GUIDANCE DOCUMENT

CANADA PLASTICS PACT

Integrating **Post-Consumer Recycled Content (PCR) in Plastic Packaging**

DECEMBER 2023

Contents

Acknowledgements

The Canada Plastics Pact (CPP) wishes to acknowledge the PCR Guides of The Australian Packaging Covenant Organization (APCO) and the US Plastics Pact, both of which influenced the development of this Guide. In addition, the CPP acknowledges and thanks the CPP Recycled Content Working Group for the work in putting this document together.

Setting the Context

Rising to the Challenge

While global efforts are underway to tackle the plastic pollution challenge, the data suggests we are still heading in the wrong direction. In just two years, from 2019 to 2021, global plastic waste increased by an equivalent of 1 kilogram for each person on the planet, and the forecasts are equally disturbing — single-use plastics are projected to surge to nearly 150 million metric tonnes by 2027[1].

In Canada, 978,743 metric tonnes of plastic packaging is generated in deposit return systems and residential systems. Based on the most current and reliable data available, it is estimated that 20% of plastic packaging was recycled in Canada in 2022, with flexible packaging having a recycling rate as low as 4%.[2]

These current realities for plastic packaging provide a transformative opportunity for the plastics packaging industry to stay ahead of the market, remove the burden of waste and align with ESG goals, and foster economic growth.

[1] Plastic Waste Makers Index. Minderoo Foundation. https://cdn.minderoo.org/content/uploads/2023/02/04205527/Plastic-Waste-Makers-Index-2023.pdf
[2] Canada Plastics Pact (2023). *Tomorrow starts today 2022 Annual Report*. Canada Plastics Pact. https://plasticspact.ca/2022-annual-report

Setting the Context (cont'd)

To address this challenge, packaging options must be evaluated on a product by product basis. That is why CPP Partners have committed to our vision and to achieving our four targets as a collective. This deliverable is in line with the Key Opening Move 2.5.2 in CPP's Roadmap to 2025, which identifies the need to develop guidance on contracting and technical inputs to aid the procurement practices and policies of CPP Signatories to promote the adoption and use of PCR content.

TARGET 1

Define a list of plastic packaging that is designated as unnecessary or problematic and take measures to eliminate them by 2025.

TARGET 2

Support efforts towards 100% of plastic packaging being designed to be reusable, recyclable or compostable by 2025.

TARGET 3

Undertake ambitious actions to ensure that at least 50% of plastic packaging is effectively recycled or compostable by 2025.

TARGET 4

Ensure an average of at least 30% recycled content across all plastic packaging (by weight) by 2025.

A first step is determining whether opportunities exist to eliminate the package, as well as exploring reusable formats or other alternatives that will not affect the product or create unintended consequences, such as increased negative economic, environmental, or social impacts. There is a growing global movement underway with companies opting for reuse and refill options, underscoring the important need to transition away from single-use plastics to more sustainable options. Once it has been determined that the plastic packaging format is the best use case, consideration should be given to ensure the package is designed for recyclability and efforts made to integrate post-consumer recycled (PCR) content into the new package where available.

About this Guide

This CPP Guidance Document on *Integrating PCR Content in Plastic Packaging* (i.e., PCR Integration Guide) is designed to support CPP Partners in their efforts to achieve a minimum of 30% recycled content across all plastic packaging.

Target Audience

This Guide is written for brand owners, producers, manufacturers, and plastic packaging converters, providing the basic knowledge needed to make informed decisions with respect to incorporating recycled content into plastic packaging.

How to Use This Guide

Brand owners, producers, manufacturers, and converters have the potential to shift the market by modifying their package designs and procurement policies to require greater amounts of recycled content in packaging. Companies can use this document to understand the benefits of using PCR, where it is being used today and availability of supply. It provides a detailed eight-step process that can support brand owners and producers with increasing the amount of recycled content used in plastic packaging.

Current State & Background

Charting the Path to Circular Plastics Packaging: The Role of PCR Content

What is PCR?

