3Rs (e.g., reduce, reuse, recycle) can influence the overall waste composition.
- Whether a school has an onsite cafeteria can impact the composition of PPP in the disposal and collected for recycling streams.
- Some schools might also have internal policies that require students take home PPP waste.

¹⁰⁷ EcoSchools Canada, n.d. A sustainable future begins at every school. Available at : https://ecoschools.ca/?gad_source=1&gclid=CjwKCAjw5ImwBhBtEiwAFHDZxxgCIX1pAmXmKVhpaxd-bh7v7WsmImTTHq6m46tAWFidj_uOzG-H7xoC_r4QAvD_BwE

¹⁰⁸ Encorp Pacific (Canada), n.d. About the return-it school recycling program. Available at: <https://www.return-it.ca/beverage/faqs/returnitschool/>

¹⁰⁹ Recycle BC, 2024. Teacher resources now available. Available at: <https://recyclebc.ca/teacher-resources-now-available/#:~:text=Topics%20covered%20in%20the%20lessons,end%20of%20life%20for%20materials>

¹¹⁰ Carton Council of Canada, n.d. Support for School-Based Recycling. Available at: <https://www.recyclecartons.ca/>

Figure 32: Disposal stream PPP contribution by material sub-category for the educational services subsector.

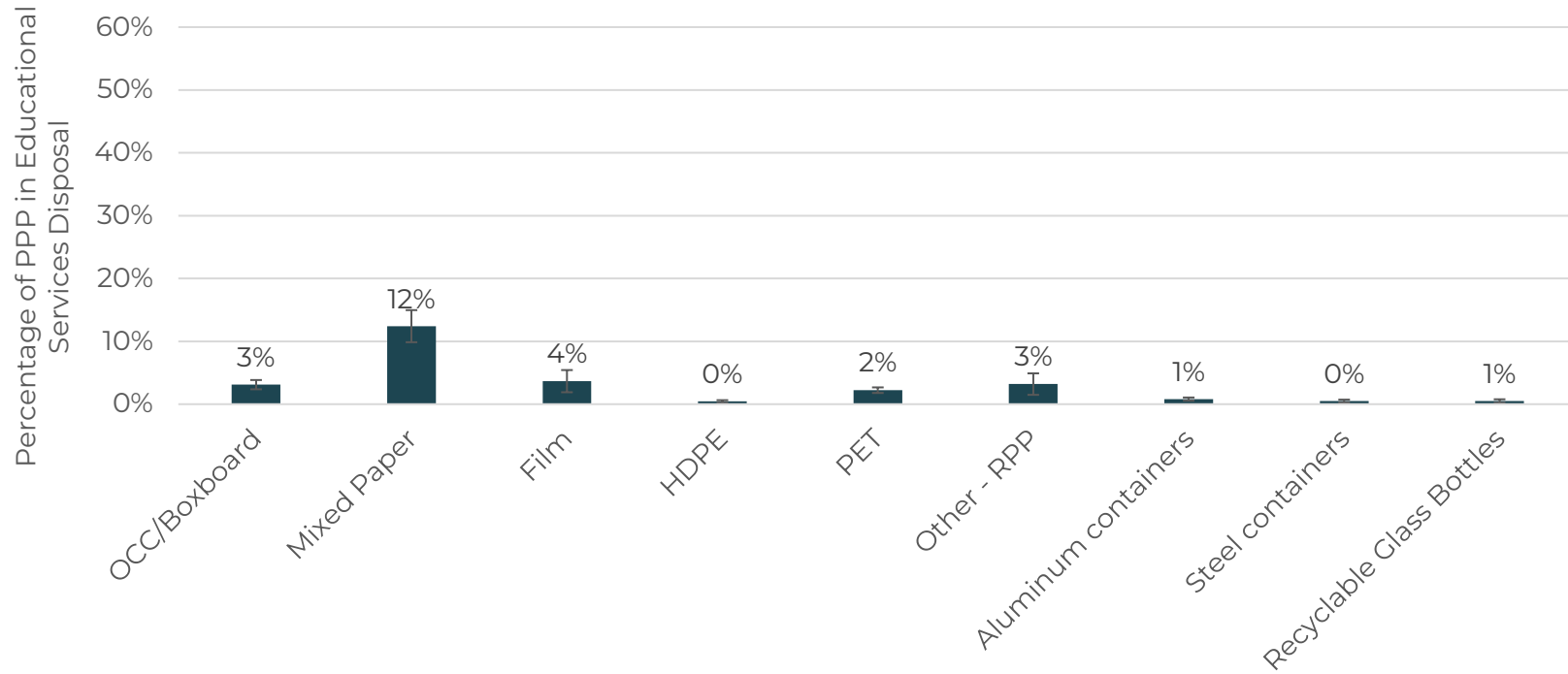
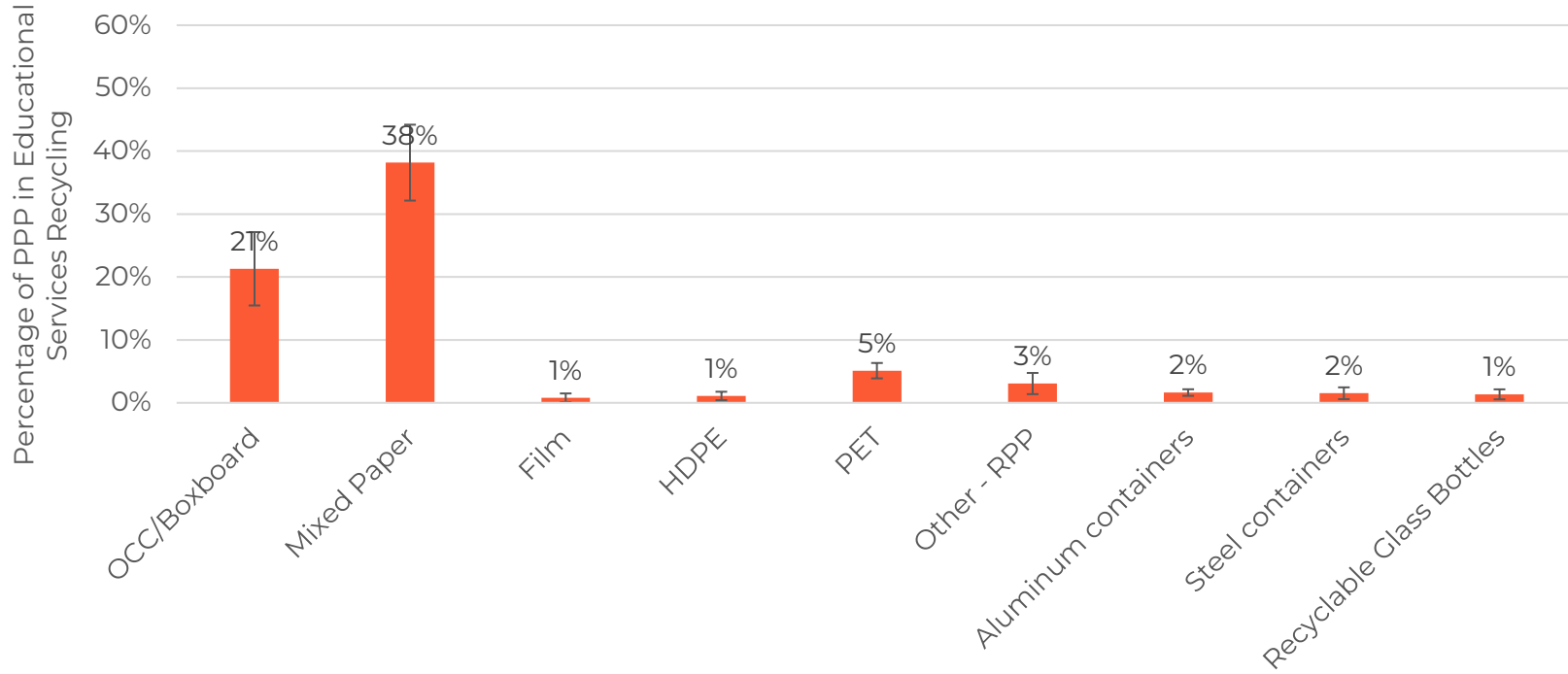


Figure 33: Collected for recycling stream PPP contribution by material sub-category for the education services subsector.



Manufacturing

Data analysis

Confidence in data: **Low | Medium** | High

The Manufacturing subsector includes entities primarily engaged in the chemical, mechanical or physical transformation of materials or substances into new products. According to Statistics Canada, 57% of the manufacturing subsector is dedicated to durables good and 43% to non-durables good. Based on the waste audit data provided, it is not clear whether these types of manufacturers are reflected proportionally in the modelling completed for this report. The Manufacturing subsector averages 9% of Canada's FTEs with the FTE spread ranging from a low of 5% in Atlantic Canada to a high of 11% in Québec (**Table 45**).

Table 45: Canada-wide economic activity by share of FTE for the manufacturing subsector.

| ICI Subsector | BC | AB | SK | MB | ON | QC | AC | TR | Canada |
|----------------------------|----|----|----|----|-----|-----|----|-----|--------|
| 31-33 Manufacturing | 6% | 6% | 5% | 9% | 10% | 11% | 5% | <1% | 9% |

A total of 126 audits were collected for this subsector (**Table 46**). The sector is a moderate employer across the country and generates a higher amount of PPP on per kg/FTE/yr basis. As a result, it represents an estimated 27% of the total ICI PPP disposed and 35% of the ICI PPP collected for recycling.

Table 46: Overview of the audits collected to inform modelling for the manufacturing subsector.

| NAICS Codes | Total Waste Audits | Waste Disposed | PPP Disposed | Material Recycled | PPP Recycled |
|----------------------------|--------------------|----------------|--------------|-------------------|--------------|
| | # | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr |
| 31-33 Manufacturing | 126 | 1,143 | 273 | 1,009 | 501 |

Results of the modelling include:

- **Figure 34** shows that for the disposal stream, there is an average of 4% OCC/boxboard, 7% mixed paper, 7% film, 3% other rigid plastics, and less than 1% each of HDPE, PET, aluminum, steel, and glass. The total plastic in the disposal stream is approximately 12%.
- **Figure 35** shows that for the collected for recycling stream there is an average of 31% OCC/boxboard, 14% mixed paper, 3% film, and less than 1% each of HDPE, PET, aluminum, steel, and glass. The total plastic PPP in the collected for recycling stream is approximately 4%.

When assessing the results of this model, the following practical factors should be considered about this subsector:

- There could be significant differences in the amount and type of PPP that manufacturers generate based on what they manufacture: i.e., whether they are a food or beverage processor, equipment manufacturer, or goods manufacturer.
- Engineering based manufacturing sites are often very lean and may generate little waste. Waste audits conducted at these facilities may not include significant portions of 'manufacturing' related waste, and instead include post-consumer materials from lunchrooms and of other ICI wastes generated by office work.
- Manufacturing waste audits may not capture infrequent disposals of large quantities of 'off spec' products (e.g., off-spec beverage containers) that might be sent directly to disposal.
- Some literature differentiates between pre-consumer waste and post-industrial waste: pre-consumer waste being that generated from materials that were intended for consumer use but did not reach the consumer (e.g., off spec packaging), and post-industrial waste being generated from use in industrial activities (e.g., broken plastic pallet, broken crate).¹¹¹

¹¹¹ Seraphim Plastics. 2022. Pre-Consumer vs Post-Industrial Plastic Waste: Are They the Same Thing? Available at: <https://www.seraphimplastics.com/pre-consumer-vs-post-industrial-plastic-waste-are-they-the-same-thing/>

Figure 34: Disposal stream PPP contribution by material sub-category for the manufacturing subsector.