Recycled content is the proportion (by mass-weight) of recycled material used in packaging (International Standards Organization 14021). It can be in the form of either post-consumer recycled content (PCR) or pre-consumer (or post-industrial) recycled content (PIR).

PCR is material generated by end-users of a product that has fulfilled its purpose. CPP's Target 4 — to achieve a minimum of 30% recycled content across all plastic packaging — is specific to PCR.

Consumers by definition can be households or commercial/industrial/institutional facilities. For example, when a household places its plastic containers in the blue bin for collection, these containers eventually get recycled and reprocessed into new PCR plastic resin. Another example of PCR is after pallet wrap (i.e., secondary packaging) has been used, collected, and re-processed, it can be created into new packaging as PCR.

PIR, on the other hand, is when the raw material generated as a waste byproduct from the manufacturing of packaging or other industrial processes is recycled and reintegrated into new packaging. As an alternative form of recycled content, PIR is not considered in this document, but is explained in Appendix A for information purposes only. It is important to note that pre-consumer material/PIR is not considered as accepted recycled content in the Canadian Federal Government's currently proposed regulations.

Placing PCR in the Waste Hierarchy

Achieving high levels of PCR in plastic packaging is a solution pathway on the road to more circular packaging (see CPP Roadmap 2025 strategy diagram — page 11).[3] However, manufacturing plastic packaging with increased levels of recycled content while preserving the packages' intended purpose and functions requires both innovative design and a viable supply of clean, recyclable plastic packaging material (feedstock) that can be transformed into recycled resin.

One of the primary hurdles for organizations looking to integrate more recycled content into their packaging is access to adequate supplies of PCR resins for suitable product applications. Given this current reality in Canada, companies should first work to eliminate all non-essential and/or problematic packaging where possible (guidance on unnecessary and problematic plastics slated for Q1 2024), as well as transition towards the use of more mono-material structures where flexible packaging is relevant (see CPP Pathways to Mono-Material Flexible Packaging), in order to improve the recyclability of the package. The Golden Design Rules for Plastics Packaging and The Association of Plastic Recyclers' (APR) Design Guide for Plastics Recyclability also provide guidance and a framework that support innovation and scalable actions, focused on the use of less plastic packaging overall, as well as easier to recycle plastic packaging.

Following the evaluation of a company's packaging portfolios inline with the above measures, businesses can look to advance the goal of incorporating greater amounts of recycled content into their plastic packaging to gain the associated benefits (see page 8: Why Use PCR?). That pursuit will take commitment, effort, and investment. While the integration of PCR into existing plastic packaging designs can be challenging, companies are continuing to innovate in terms of specific material applications and design processes in order to overcome barriers and improve the options for the integration of PCR into all types of packaging and product applications.

Companies should first work to eliminate all non-essential and/or problematic packaging where possible, as well as transition towards the use of more mono-material structures where flexible packaging is relevant, in order to improve the recyclability of the package.

> "Using 30% recycled content in polyethylene (PE) films has been estimated to reduce energy consumption by a quarter and greenhouse gas emissions by one-third during manufacturing."
>
> — Sustainable Packaging Coalition (2019)

[3] (2021, October). *Roadmap to 2025: A Shared Action Plan to Build a Circular Economy for Plastics Packaging.* Canadian Plastics Pact. https://roadmap.plasticspact.ca/wp-content/uploads/2021/10/CPP_Roadmap_V1_Oct2021.pdf

Why Use PCR?

Including PCR in plastic packaging…

Produces Environmental Benefits: Using PCR in packaging has multiple environmental benefits compared to packaging that contains 100% virgin plastics. Adding PCR to a package can reduce greenhouse gas (GHG) emissions and energy consumption, while also preventing valuable materials from being landfilled.[4]

Helps Achieve Environmental, Social & Governance (ESG) Objectives: Related to the above benefit, many organizations have established ESG strategies and/or GHG emission reduction strategies. Using PCR can help support these existing priorities, specifically Scope 3 GHG emission reductions, fossil fuel use reductions, and/or plastic footprint reductions.

Builds & Protects Brand Equity: Using PCR demonstrates leadership through a commitment to waste reduction and lowering environmental impact, both of which can protect or enhance a brand's reputation in an era of growing environmental consciousness.[5]

Proactively Meets Regulations: Proactively working to integrate PCR into plastic packaging can help companies get ahead of pending and anticipated regulation. The Government of Canada is expected to publish regulations that will require certain plastic packaging applications and formats to contain at least 50% recycled content by 2030, while other plastic packaging types will have lower requirements.[6] Under the regulations, some packaging formats will require minimum levels of recycled content by 2026. It is important for companies to know where their plastic packaging resins fit within the proposed recycled content standards and regulatory priorities.

Helps Create a Viable Marketplace: Demand for recycled materials stimulates investment in collection and recycling systems, amplifying the potential for a circular model: *"Specifying recycled content can help ensure that end markets exist, and helps to ensure that the system of recycling is robust enough to support marketing claims of recyclability for packaging."*[7]

Facilitates Economic Development: Increasing recycling to support the use of PCR helps the economy and creates local jobs. For example, recycling plastic rather than landfilling has been shown to create more jobs than traditional waste management.[8] A U.S. based study highlights that processing recyclables creates two jobs per kiloton (kt) compared to 0.1 job per kt for disposal.[9]

[4] (n.d.). *Design for Recycled Content Guide*. Recycled Packaging Content. https://recycledcontent.org/
[5] (n.d.). *Design for Recycled Content Guide*. Recycled Packaging Content. https://recycledcontent.org/
[6] (n.d.). *Recycled content and labelling rules for plastics: Regulatory Framework Paper*. Government of Canada. https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/recycled-content-labelling-rules-plastics.html
[7] (n.d.). *Technical issues paper: Recycled content for certain plastic manufactured items Regulations*. Government of Canada. https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/technical-issues-paper-recycled-content-plastic-manufactured-regulations.html
[8] AECOM (2009, September 23). *The Economic Benefits of Recycling in Ontario – Final Report*. https://ia803407.us.archive.org/25/items/theeconomicbenef00snsn21841/theeconomicbenef00snsn21841.pdf
[9] Tellus Institute with Sound Resource Management (n.d.). *More Jobs, Less Pollution: Growing the Recycling Economy in the U.S.* Tellus. https://www.tellus.org/pub/More%20Jobs,%20Less%20Pollution%20-%20Growing%20the%20Recycling%20Economy%20in%20the%20US.pdf

Where is PCR Being Used Today?

PCR content in plastic packaging can and is currently being used in various applications — both flexible and rigid packaging — including in some of the more challenging categories such as food, beverage, and medicinal products (albeit with tighter controls and testing for these types of packages).

While its use on average is currently below CPP's target for recycled content of 30% across all packaging types, the effective use of PCR in plastic packaging is evolving. Some non-food package applications are already achieving 30% PCR content or higher.

The use of PCR is impacted by factors such as:

- Resin type — including PET (Polyethylene terephthalate), PP (Polypropylene), HDPE (High density polyethylene)
- Packaging format (i.e., flexible versus rigid)
- The relative maturity of the market (i.e., well-established versus emerging)
- The product or packaging use (i.e., food versus non-food)

Currently, PET and HDPE are the predominant resins that integrate recycled content, as the market is well-established and has the most developed recycling system infrastructure, allowing for a stable and affordable supply of clean PCR for those resins.

In terms of packaging format, rigid plastic packaging is well ahead of flexible packaging in terms of the use of PCR. Among CPP Partners, PE tubes, PET bottles, and PET thermoforms are the packaging types with the highest percentages of PCR integration on average.[10] As per the 2022 CPP Annual Report, PCR content stood at 12% of the total amount of plastic packaging produced by CPP Partners and represented a 32% growth overall in the use of PCR plastic since 2020. For PET bottles, the relative uniformity of the stream also contributes to its higher use as recycled content.

Food versus non-food products and their packaging is an additional critical factor determining the current use of PCR in packaging.