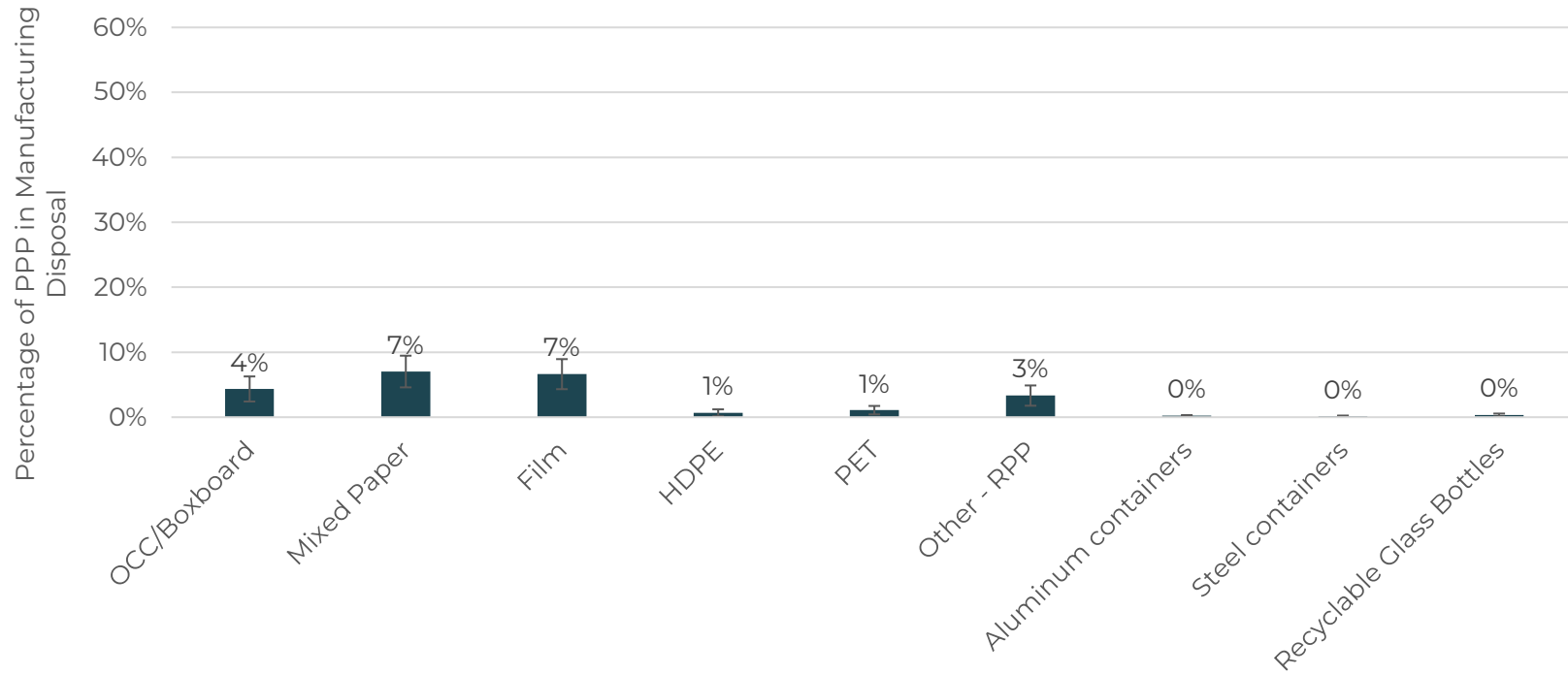
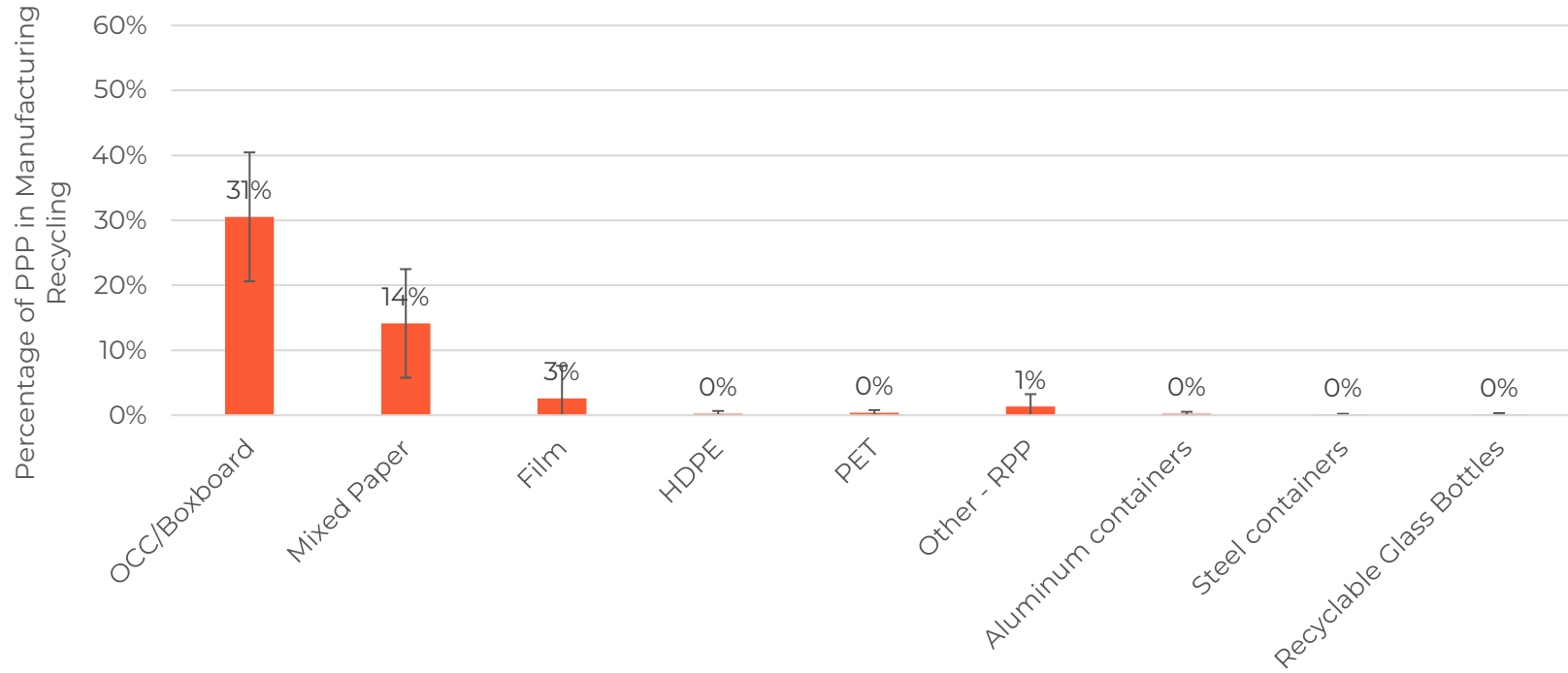


Figure 35: Collected for recycling stream PPP contribution by material sub-category for the manufacturing subsector.



Accommodation & Food Services

Data analysis

Confidence in data: **Low** | Medium | High

The Accommodations subsector includes entities primarily engaged in providing short-term lodging for travellers, vacationers, and others (e.g., hotels, motels, resorts, recreational camps, seasonal trailer parks). In addition to lodging, a range of other services might be provided (e.g., food, recreation). The Food Services subsector entities that prepare food for immediate consumption on or off the premises. Examples include full-service sit-in restaurants, quick service restaurants, cafeterias, bars, taverns, caterers, and mobile food trucks. It does not include meals that occur within other establishments such as hotels, amusement and recreation parks, theatres, unless they are leased food service locations (e.g., airports, malls, hotels). The Accommodation & Food Services subsector averages 7% of Canada's FTEs with an FTE spread that is relatively consistent across all jurisdictions (**Table 47**).

Table 47: Canada-wide economic activity by share of FTE for the accommodation and food services subsector.

| ICI Subsector | | BC | AB | SK | MB | ON | QC | AC | TR | Canada |
|---|---|----|----|----|----|-----|-----|----|----|--------|
| 72 Accommodation and food services | 722 Food services and drinking places | 7% | 6% | 6% | 6% | 6% | 6% | 6% | 4% | 6% |
| | 721 Accommodation services | 1% | 1% | 1% | 1% | <1% | <1% | 1% | 3% | <1% |
| | Sum of 72 Accommodation and food services | 9% | 8% | 7% | 7% | 7% | 6% | 7% | 8% | 7% |

For this report, a total of 82 audits were collected for this subsector, including 54 Food Services and 28 Accommodation audits (**Table 48**). The subsector is a moderate employer across the country and generates a higher amount of PPP on per kg/FTE/yr basis. As a result, it represents an estimated 32% of the total ICI PPP disposed and 7% of the ICI PPP collected for recycling.

Table 48: Overview of the audits collected to inform modelling for the accommodation and food services subsector.

| NAICS Codes | Total Waste Audits | Waste Disposed | PPP Disposed | Material Recycled | PPP Recycled |
|---|--------------------|----------------|--------------|-------------------|--------------|
| | # | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr |
| 72 Accommodation and food services | 82 | - | - | - | - |
| 722 Food services | 54 | 1,744 | 524 | 168 | 86 |
| 721 Accommodation | 28 | 572 | 118 | 932 | 616 |

Results of the Accommodations subsector modelling include:

- **Figure 36** shows that for the disposal stream, there is an average of 3% OCC/boxboard, 6% mixed paper, 3% glass, 3% PET, 2% HDPE, film, less than 2% each of film, other rigid plastics, aluminum, and steel. The total plastic in the disposal stream is approximately 7%.
- **Figure 37** shows that for the collected for recycling stream there is an average of 30% OCC/boxboard, 18% mixed paper, 12% glass, 3% PET, and <2% each of film, HDPE, other rigid plastics, glass, aluminum, and steel. The total plastic PPP in the collected for recycling stream is approximately 5%.

Results of the Food Services subsector modelling include:

- **Figure 38** shows that for the disposal stream, there is an average of 3% OCC/boxboard, 10% mixed paper, 8% film, 2% other rigid plastics, and less than 2% each of HDPE, PET, aluminum, steel, and glass. The total plastic in the disposal stream is approximately 13%.
- **Figure 39** shows that for the collected for recycling stream there is an average of 22% OCC/boxboard, 19% mixed paper, 6% glass, and <2% each of film, HDPE, PET, other rigid plastics, aluminum, and steel. The total plastic PPP in the collected for recycling stream is approximately 3%.

When assessing the results of this model, the following practical factors should be considered about this subsector:

- It was not clear in the waste audit data received as to whether the management of deposit bearing beverage containers were captured or not. As many of the entities within this subsector would use deposit bearing containers, the PPP generation might be underestimated.
- This subsector often deals with more highly contaminated material in the collected for recycling stream (e.g., food contaminated packaging, consumers improperly sorting waste and recyclables).
- The data may be more skewed to quick serve restaurants as opposed to sit-in restaurants.

Figure 36: Disposal stream PPP contribution by material sub-category for the accommodations subsector.

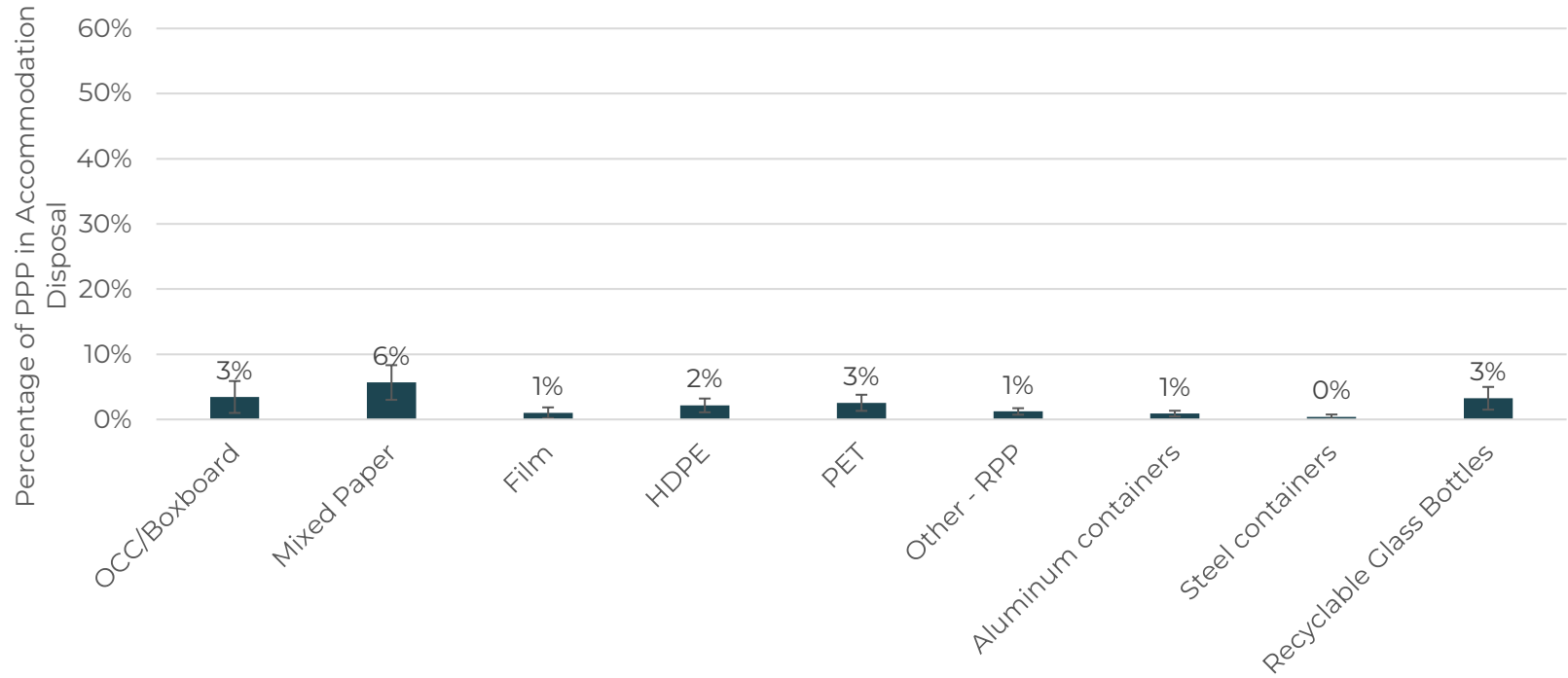


Figure 37: Collected for recycling stream PPP contribution by material sub-category for the accommodations subsector.