Food and medical grade PCR is more challenging due to technical and regulatory restrictions[11] that affect its use in packaging, as well as a shortage of supply. The input material must adhere to strict specifications and be suitable for contact with food to ensure there are no risks to human health or adverse affects on the food in terms of safety, taste, odour, or composition. That said, there is increasing demand for food-grade PCR solutions amongst CPP Partners and other brand owners and producers globally. More information on food-grade PCR can be found on page 24.

It is important to note that PCR is also being used in a variety of non-packaging products. While there is minimal use of other resins as PCR in packaging (i.e., low-density polyethylene (LDPE), Polypropylene (PP), and polystyrene (PS)), these resins, along with PET and HDPE, are used as PCR in durable goods (i.e., decking, piping, buckets, textiles, and lawn and garden products).[12] **The competition for available supplies of suitable, pure PCR streams is a current, and likely to be an increasing, challenge in the future in order to reach higher levels of PCR in packaging.**

Companies are continuing to innovate, and organizations should regularly review packaging formats for alternative options, including eliminating unnecessary and problematic packaging and considering alternatives such as reuse or refill. It is important to remember that in scenarios where PCR is not appropriate for use in primary packaging, the use of recycled content should also be considered for secondary and tertiary packaging, such as shipping cartons.

[10] Canada Plastics Pact (2023). *Tomorrow starts today 2022 Annual Report*. Canada Plastics Pact. https://plasticspact.ca/2022-annual-report

[11] See Government of Canada guidelines for using recycled plastics in food packaging: https://www.canada.ca/en/health-canada/services/food-nutrition/legislation-guidelines/guidance-documents/guidelines-determining-acceptability-use-recycled-plastics-food-packaging-applications.html

[12] Ocean Conservancy (2022, February). *Recommendations for Recycled Content Requirements for Plastics Goods and Packaging*. https://oceanconservancy.org/wp-content/uploads/2022/02/RRS_OceanConReport_Feb2022_Final.pdf

Recycled Content in Action!

Below are five case studies of CPP Partners demonstrating successful incorporation of PCR content into plastic packaging.

Snapple's Transition to 100% Recycled Plastic Packaging

- The 473mL Snapple bottle first transitioned from glass to virgin PET in 2019, and then to 100% post-consumer recycled PET (rPET) in 2021 (excluding the cap and label) across Canada.
- According to Snapple, by removing the metal closure and using a recycle-friendly polyester label, the package's recyclability potential has greatly improved.

Click here for more details.

Ice River Sustainable Solutions Increased Use of Recycled Content In Flexible Film

- The company has ventured into LDPE (low-density polyethylene) resin and invested in a state-of-the-art blown film technology to start introducing recycled content into its own collation shrink film.
- This thin gauge, high-strength engineered film reduces plastic and eliminates the cardboard packaging previously required for heavy products.

Click here for more details.

Recycled Content in Action!

NOVA Chemicals Commercializes 100% Mechanically Recycled Polyethylene (rPE) for Food Contact Packaging

- SYNDIGO™ recycled polyethylene resin is certified as 100% post-consumer content by the Association of Plastic Recyclers (APR).
- SYNDIGO rPE-0860-FC is an approved food-contact PCR resin in the United States and Canada, allowing it to be used in a wide variety of flexible food packaging applications such as cereal and barrier films, stand up pouches, and heavy-duty sacks.

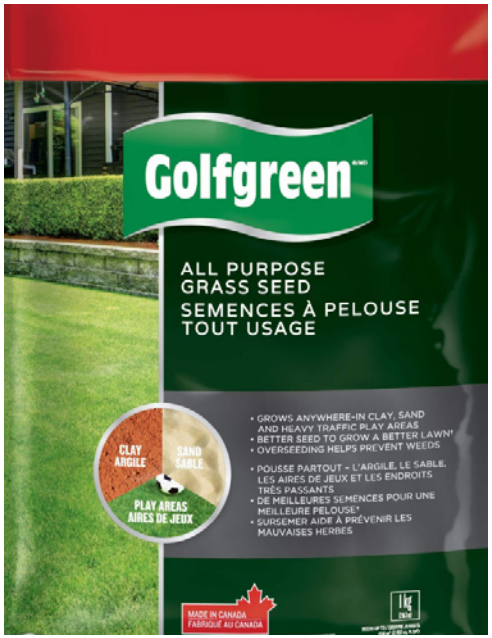
Click here for more details.