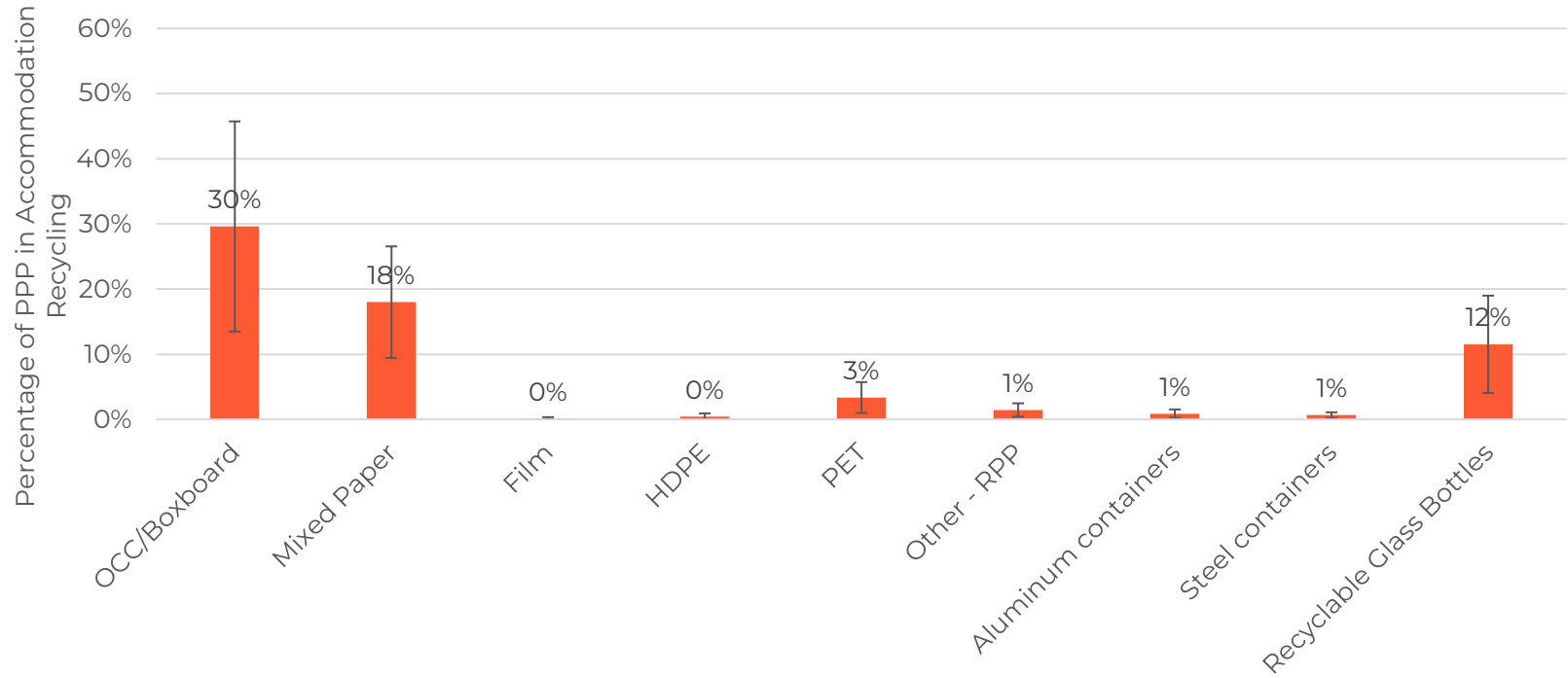


Figure 38: Disposal stream PPP contribution by material sub-category for the food services subsector.

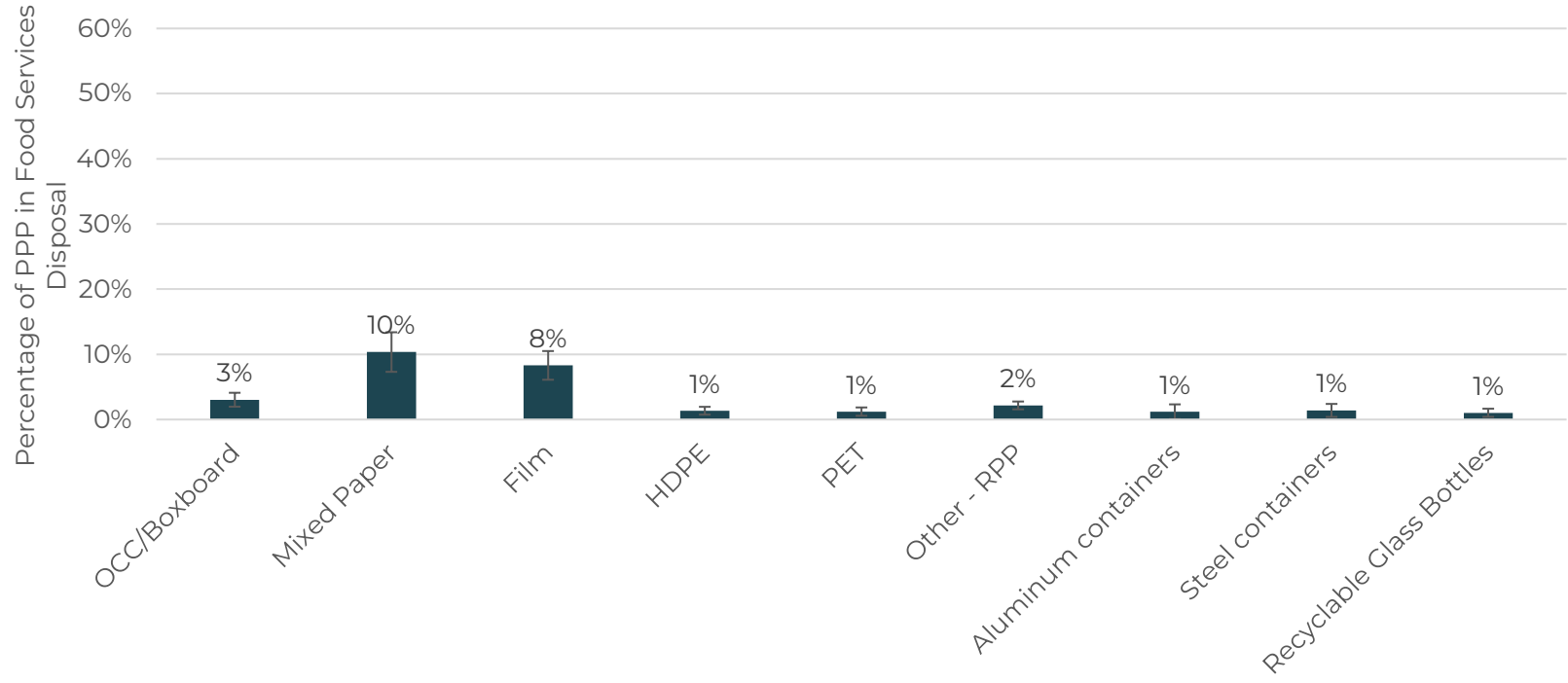
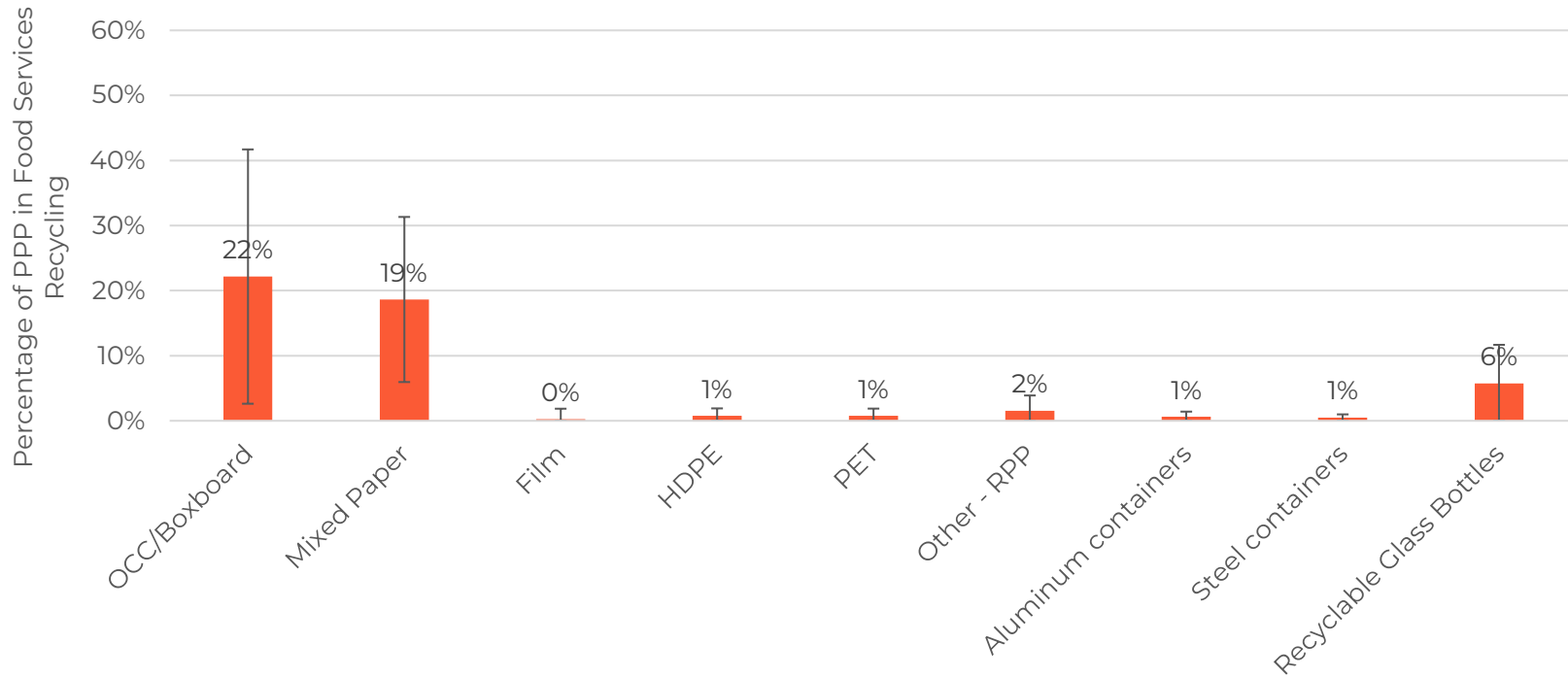


Figure 39: Collected for recycling stream PPP contribution by material sub-category for the food services subsector.



Arts, Entertainment, and Recreation

Data analysis

Confidence in data: **Low** | Medium | High

The Arts, Entertainment and Recreation subsector includes entities primarily engaged in operating facilities or providing services to meet the cultural, entertainment and recreational interests of their patrons (e.g., theatres, sports venues, museums, zoos). The subsector averages 13% of Canada's FTEs with the FTE spread ranging from a low of 7% in the Territories to a high of 16% in Manitoba and Atlantic Canadas (**Table 49**).

Table 49: Canada-wide economic activity by share of FTE for the arts, entertainment, and recreation subsector.

| ICI Subsector | BC | AB | SK | MB | ON | QC | AC | TR | Canada |
|---|----|----|----|----|----|----|----|----|--------|
| 71 Arts, entertainment, and recreation | 2% | 2% | 2% | 2% | 2% | 2% | 1% | 2% | |

For this report, a total of 42 audits were collected for this subsector (**Table 50**). The subsector is a small employer across the country and generates a moderate amount of PPP on per kg/FTE/yr basis. As a result, it represents an estimated 1% of the total ICI PPP disposed and collected for recycling.

Table 50: Overview of the audits collected to inform modelling for the arts, entertainment, and recreation subsector.

| NAICS Codes | Total Waste Audits | Waste Disposed | PPP Disposed | Material Recycled | PPP Recycled |
|---|--------------------|----------------|--------------|-------------------|--------------|
| | # | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr |
| 71 Arts, entertainment, and recreation | 42 | 308 | 66 | 87 | 59 |

Results of the modelling include:

- **Figure 40** shows that for the disposal stream, there is an average of 3% OCC/boxboard, 7% mixed paper, 2% film, 2% other rigid plastics, 1% or under for HDPE, PET, aluminum, steel, and glass. The total plastic in the disposal stream is approximately 7%.

- **Figure 41** shows that for the collected for recycling stream there is an average of 19% OCC/boxboard, 28% mixed paper, 9% glass, 5% PET, and <2% each of HDPE, film, aluminum, and steel. The total plastic PPP in the collected for recycling stream is approximately 9%.

When assessing the results of this model, the following practical factors should be considered about this subsector:

- More waste audit data would be helpful from this subsector given the variability in the types of events or activities (i.e., concert, art gallery, sports event, corporate event), the sizes, and the seasonality related to activities.

Figure 40: Disposal stream PPP contribution by material sub-category for the arts, entertainment, and recreation subsector.

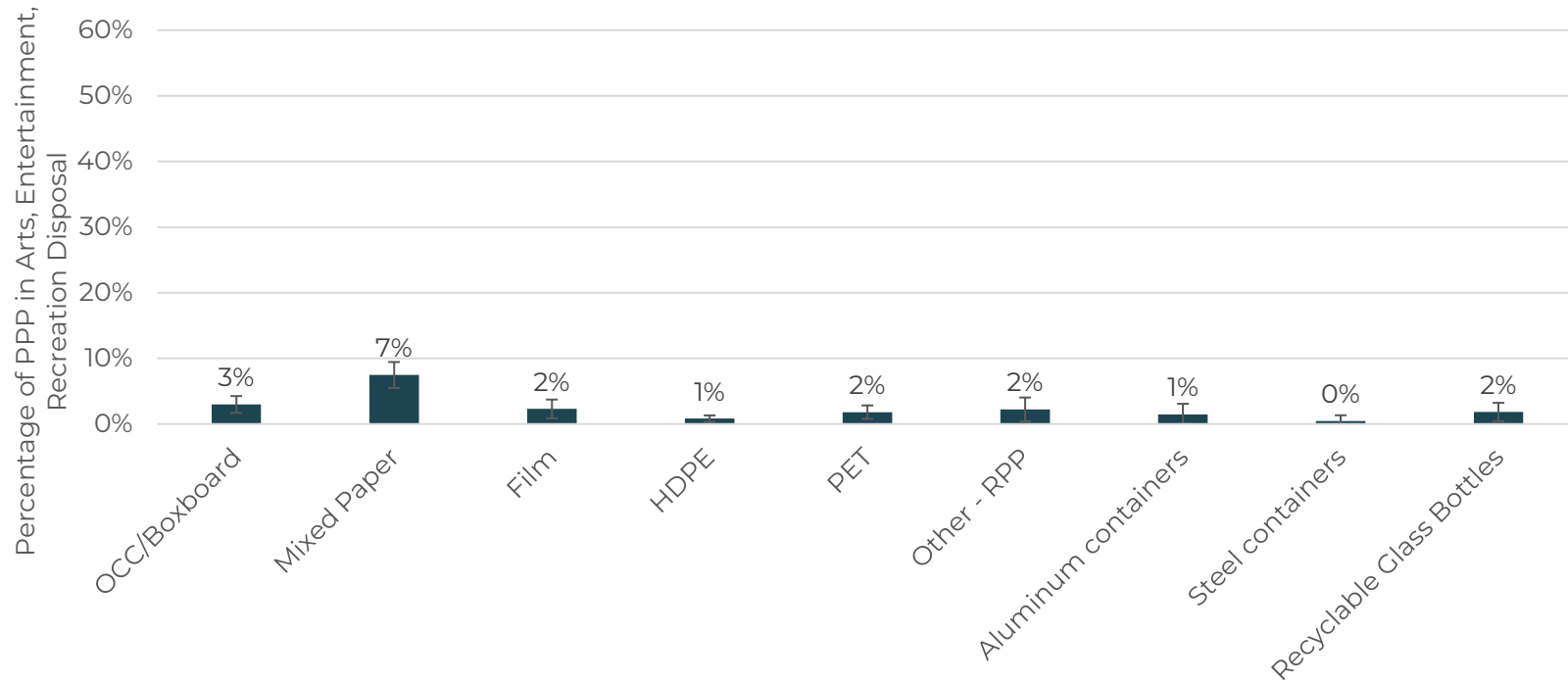
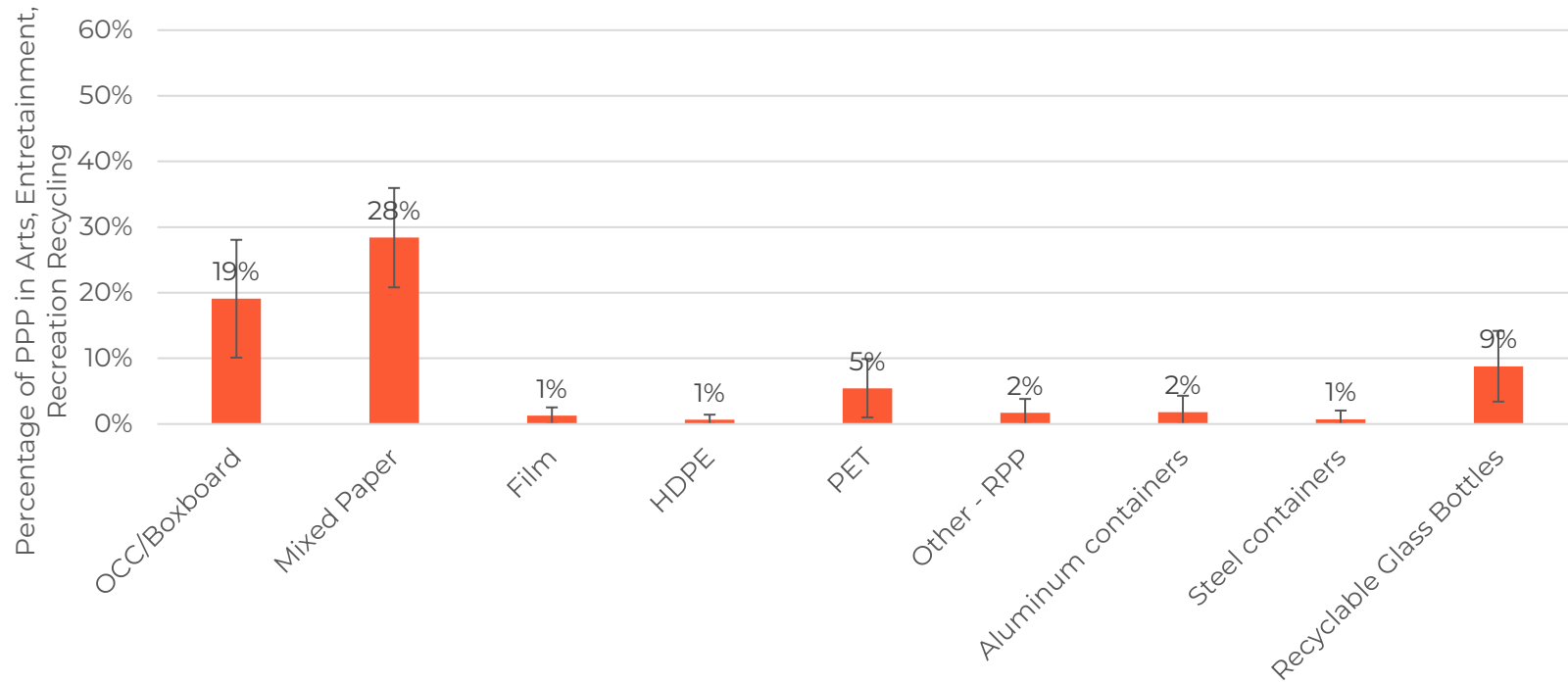


Figure 41: Collected for recycling stream PPP contribution by material sub-category for the arts, entertainment, and recreation subsector.



Agriculture

Data analysis

Confidence in data: **Low | Medium | High**

The Agriculture subsector includes entities, such as:

- farms, orchards, groves, greenhouses, and nurseries, primarily engaged in growing crops, plants, vines, trees, and their seeds (excluding those engaged in forestry operations)
- ranches, farms, and feedlots, primarily engaged in raising animals, producing animal products, and fattening animals.

The Agriculture subsector averages <1% of Canada's FTEs with the FTE spread ranging relatively fairly consistent across Canada (**Table 51**).

Table 51: Canada-wide economic activity by share of FTE or the agriculture subsector.

| ICI Subsector | | BC | AB | SK | MB | ON | QC | AC | TR | Canada |
|---|---|-----|-----|----|----|-----|-----|----|-----|--------|
| 11 Agriculture, forestry, fishing, and hunting | 111, 112 Crop production, animal production and aquaculture | <1% | <1% | 2% | 1% | <1% | <1% | 2% | <1% | <1% |

For this report, the data used was provided by from Cleanfarms from waste audits that included data on only plastic packaging generated (**Table 52**). This subsector is a smaller employer across the country but generates the highest amount of PPP on a per kg/FTE/yr basis. It represents an estimated 2% and 1% respectively of the total ICI PPP plastic disposed and collected for recycling.

Table 52: Overview of the audits collected to inform modelling for the agriculture subsector.

| NAICS Codes | Total Waste Audits | Waste Disposed | PPP Disposed | Material Recycled | PPP Recycled |
|--|--------------------|----------------|--------------|-------------------|--------------|
| | # | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr |
| 111, 112 Crop production, animal production and aquaculture | n/a | n/a | 554 | n/a | 55 |

Construction

Data analysis

Confidence in data: **Low | Medium | High**

The Construction subsector includes entities primarily engaged in constructing, repairing, and renovating buildings and engineering works, and in subdividing and developing land.

The Construction subsector averages 6% of Canada's FTEs with an FTE spread that is relatively consistent across all jurisdictions, except for Alberta, which is slightly higher at 9% (**Table 53**).

Table 53: Canada-wide economic activity by share of FTE for the construction subsector.

| ICI Subsector | BC | AB | SK | MB | ON | QC | AC | TR | Canada |
|------------------------|----|----|----|----|----|----|----|----|--------|
| 23 Construction | 7% | 9% | 6% | 6% | 6% | 6% | 7% | 8% | 6% |

For this report, the modelling undertaken was based comprehensive C&D waste audit data provided by RECYC-QUÉBEC. (**Table 54**). This subsector is a smaller employer across the country but generates a higher amount of PPP on a per kg/FTE/yr basis. It represents an estimated 3% respectively of the total ICI PPP plastic disposed.