The Coca-Cola Company Launches 100% Recycled Material Bottles* Across Canada

- The company is the first to launch multiple sparkling beverages in 100% recycled material bottles* across Canada.
- All 500-mL sparkling beverages bottles sold by The Coca-Cola Company in Canada will be made with 100% recycled material* by early 2024. Learn more.
- This follows The Coca-Cola Company's 2022 nationwide rollout of DASANI bottles made from 100% recycled material*, and Sprite and Fresca bottles shifting all of plastic PET packaging from its signature green colour to clear to improve the quality of the recycled material. Learn more.

*caps and labels excluded

Recycled Content in Action!



Golfgreen Brand by Canadian Tire Corporation Transitions to Recyclable Packaging with Higher Recycled Material Content

- In 2021, Canadian Tire collaborated with its internal teams in Merchandising, Branding, Packaging, and Product Development, alongside external vendors, to develop a packaging solution for its Golfgreen products. The packaging underwent several iterations to meet branding standards, ensure sturdy product protection, maintain production efficiency, incorporated recycled materials, and maintained recyclability.
- The circularity pilot will result in two Golfgreen SKUs transitioning from a mixed laminate with 0% recycled content to mono-material LDPE with 30% recycled content in 2024.
- Canadian Tire is implementing its new packaging in a phased approach to use up its existing inventory of packaging and align changes with its planned brand refresh.

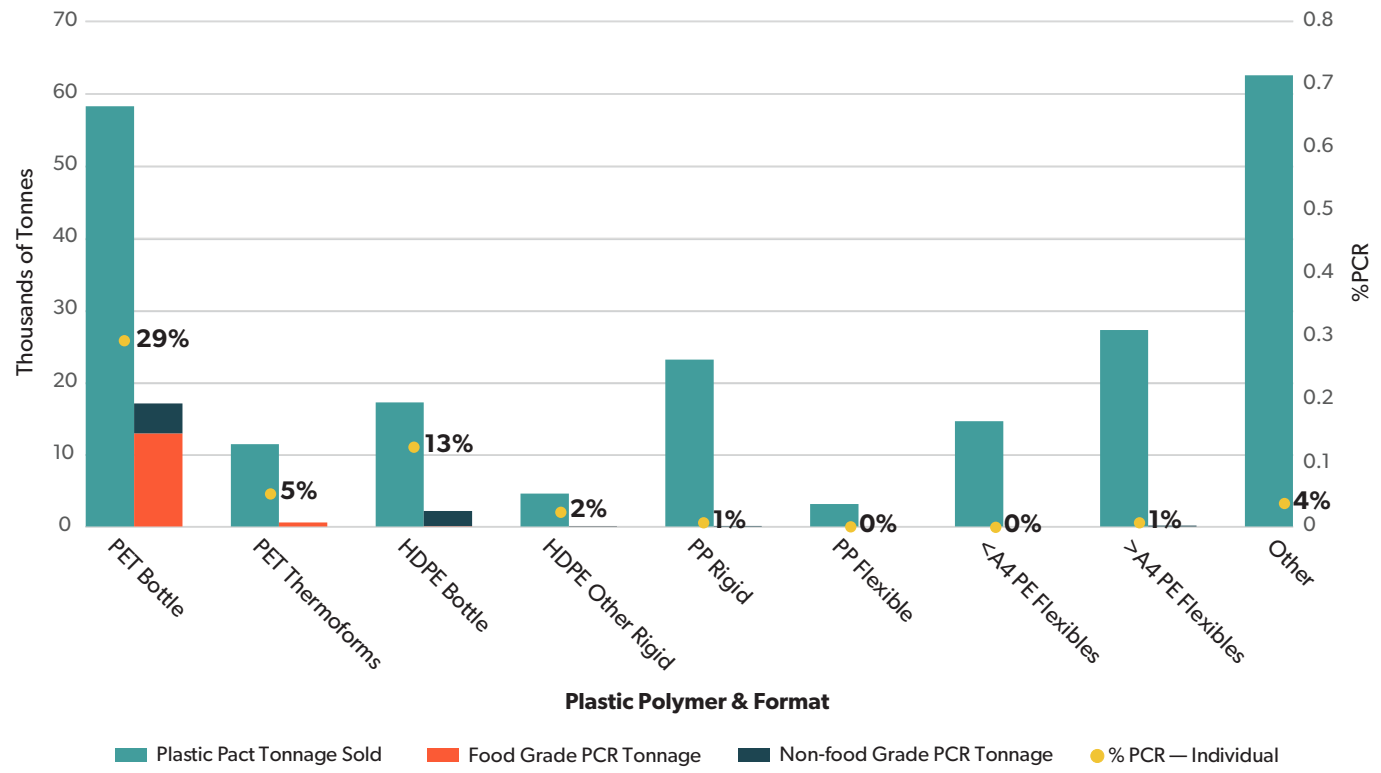
To read more case studies, visit the CPP website.