Table 54: Overview of the audits collected to inform modelling for the construction subsector.

| NAICS Codes | Total Waste Audits | Waste Disposed | PPP Disposed | Material Recycled | PPP Recycled |
|------------------------|--------------------|----------------|--------------|-------------------|--------------|
| | # | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr | kg/FTE/yr |
| 23 Construction | n/a | 3,982 | 128 | n/a | 53 |

Results of the modelling include:

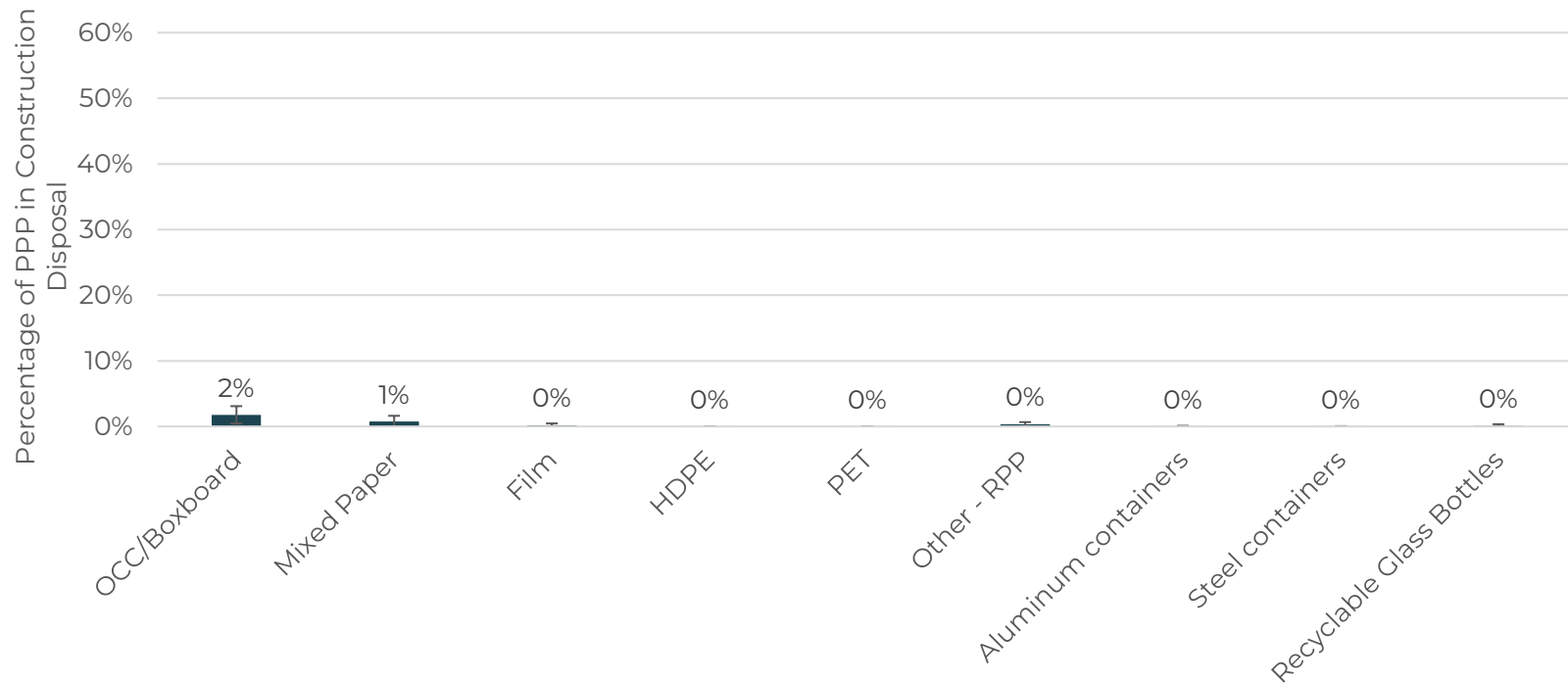
- **Figure 42** shows that for the disposal stream, there is an estimated average of 2% OCC/boxboard, less than 2% for each of the other material categories (i.e., plastic, metal, and glass).

When assessing the results of this model, the following should be considered:

- There was no useable recycling audit data available for this subsector.

- The waste audits were undertaken only in Québec and those waste audit results were modelled for the rest of Canada. This was done because this data set is the only comprehensive and large-scale C&D waste audit data set available in Canada.
- The amounts of PPP are small in comparison to the amount of other materials being generated.
- In future C&D waste audits, it would be helpful to get clearer understanding of the PPP generated at different types of construction sites (e.g., large/small, renovation/demolition/new builds, residential/commercial).

Figure 42: Disposal stream PPP contribution by material sub-category for the construction subsector.



APPENDIX D: ICI RECYCLING MARKETS

A scan of ICI recyclers operating in Canada is provided in **Table 55**. In addition, Canada has several niche plastics recycling markets serving the ICI sector such as:

- In 2022, Québec's ICI sector recycled close to 7,000 MT of EPS due demand from a high concentration of PS manufacturers for the construction industry located in the province.
- In Ontario, approximately 20 hospitals are participating in a PVC recycling initiative to recover intravenous fluid bags, tubing, and oxygen masks. The material is collected and managed by Norwich Plastic, a PVC recycler located in Cambridge, Ontario.
- Across Canada, companies like RPM Eco and Pnewko Brothers, are specialized in processing HDPE jugs containing hazardous or special products such as lubricating oil and pesticides.
- The Alberta Beverage Container Recycling Corporation (ABCRC) is now reporting that they are able to recycle some of the flexible plastic bladders and pouches their contracted supplier, Merlin Plastics.
- Revolution Sustainable Solutions recently acquired PolyAg Recycling Ltd. to become the largest recycler of agricultural film in the region.

Table 55: Reprocessors of ICI post-consumer plastic in the Canadian market.

| Resin/Product | Province | Name |
|-----------------------|-------------|-----------------------------------|
| Automotive Containers | AB and ON | Pnewko Brothers Ltd |
| Automotive Containers | Canada | GFL Environmental Services Inc. |
| Automotive Containers | Canada (QC) | RPM Environment Ltd. |
| Automotive Containers | BC | Merlin Plastics Supply Inc. |
| Automotive Containers | AB | Environmental 360 Solutions |
| Automotive Containers | AB | Van Bradbant Oil Ltd. |
| Automotive Containers | MB | Dunford Holdings Inc. |
| Automotive Containers | AB | Full Circle Plastics Ltd. |
| Automotive Containers | US | KW Plastics, Recycling Div. |
| Automotive Containers | QC | Phoenix Services Environnementaux |
| Automotive Containers | SK | Steam-Est Industries (2015) Ltd. |
| Automotive Containers | SK | Titan Clean Energy Projects Corp. |

| Resin/Product | Province | Name |
|-------------------------------------|-----------------|--|
| Automotive Containers | SK | Tri-County Plastics Ltd. |
| Automotive Containers | AB | Precision Plastics |
| Automotive Containers | MB | The ROC – Tritec Concrete |
| Automotive Containers | MB | United Chemical Services Inc. |
| Automotive Containers | ON | Tomlinson Environmental Group |
| Automotive Containers | QC | Phoenix Services Environnementaux |
| FIBCs | US | Arch Polymers |
| FIBCs | BC | Merlin Plastics (ABCRC Totes) |
| PS | BC | Interone |
| PS | AB | StyroGo |
| PS | QC | Eco Captation |
| PS | QC | Soprema |
| PS | QC | Polystyvert |
| PS | AC | Scotia Recycling |
| Pallet wrap / LDPE film | BC | Merlin Plastics |
| Pallet wrap / LDPE film | AB | Revolution Sustainable Solutions, LLC (Revolution) |
| Pallet wrap / LDPE film | AB | EFS Plastics |
| Pallet wrap / LDPE film | ON | EFS Plastics |
| Pallet wrap / LDPE film | ON | Kal-Polymers |
| Pallet wrap / LDPE film | ON | NAM Polymers |
| Pallet wrap / LDPE film | QC | Modix Plastics |
| Pallet wrap / LDPE film | QC | Exxel Polymers |
| Pallet wrap / LDPE film | QC | Polykar |
| Pallet wrap / LDPE film | QC | Hood Packaging |
| Pallet wrap / LDPE film | AC | Scotia Recycling |
| PVC | ON | Norwich Plastics |
| Pails, buckets & barrels | BC | Merlin Plastics |
| Pails, buckets & barrels | BC | Fraser Plastics |
| Pails, buckets & barrels | AB | Fraser Plastics |
| Pails, buckets & barrels | AB | RBW Waste Management Ltd |
| Pails, buckets & barrels | ON | Bay Polymers |

| Resin/Product | Province | Name |
|-------------------------------------|-----------------|------------------------|
| Pails, buckets & barrels | ON | EFS Plastics |
| Pails, buckets & barrels | ON | ReVital |
| Pails, buckets & barrels | QC | Les Plastiques DC Inc. |
| Pails, buckets & barrels | QC | ATMPRQ |
| Pails, buckets & barrels | QC | Plastimum |
| Pails, buckets & barrels | QC | CED-LO |
| Pails, buckets & barrels | QC | EnergiPlast |
| Pails, buckets & barrels | AC | Scotia Recycling |

APPENDIX E: CONFIDENCE INTERVALS

Data Reliability

As with the Foundational Report, a significant finding of this 2023 Progress Report is that there are still gaps in data reliability and availability, which presents challenges for taking targeted system-level action. This report presents the best available information or, where data were limited or unavailable, the best estimate.

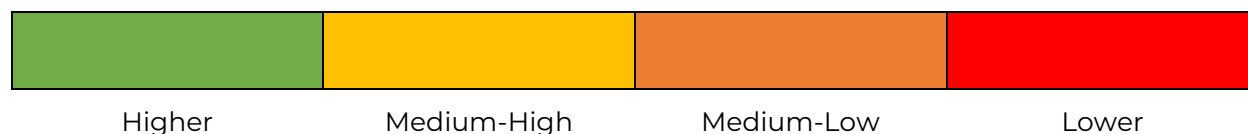
While data for plastic packaging managed under regulated DRSs and regulated EPR systems is generally more available, there is still markedly more detailed and comprehensive reporting occurring in the DRSs than in the PPP systems. Because of the financial accountability required with DRSs (i.e., the management of consumer deposits and refunds) data for DRSs track packaging by individual units from the point of supply to collection. At the point of collection, those containers are then source separated into marketable bales or totes. As a result, there is high confidence in these numbers.

Overall, the data available for PPP systems, even regulated systems, varies. The measurement and reporting of the generation, collection, sorting and recycling of plastic packaging, and resin types of that plastic packaging, remains inconsistent across systems. As a result, data gaps led to the application of confidence ranges that reflect uncertainty. The table below provides an overview of the confidence levels in the national data presented in the report.

Table 56: National data reliability.

| Categories | Generated | Collected | Sorted | Recycled |
|--------------------------------|-------------|-------------|-------------|-------------|
| DRSs | Higher | Higher | Higher | Medium-High |
| Residential PPP Systems | | | | |
| EPR | Medium-High | Medium-High | Medium-High | Medium-High |
| Non-EPR | Medium-Low | Medium-Low | Medium-High | Medium-High |
| ICI PPP | Lower | Lower | Lower | Lower |

Legend:



APPENDIX F: PROVINCIAL, TERRITORIAL, AND REGIONAL SUMMARIES

British Columbia

| | | Generated (MT) | | | Collected (MT) | | | Collected rate (%) | Sorted (MT) | | | Recycled (MT) | | | Recycled rate (%) |
|--------------------------------|-----------------------------------|----------------|---------|---------|----------------|--------|---------|--------------------|-------------|--------|---------|---------------|--------|---------|-------------------|
| | | Low | High | Average | Low | High | Average | | Low | High | Average | Low | High | Average | |
| 2019 | Rigid plastic packaging | 120,506 | 146,475 | 133,490 | 42,634 | 45,124 | 43,879 | 33% | 41,037 | 43,403 | 42,220 | 30,001 | 35,338 | 32,669 | 24% |
| | PET | 13,924 | 13,924 | 13,924 | 10,694 | 10,694 | 10,694 | 77% | 18,184 | 18,184 | 18,184 | 13,799 | 15,457 | 14,628 | 105% |
| | HDPE | - | - | - | - | - | - | - | 8,249 | 8,249 | 8,249 | 6,187 | 7,012 | 6,599 | - |
| | PET/HDPE | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Other - RPP | - | - | - | - | - | - | - | 7,900 | 7,900 | 7,900 | 4,944 | 6,008 | 5,476 | - |
| | Unclassified - RPP | 106,582 | 132,551 | 119,566 | 31,940 | 34,430 | 33,185 | - | 6,704 | 9,070 | 7,887 | 5,071 | 6,861 | 5,966 | - |
| | Flexible plastic packaging | 111,710 | 150,410 | 131,060 | 8,284 | 9,596 | 8,940 | 7% | 2,080 | 2,379 | 2,230 | 1,146 | 1,641 | 1,394 | 1% |
| | Film | - | - | - | - | - | - | - | 984 | 984 | 984 | 492 | 738 | 615 | - |
| | Laminates | 501 | 501 | 501 | 248 | 248 | 248 | 50% | 248 | 248 | 248 | 124 | 186 | 155 | 31% |
| | Unclassified - FPP | 111,210 | 149,910 | 130,560 | 8,036 | 9,348 | 8,692 | 7% | 848 | 1,147 | 998 | 530 | 717 | 624 | - |
| Total plastic packaging | 232,216 | 296,885 | 264,550 | 50,917 | 54,721 | 52,819 | 20% | 43,117 | 45,783 | 44,450 | 31,147 | 36,979 | 34,062 | 13% | |

| | | Generated (MT) | | | Collected (MT) | | | Collected rate (%) | Sorted (MT) | | | Recycled (MT) | | | Recycled rate (%) |
|--------------------------------|-----------------------------------|----------------|----------------|----------------|----------------|---------------|---------------|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|
| | | Low | High | Average | Low | High | Average | | Low | High | Average | Low | High | Average | |
| 2022 | Rigid plastic packaging | 145,042 | 174,689 | 159,098 | 61,935 | 61,935 | 61,935 | 39% | 60,032 | 60,032 | 60,032 | 43,258 | 49,418 | 46,338 | 29% |
| | PET | 32,324 | 32,324 | 32,324 | 19,013 | 19,013 | 19,013 | 59% | 26,061 | 26,061 | 26,061 | 19,832 | 22,152 | 20,992 | 65% |
| | HDPE | 15,748 | 15,748 | 15,748 | 7,231 | 7,231 | 7,231 | 46% | 11,752 | 11,752 | 11,752 | 8,996 | 9,989 | 9,493 | 60% |
| | PET/HDPE | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Other - RPP | 39,598 | 39,598 | 39,598 | 9,238 | 9,238 | 9,238 | 23% | 22,219 | 22,219 | 22,219 | 14,429 | 17,277 | 15,853 | 40% |
| | Unclassified - RPP | 57,372 | 87,019 | 71,428 | 26,452 | 26,452 | 26,452 | 0 | - | - | - | - | - | - | - |
| | Flexible plastic packaging | 99,281 | 116,246 | 107,324 | 11,769 | 11,769 | 11,769 | 11% | 9,287 | 9,287 | 9,287 | 5,915 | 7,473 | 6,694 | 6% |
| | Film | 63,561 | 63,561 | 63,561 | 6,445 | 6,445 | 6,445 | 10% | 9,027 | 9,027 | 9,027 | 5,785 | 7,278 | 6,532 | 10% |
| | Laminates | 596 | 596 | 596 | 260 | 260 | 260 | 44% | 260 | 260 | 260 | 130 | 195 | 163 | 27% |
| | Unclassified - FPP | 35,124 | 52,089 | 43,167 | 5,064 | 5,064 | 5,064 | 12% | - | - | - | - | - | - | - |
| Total plastic packaging | 244,322 | 290,935 | 266,422 | 73,704 | 73,704 | 73,704 | 28% | 69,319 | 69,319 | 69,319 | 49,172 | 56,892 | 53,032 | 20% | |

Alberta

| | | Generated (MT) | | | Collected (MT) | | | Collected rate (%) | Sorted (MT) | | | Recycled (MT) | | | Recycled rate (%) | |
|--------------------------------|-----------------------------------|----------------|----------------|----------------|----------------|---------------|---------------|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|---|
| | | Low | High | Average | Low | High | Average | | Low | High | Average | Low | High | Average | | |
| 2019 | Rigid plastic packaging | 113,229 | 138,564 | 125,896 | 32,232 | 37,643 | 34,938 | 28% | 26,662 | 27,316 | 26,989 | 20,138 | 22,347 | 21,243 | 17% | |
| | PET | 16,640 | 16,640 | 16,640 | 12,365 | 12,365 | 12,365 | 74% | 13,721 | 13,721 | 13,721 | 10,841 | 11,663 | 11,252 | 68% | |
| | HDPE | 7,276 | 7,276 | 7,276 | 7,081 | 7,081 | 7,081 | 97% | 8,486 | 8,486 | 8,486 | 6,719 | 7,214 | 6,966 | 96% | |
| | PET/HDPE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | Other - RPP | - | - | - | - | - | - | - | - | 2,602 | 2,602 | 2,602 | 1,301 | 1,743 | 1,522 | - |
| | Unclassified - RPP | 89,313 | 114,648 | 101,980 | 12,786 | 18,197 | 15,491 | - | 1,852 | 2,506 | 2,179 | 1,277 | 1,728 | 1,502 | - | |
| | Flexible plastic packaging | 104,780 | 134,783 | 119,781 | 8,063 | 11,130 | 9,597 | 8% | 1,355 | 1,455 | 1,405 | 690 | 1,009 | 849 | 1% | |
| | Film | - | - | - | - | - | - | - | - | 1,023 | 1,023 | 1,023 | 512 | 767 | 639 | - |
| | Laminates | 112 | 112 | 112 | 46 | 46 | 46 | 41% | 46 | 46 | 46 | - | - | - | 0% | |
| | Unclassified - FPP | 104,668 | 134,671 | 119,669 | 8,017 | 11,084 | 9,551 | 8% | 285 | 386 | 336 | 178 | 241 | 210 | - | |
| Total plastic packaging | 218,009 | 273,347 | 245,678 | 40,295 | 48,774 | 44,535 | 18% | 28,017 | 28,771 | 28,394 | 20,828 | 23,356 | 22,092 | 9% | | |
| 2022 | Rigid plastic packaging | 133,616 | 147,791 | 140,703 | 45,704 | 49,792 | 47,748 | 34% | 40,589 | 40,589 | 40,589 | 30,321 | 33,723 | 32,022 | 23% | |
| | PET | 31,345 | 31,345 | 31,345 | 19,062 | 19,062 | 19,062 | 61% | 19,628 | 19,628 | 19,628 | 15,352 | 16,683 | 16,018 | 51% | |
| | HDPE | 16,106 | 16,106 | 16,106 | 9,694 | 9,694 | 9,694 | 60% | 9,911 | 9,911 | 9,911 | 7,760 | 8,424 | 8,092 | 50% | |
| | PET/HDPE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | Other - RPP | 31,651 | 31,651 | 31,651 | 7,920 | 7,920 | 7,920 | 25% | 11,051 | 11,051 | 11,051 | 7,209 | 8,616 | 7,912 | 25% | |
| | Unclassified - RPP | 54,513 | 68,688 | 61,600 | 9,027 | 13,116 | 11,072 | - | - | - | - | - | - | - | - | |
| | Flexible plastic packaging | 116,098 | 129,739 | 122,919 | 12,187 | 14,558 | 13,373 | 11% | 1,115 | 1,115 | 1,115 | 660 | 851 | 756 | 1% | |
| | Film | 58,016 | 58,016 | 58,016 | 6,096 | 6,096 | 6,096 | 11% | 1,067 | 1,067 | 1,067 | 660 | 851 | 756 | 1% | |
| | Laminates | 100 | 100 | 100 | 48 | 48 | 48 | 48% | 48 | 48 | 48 | - | - | - | 0% | |
| | Unclassified - FPP | 57,983 | 71,623 | 64,803 | 6,043 | 8,414 | 7,228 | 11% | - | - | - | - | - | - | - | |
| Total plastic packaging | 249,714 | 277,529 | 263,622 | 57,890 | 64,351 | 61,121 | 23% | 41,703 | 41,703 | 41,703 | 30,981 | 34,574 | 32,777 | 12% | | |

Saskatchewan

| | | Generated (MT) | | | Collected (MT) | | | Collected rate (%) | Sorted (MT) | | | Recycled (MT) | | | Recycled rate (%) |
|------|-----------------------------------|----------------|---------------|---------------|----------------|---------------|---------------|--------------------|---------------|---------------|---------------|---------------|--------------|--------------|-------------------|
| | | Low | High | Average | Low | High | Average | | Low | High | Average | Low | High | Average | |
| 2019 | Rigid plastic packaging | 22,036 | 27,343 | 24,689 | 7,812 | 9,047 | 8,430 | 34% | 7,329 | 7,799 | 7,564 | 5,445 | 6,239 | 5,842 | 24% |
| | PET | 3,803 | 3,803 | 3,803 | 3,103 | 3,103 | 3,103 | 82% | 3,375 | 3,375 | 3,375 | 2,673 | 2,869 | 2,771 | 73% |
| | HDPE | 1,025 | 1,025 | 1,025 | 991 | 991 | 991 | 97% | 1,831 | 1,831 | 1,831 | 1,423 | 1,557 | 1,490 | 145% |
| | PET/HDPE | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Other - RPP | - | - | - | 33 | 33 | 33 | - | 793 | 793 | 793 | 406 | 537 | 472 | - |
| | Unclassified - RPP | 17,208 | 22,516 | 19,862 | 3,685 | 4,921 | 4,303 | - | 1,331 | 1,800 | 1,565 | 943 | 1,276 | 1,110 | - |
| | Flexible plastic packaging | 20,897 | 27,591 | 24,244 | 1,612 | 2,127 | 1,870 | 8% | - | - | - | - | - | - | 0% |
| | Film | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Laminates | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Unclassified - FPP | 20,897 | 27,591 | 24,244 | 1,612 | 2,127 | 1,870 | 8% | - | - | - | - | - | - | - |
| | Total plastic packaging | 42,932 | 54,934 | 48,933 | 9,424 | 11,175 | 10,300 | 21% | 7,329 | 7,799 | 7,564 | 5,445 | 6,239 | 5,842 | 12% |
| 2022 | Rigid plastic packaging | 30,707 | 30,815 | 30,761 | 13,146 | 13,225 | 13,186 | 43% | 10,058 | 10,058 | 10,058 | 7,576 | 8,425 | 8,000 | 26% |
| | PET | 7,166 | 7,166 | 7,166 | 4,722 | 4,722 | 4,722 | 66% | 4,760 | 4,760 | 4,760 | 3,726 | 4,046 | 3,886 | 54% |
| | HDPE | 4,760 | 4,760 | 4,760 | 1,939 | 1,939 | 1,939 | 41% | 2,612 | 2,612 | 2,612 | 2,007 | 2,220 | 2,114 | 44% |
| | PET/HDPE | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Other - RPP | 8,652 | 8,652 | 8,652 | 2,606 | 2,606 | 2,606 | 30% | 2,687 | 2,687 | 2,687 | 1,843 | 2,159 | 2,001 | 23% |
| | Unclassified - RPP | 10,129 | 10,237 | 10,183 | 3,879 | 3,958 | 3,919 | - | - | - | - | - | - | - | - |
| | Flexible plastic packaging | 31,295 | 31,524 | 31,409 | 2,986 | 2,986 | 2,986 | 10% | 201 | 201 | 201 | 150 | 170 | 160 | 1% |
| | Film | 22,023 | 22,023 | 22,023 | 2,406 | 2,406 | 2,406 | 11% | 201 | 201 | 201 | 150 | 170 | 160 | 1% |
| | Laminates | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Unclassified - FPP | 9,272 | 9,501 | 9,386 | 580 | 580 | 580 | 6% | - | - | - | - | - | - | 0% |
| | Total plastic packaging | 62,002 | 62,338 | 62,170 | 16,132 | 16,211 | 16,172 | 26% | 10,259 | 10,259 | 10,259 | 7,726 | 8,595 | 8,161 | 13% |

Manitoba

| | | Generated (MT) | | | Collected (MT) | | | Collected rate (%) | Sorted (MT) | | | Recycled (MT) | | | Recycled rate (%) |
|------|-----------------------------------|----------------|---------------|---------------|----------------|---------------|---------------|--------------------|---------------|---------------|---------------|---------------|--------------|--------------|-------------------|
| | | Low | High | Average | Low | High | Average | | Low | High | Average | Low | High | Average | |
| 2019 | Rigid plastic packaging | 34,466 | 39,288 | 36,877 | 13,900 | 14,845 | 14,372 | 39% | 9,137 | 9,758 | 9,447 | 6,174 | 7,693 | 6,933 | 19% |
| | PET | 8,994 | 8,994 | 8,994 | 5,764 | 5,764 | 5,764 | 64% | 3,971 | 3,971 | 3,971 | 2,780 | 3,376 | 3,078 | 34% |
| | HDPE | 4,439 | 4,439 | 4,439 | 3,136 | 3,136 | 3,136 | 71% | 1,598 | 1,598 | 1,598 | 1,199 | 1,358 | 1,279 | 29% |
| | PET/HDPE | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Other - RPP | 7,370 | 7,370 | 7,370 | 2,322 | 2,322 | 2,322 | 32% | 1,807 | 1,807 | 1,807 | 904 | 1,211 | 1,057 | 14% |
| | Unclassified - RPP | 13,663 | 18,485 | 16,074 | 2,678 | 3,623 | 3,150 | 0 | 1,760 | 2,381 | 2,071 | 1,292 | 1,748 | 1,520 | - |
| | Flexible plastic packaging | 27,534 | 33,848 | 30,691 | 2,478 | 2,976 | 2,727 | 9% | - | - | - | - | - | - | 0% |
| | Film | 5,112 | 5,112 | 5,112 | 651 | 651 | 651 | 13% | - | - | - | - | - | - | 0% |
| | Laminates | 4,533 | 4,533 | 4,533 | 416 | 416 | 416 | 9% | - | - | - | - | - | - | 0% |
| | Unclassified - FPP | 17,889 | 24,203 | 21,046 | 1,411 | 1,909 | 1,660 | 8% | - | - | - | - | - | - | - |
| | Total plastic packaging | 62,000 | 73,136 | 67,568 | 16,377 | 17,820 | 17,099 | 25% | 9,137 | 9,758 | 9,447 | 6,174 | 7,693 | 6,933 | 10% |
| 2022 | Rigid plastic packaging | 35,850 | 42,259 | 39,055 | 16,396 | 17,394 | 16,895 | 43% | 10,095 | 10,095 | 10,095 | 6,718 | 8,022 | 7,370 | 19% |
| | PET | 10,535 | 14,418 | 12,477 | 6,113 | 7,770 | 6,941 | 56% | 4,701 | 4,701 | 4,701 | 3,179 | 3,802 | 3,490 | 28% |
| | HDPE | 7,084 | 8,497 | 7,790 | 3,790 | 4,249 | 4,019 | 52% | 1,589 | 1,589 | 1,589 | 1,192 | 1,351 | 1,271 | 16% |
| | PET/HDPE | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Other - RPP | 18,231 | 19,344 | 18,788 | 6,494 | 5,375 | 5,935 | 32% | 3,805 | 3,805 | 3,805 | 2,347 | 2,870 | 2,609 | 14% |
| | Unclassified - RPP | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Flexible plastic packaging | 26,531 | 30,277 | 28,404 | 3,517 | 3,536 | 3,526 | 12% | 64 | 64 | 64 | 43 | 53 | 48 | 0% |
| | Film | 23,134 | 25,146 | 24,140 | 2,938 | 3,106 | 3,022 | 13% | 64 | 64 | 64 | 43 | 53 | 48 | <1% |
| | Laminates | 3,397 | 5,131 | 4,264 | 579 | 429 | 504 | 12% | - | - | - | - | - | - | 0% |
| | Unclassified - FPP | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Total plastic packaging | 62,381 | 72,536 | 67,459 | 19,913 | 20,930 | 20,422 | 30% | 10,159 | 10,159 | 10,159 | 6,761 | 8,075 | 7,418 | 11% |

Ontario

| | | Generated (MT) | | | Collected (MT) | | | Collected rate (%) | Sorted (MT) | | | Recycled (MT) | | | Recycled rate (%) |
|------|-----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------------|
| | | Low | High | Average | Low | High | Average | | Low | High | Average | Low | High | Average | |
| 2019 | Rigid plastic packaging | 339,601 | 445,739 | 392,671 | 107,053 | 150,711 | 128,881 | 33% | 109,393 | 116,819 | 113,106 | 74,367 | 92,560 | 83,463 | 21% |
| | PET | 88,492 | 116,827 | 102,660 | 47,244 | 66,021 | 56,632 | 55% | 52,216 | 52,216 | 52,216 | 36,648 | 44,383 | 40,516 | 39% |
| | HDPE | 30,762 | 37,591 | 34,177 | 15,451 | 21,160 | 18,305 | 54% | 15,650 | 15,650 | 15,650 | 11,738 | 13,303 | 12,520 | 37% |
| | PET/HDPE | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Other - RPP | 77,785 | 98,443 | 88,114 | 20,359 | 31,061 | 25,710 | 29% | 20,488 | 20,488 | 20,488 | 10,472 | 13,891 | 12,181 | 14% |
| | Unclassified - RPP | 142,562 | 192,878 | 167,720 | 23,999 | 32,469 | 28,234 | - | 21,039 | 28,465 | 24,752 | 15,509 | 20,983 | 18,246 | - |
| | Flexible plastic packaging | 292,425 | 380,664 | 336,545 | 24,732 | 36,683 | 30,707 | 9% | 14,529 | 16,806 | 15,667 | 8,071 | 11,513 | 9,792 | 3% |
| | Film | 69,675 | 83,425 | 76,550 | 9,119 | 14,903 | 12,011 | 16% | 8,075 | 8,075 | 8,075 | 4,037 | 6,056 | 5,047 | 7% |
| | Laminates | 32,257 | 39,513 | 35,885 | 2,964 | 4,667 | 3,815 | 11% | - | - | - | - | - | - | 0% |
| | Unclassified - FPP | 190,493 | 257,726 | 224,110 | 12,649 | 17,113 | 14,881 | 7% | 6,454 | 8,731 | 7,592 | 4,034 | 5,457 | 4,745 | 2% |
| | Total plastic packaging | 632,026 | 826,403 | 729,216 | 131,785 | 187,395 | 159,588 | 22% | 123,922 | 133,625 | 128,773 | 82,438 | 104,073 | 93,256 | 13% |
| 2022 | Rigid plastic packaging | 378,476 | 509,944 | 439,418 | 140,624 | 189,364 | 163,044 | 37% | 146,166 | 146,166 | 146,166 | 101,704 | 120,661 | 111,183 | 25% |
| | PET | 127,202 | 183,760 | 154,167 | 63,432 | 86,739 | 74,708 | 48% | 75,901 | 75,901 | 75,901 | 53,977 | 64,516 | 59,247 | 38% |
| | HDPE | 63,423 | 99,320 | 77,894 | 29,558 | 41,453 | 33,933 | 44% | 24,693 | 24,693 | 24,693 | 18,520 | 20,989 | 19,754 | 25% |
| | PET/HDPE | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Other - RPP | 187,850 | 226,864 | 207,357 | 47,635 | 61,172 | 54,403 | 26% | 45,571 | 45,571 | 45,571 | 29,207 | 35,156 | 32,182 | 16% |
| | Unclassified - RPP | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Flexible plastic packaging | 263,918 | 303,829 | 283,874 | 36,110 | 45,856 | 40,983 | 14% | 21,924 | 21,924 | 21,924 | 14,219 | 17,745 | 15,982 | 6% |
| | Film | 227,489 | 248,151 | 237,820 | 34,399 | 40,771 | 37,585 | 16% | 21,924 | 21,924 | 21,924 | 14,219 | 17,745 | 15,982 | 7% |
| | Laminates | 36,429 | 55,678 | 46,053 | 1,710 | 5,085 | 3,398 | 7% | - | - | - | - | - | - | 0% |
| | Unclassified - FPP | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Total plastic packaging | 642,393 | 813,773 | 723,292 | 176,734 | 235,220 | 204,026 | 28% | 168,089 | 168,089 | 168,089 | 115,923 | 138,407 | 127,165 | 18% |

Québec

| | | Generated (MT) | | | Collected (MT) | | | Collected rate (%) | Sorted (MT) | | | Recycled (MT) | | | Recycled rate (%) |
|------|-----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|
| | | Low | High | Average | Low | High | Average | | Low | High | Average | Low | High | Average | |
| 2019 | Rigid plastic packaging | 193,939 | 223,653 | 208,796 | 74,101 | 79,931 | 77,016 | 37% | 59,024 | 63,601 | 61,312 | 40,446 | 50,025 | 45,235 | 22% |
| | PET | 48,263 | 48,263 | 48,263 | 29,900 | 29,900 | 29,900 | 62% | 25,247 | 25,247 | 25,247 | 18,073 | 21,460 | 19,766 | 41% |
| | HDPE | 18,208 | 18,208 | 18,208 | 12,448 | 12,448 | 12,448 | 68% | 9,920 | 9,920 | 9,920 | 7,440 | 8,432 | 7,936 | 44% |
| | PET/HDPE | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Other - RPP | 43,278 | 43,278 | 43,278 | 15,233 | 15,233 | 15,233 | 35% | 10,890 | 10,890 | 10,890 | 5,445 | 7,296 | 6,371 | 15% |
| | Unclassified - RPP | 84,190 | 113,904 | 99,047 | 16,520 | 22,350 | 19,435 | - | 12,967 | 17,543 | 15,255 | 9,488 | 12,836 | 11,162 | - |
| | Flexible plastic packaging | 179,672 | 218,571 | 199,122 | 23,562 | 26,635 | 25,098 | 13% | 793 | 896 | 845 | 433 | 623 | 528 | 0% |
| | Film | 36,480 | 36,480 | 36,480 | 9,527 | 9,527 | 9,527 | 26% | 500 | 500 | 500 | 250 | 375 | 313 | 1% |
| | Laminates | 32,980 | 32,980 | 32,980 | 5,328 | 5,328 | 5,328 | 16% | - | - | - | - | - | - | 0% |
| | Unclassified - FPP | 110,212 | 149,111 | 129,662 | 8,707 | 11,780 | 10,243 | 8% | 293 | 396 | 345 | 183 | 248 | 215 | - |
| | Total plastic packaging | 373,611 | 442,224 | 407,918 | 97,663 | 106,566 | 102,114 | 25% | 59,817 | 64,497 | 62,157 | 40,879 | 50,648 | 45,763 | 11% |
| 2022 | Rigid plastic packaging | 262,342 | 262,342 | 262,342 | 108,294 | 108,294 | 108,294 | 41% | 75,299 | 75,299 | 75,299 | 52,203 | 61,736 | 56,970 | 22% |
| | PET | 85,517 | 85,517 | 85,517 | 49,504 | 49,504 | 49,504 | 58% | 36,496 | 36,496 | 36,496 | 26,251 | 31,022 | 28,636 | 33% |
| | HDPE | 49,673 | 49,673 | 49,673 | 20,335 | 20,335 | 20,335 | 41% | 13,954 | 13,954 | 13,954 | 10,465 | 11,861 | 11,163 | 22% |
| | PET/HDPE | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Other - RPP | 127,151 | 127,151 | 127,151 | 38,455 | 38,455 | 38,455 | 30% | 24,849 | 24,849 | 24,849 | 15,487 | 18,854 | 17,171 | 14% |
| | Unclassified - RPP | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Flexible plastic packaging | 173,021 | 173,021 | 173,021 | 33,605 | 33,605 | 33,605 | 19% | 4,298 | 4,298 | 4,298 | 2,648 | 3,423 | 3,036 | 2% |
| | Film | 132,632 | 132,632 | 132,632 | 22,936 | 22,936 | 22,936 | 17% | 4,298 | 4,298 | 4,298 | 2,648 | 3,423 | 3,036 | 2% |
| | Laminates | 40,389 | 40,389 | 40,389 | 10,669 | 10,669 | 10,669 | 26% | - | - | - | - | - | - | 0% |
| | Unclassified - FPP | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Total plastic packaging | 435,362 | 435,362 | 435,362 | 141,899 | 141,899 | 141,899 | 33% | 79,597 | 79,597 | 79,597 | 54,852 | 65,159 | 60,005 | 14% |

Atlantic Canada

| | | Generated (MT) | | | Collected (MT) | | | Collected rate (%) | Sorted (MT) | | | Recycled (MT) | | | Recycled rate (%) |
|------|-----------------------------------|----------------|----------------|----------------|----------------|---------------|---------------|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|
| | | Low | High | Average | Low | High | Average | | Low | High | Average | Low | High | Average | |
| 2019 | Rigid plastic packaging | 65,477 | 81,561 | 73,518 | 22,734 | 24,046 | 23,390 | 32% | 19,641 | 20,676 | 20,159 | 14,168 | 16,492 | 15,330 | 21% |
| | PET | 17,286 | 18,480 | 17,883 | 10,536 | 10,536 | 10,536 | 59% | 7,689 | 7,689 | 7,689 | 5,954 | 6,536 | 6,245 | 35% |
| | HDPE | 8,463 | 11,013 | 9,738 | 3,632 | 3,632 | 3,632 | 37% | 3,655 | 3,655 | 3,655 | 2,747 | 3,107 | 2,927 | 30% |
| | PET/HDPE | 3,011 | 3,011 | 3,011 | 2,195 | 2,195 | 2,195 | 73% | 2,195 | 2,195 | 2,195 | 1,756 | 1,866 | 1,811 | 60% |
| | Other - RPP | 14,876 | 19,507 | 17,191 | 2,653 | 2,653 | 2,653 | 15% | 3,170 | 3,170 | 3,170 | 1,608 | 2,138 | 1,873 | 11% |
| | Unclassified - RPP | 21,841 | 29,550 | 25,695 | 3,718 | 5,030 | 4,374 | - | 2,933 | 3,968 | 3,450 | 2,103 | 2,845 | 2,474 | - |
| | Flexible plastic packaging | 46,116 | 60,564 | 53,339 | 6,255 | 6,946 | 6,600 | 12% | 4,921 | 5,465 | 5,193 | 2,653 | 3,838 | 3,246 | 6% |
| | Film | 10,941 | 13,989 | 12,465 | 3,241 | 3,241 | 3,241 | 26% | 3,379 | 3,379 | 3,379 | 1,689 | 2,534 | 2,112 | 17% |
| | Laminates | 6,031 | 7,144 | 6,587 | 1,054 | 1,054 | 1,054 | 16% | - | - | - | - | - | - | 0% |
| | Unclassified - FPP | 29,144 | 39,431 | 34,287 | 1,960 | 2,651 | 2,305 | 7% | 1,542 | 2,086 | 1,814 | 964 | 1,304 | 1,134 | 3% |
| | Total plastic packaging | 111,593 | 142,124 | 126,858 | 28,988 | 30,992 | 29,990 | 24% | 24,562 | 26,141 | 25,352 | 16,820 | 20,329 | 18,575 | 15% |
| 2022 | Rigid plastic packaging | 85,355 | 95,380 | 90,368 | 32,660 | 32,660 | 32,660 | 36% | 18,082 | 18,082 | 18,082 | 13,618 | 15,095 | 14,356 | 16% |
| | PET | 29,743 | 31,173 | 30,458 | 15,182 | 15,182 | 15,182 | 50% | 8,145 | 8,145 | 8,145 | 6,387 | 6,924 | 6,655 | 22% |
| | HDPE | 15,585 | 18,637 | 17,111 | 6,362 | 6,362 | 6,362 | 37% | 2,716 | 2,716 | 2,716 | 2,038 | 2,308 | 2,173 | 13% |
| | PET/HDPE | 3,711 | 3,711 | 3,711 | 3,026 | 3,026 | 3,026 | 82% | 3,026 | 3,026 | 3,026 | 2,421 | 2,572 | 2,496 | 67% |
| | Other - RPP | 36,316 | 41,859 | 39,087 | 8,090 | 8,090 | 8,090 | 21% | 4,195 | 4,195 | 4,195 | 2,771 | 3,291 | 3,031 | 8% |
| | Unclassified - RPP | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Flexible plastic packaging | 47,828 | 52,917 | 50,373 | 5,687 | 6,897 | 6,292 | 12% | 3,629 | 3,629 | 3,629 | 2,285 | 2,910 | 2,597 | 5% |
| | Film | 40,550 | 44,305 | 42,428 | 4,415 | 5,627 | 5,021 | 12% | 3,629 | 3,629 | 3,629 | 2,285 | 2,910 | 2,597 | 6% |
| | Laminates | 7,278 | 8,611 | 7,945 | 1,272 | 1,270 | 1,271 | 16% | - | - | - | - | - | - | 0% |
| | Unclassified - FPP | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Total plastic packaging | 133,183 | 148,297 | 140,740 | 38,347 | 39,557 | 38,952 | 28% | 21,711 | 21,711 | 21,711 | 15,903 | 18,005 | 16,954 | 12% |

Territories

| | | Generated (MT) | | | Collected (MT) | | | Collected rate (%) | Sorted (MT) | | | Recycled (MT) | | | Recycled rate (%) |
|------|-----------------------------------|----------------|--------------|--------------|----------------|------------|------------|--------------------|-------------|------------|------------|---------------|------------|------------|-------------------|
| | | Low | High | Average | Low | High | Average | | Low | High | Average | Low | High | Average | |
| 2019 | Rigid plastic packaging | 1,428 | 1,795 | 1,611 | 307 | 307 | 307 | 19% | 307 | 307 | 307 | 246 | 261 | 253 | 16% |
| | PET | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | HDPE | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | PET/HDPE | 388 | 388 | 388 | 307 | 307 | 307 | 79% | 307 | 307 | 307 | 246 | 261 | 253 | 65% |
| | Other - RPP | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Unclassified - RPP | 1,040 | 1,407 | 1,223 | - | - | - | - | - | - | - | - | - | - | - |
| | Flexible plastic packaging | 1,560 | 2,111 | 1,835 | - | - | - | 0% | - | - | - | - | - | - | 0% |
| | Film | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Laminates | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Unclassified - FPP | 1,560 | 2,111 | 1,835 | - | - | - | 0% | - | - | - | - | - | - | 0% |
| | Total plastic packaging | 2,988 | 3,905 | 3,446 | 307 | 307 | 307 | 9% | 307 | 307 | 307 | 246 | 261 | 253 | 7% |
| 2022 | Rigid plastic packaging | 1,528 | 1,528 | 1,528 | 670 | 670 | 670 | 44% | 670 | 670 | 670 | 515 | 570 | 542 | 36% |
| | PET | 313 | 313 | 313 | 174 | 174 | 174 | 56% | 174 | 174 | 174 | 130 | 148 | 139 | 44% |
| | HDPE | 191 | 191 | 191 | 76 | 76 | 76 | 40% | 76 | 76 | 76 | 57 | 65 | 61 | 32% |
| | PET/HDPE | 395 | 395 | 395 | 251 | 251 | 251 | 64% | 251 | 251 | 251 | 201 | 214 | 207 | 53% |
| | Other - RPP | 629 | 629 | 629 | 169 | 169 | 169 | 27% | 169 | 169 | 169 | 127 | 144 | 135 | 22% |
| | Unclassified - RPP | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Flexible plastic packaging | 779 | 779 | 779 | 55 | 55 | 55 | 7% | - | - | - | - | - | - | 0% |
| | Film | 779 | 779 | 779 | 55 | 55 | 55 | 7% | - | - | - | - | - | - | 0% |
| | Laminates | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Unclassified - FPP | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Total plastic packaging | 2,306 | 2,306 | 2,306 | 725 | 725 | 725 | 31% | 670 | 670 | 670 | 515 | 570 | 542 | 24% |

Canada-wide

| | | Generated (MT) | | | Collected (MT) | | | Collected rate (%) | Sorted (MT) | | | Recycled (MT) | | | Recycled rate (%) |
|------|-----------------------------------|------------------|------------------|------------------|----------------|----------------|----------------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------------|
| | | Low | High | Average | Low | High | Average | | Low | High | Average | Low | High | Average | |
| 2019 | Rigid plastic packaging | 890,681 | 1,104,418 | 997,550 | 300,773 | 361,656 | 331,213 | 33% | 272,531 | 289,679 | 281,105 | 190,985 | 230,955 | 210,969 | 21% |
| | PET | 197,402 | 226,931 | 212,167 | 119,606 | 138,383 | 128,994 | 61% | 124,404 | 124,404 | 124,404 | 90,768 | 105,743 | 98,256 | 46% |
| | HDPE | 70,173 | 79,552 | 74,863 | 42,739 | 48,448 | 45,593 | 61% | 49,390 | 49,390 | 49,390 | 37,453 | 41,983 | 39,717 | 53% |
| | PET/HDPE | 3,399 | 3,399 | 3,399 | 2,502 | 2,502 | 2,502 | 74% | 2,502 | 2,502 | 2,502 | 2,002 | 2,127 | 2,064 | 61% |
| | Other - RPP | 143,309 | 168,598 | 155,953 | 40,600 | 51,302 | 45,951 | 29% | 47,650 | 47,650 | 47,650 | 25,080 | 32,825 | 28,952 | 19% |
| | Unclassified - RPP | 476,398 | 625,938 | 551,168 | 95,325 | 121,020 | 108,173 | - | 48,586 | 65,734 | 57,160 | 35,683 | 48,277 | 41,980 | - |
| | Flexible plastic packaging | 784,695 | 1,008,541 | 896,617 | 74,985 | 96,094 | 85,539 | 10% | 23,677 | 27,002 | 25,339 | 12,992 | 18,623 | 15,809 | 2% |
| | Film | 122,208 | 139,006 | 130,607 | 22,538 | 28,322 | 25,430 | 19% | 13,961 | 13,961 | 13,961 | 6,980 | 10,470 | 8,726 | 7% |
| | Laminates | 76,414 | 84,783 | 80,598 | 10,056 | 11,759 | 10,907 | 14% | 294 | 294 | 294 | 124 | 186 | 155 | <1% |
| | Unclassified - FPP | 586,073 | 784,752 | 685,412 | 42,391 | 56,013 | 49,202 | 7% | 9,422 | 12,747 | 11,084 | 5,888 | 7,967 | 6,928 | 1% |
| | Total plastic packaging | 1,675,376 | 2,112,958 | 1,894,167 | 375,757 | 457,749 | 416,752 | 22% | 296,208 | 316,681 | 306,445 | 203,977 | 249,578 | 226,778 | 12% |
| 2022 | Rigid plastic packaging | 1,072,915 | 1,264,747 | 1,163,272 | 419,429 | 473,334 | 444,431 | 38% | 360,991 | 360,991 | 360,991 | 255,912 | 297,651 | 276,781 | 24% |
| | PET | 324,146 | 386,017 | 353,767 | 177,201 | 202,166 | 189,306 | 54% | 175,866 | 175,866 | 175,866 | 128,835 | 149,292 | 139,064 | 39% |
| | HDPE | 172,569 | 212,931 | 189,272 | 78,984 | 91,339 | 83,589 | 44% | 67,302 | 67,302 | 67,302 | 51,035 | 57,206 | 54,121 | 29% |
| | PET/HDPE | 4,106 | 4,106 | 4,106 | 3,277 | 3,277 | 3,277 | 80% | 3,277 | 3,277 | 3,277 | 2,622 | 2,786 | 2,704 | 66% |
| | Other - RPP | 450,080 | 495,749 | 472,914 | 120,608 | 133,026 | 126,817 | 27% | 114,546 | 114,546 | 114,546 | 73,421 | 88,366 | 80,893 | 17% |
| | Unclassified - RPP | 122,014 | 165,944 | 143,212 | 39,359 | 43,526 | 41,443 | - | - | - | - | - | - | - | - |
| | Flexible plastic packaging | 758,750 | 838,332 | 798,102 | 105,915 | 119,262 | 112,589 | 14% | 40,516 | 40,516 | 40,516 | 25,920 | 32,626 | 29,273 | 4% |
| | Film | 568,183 | 594,613 | 581,398 | 79,691 | 87,443 | 83,567 | 14% | 40,208 | 40,208 | 40,208 | 25,790 | 32,431 | 29,111 | 5% |
| | Laminates | 88,189 | 110,506 | 99,348 | 14,538 | 17,762 | 16,150 | 16% | 308 | 308 | 308 | 130 | 195 | 163 | <1% |
| | Unclassified - FPP | 102,378 | 133,213 | 117,357 | 11,686 | 14,058 | 12,872 | 11% | - | - | - | - | - | - | - |
| | Total plastic packaging | 1,831,665 | 2,103,078 | 1,961,374 | 525,344 | 592,596 | 557,020 | 28% | 401,507 | 401,507 | 401,507 | 281,833 | 330,276 | 306,055 | 16% |