Availability of PCR Supply in Canada

Figure 1 illustrates the tonnages of plastic resin (by format) that were sold by CPP Partners in 2020, as well as how much PCR tonnage was purchased by these CPP Partners in terms of both food and non-food grade resin. PCR was primarily integrated in PET bottles, as well as HDPE bottles and PET thermoforms to a lesser degree.

While the amount of PCR content is growing within CPP Partner packaging, technical modeling undertaken by Eunomia on behalf of the CPP suggests that achieving 30% recycled content as an average across all plastic packaging formats will be challenging in the short-term given the limited availability of quality PCR resins in Canada for packaging uses — particularly for food-grade applications and resins other than PET and HDPE.

Figure 1: Tonnages of plastic resin (by format) that were sold by CPP Partners in 2020



At present, a large volume of PCR is currently directed toward non-packaging products, such as carpets and textiles.

Achieving higher recycled content targets can be achieved over the medium-term; however, this will require recycling rates to increase, while also greater purchasing of available PCR for packaging (as opposed to it going toward other end uses).

Guidance

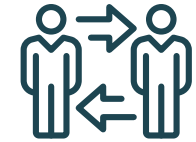
Eight Steps to Using PCR

Brand owners, producers, and manufacturers have the potential to shift the market by modifying their procurement policies and their packaging designs to require greater amounts of recycled content in packaging. By building recycled content into plastic packaging materials, producers and brand owners will drive the investments for circular plastic packaging and the related infrastructure. The following eight steps can support brand owners and producers with increasing the amount of recycled content used in plastic packaging.

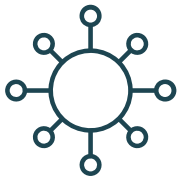
1. Identify packaging needs based on performance and regulatory requirements

2. Set your PCR targets and communicate

3. Establish internal buy-in



4. Engage and collaborate early with suppliers



5. Determine available sources of PCR and their suitability for your application

6. Complete trials with different PCR content levels to create prototypes and understand processing & quality variation

7. Verify PCR content

8. Launch your new packaging and communicate your efforts

1. Identify packaging needs based on performance and regulatory requirements

- Determine the intended use and format of the plastic packaging. That will help determine other aspects that need to be considered (i.e., food vs. non-food use, removable labels vs. printed on package directly).
- Be aware that recycled content could result in performance loss and could change the visual appearance of the package (refer to the Factors for Consideration in PCR Use of this Guide for more details).
- Determine what are "must haves" and what are "nice to haves" with your packaging design, as tradeoffs may be required. Consult both marketing and operation teams early in the process.

2. Set your PCR targets and communicate

- Establish targets (e.g., 30% PCR) early in your journey and communicate them internally, to ensure buy-in across the organization.
- Consider targets being set by government bodies and organizations (i.e., the CPP) and use these to inform your own targets and standard setting to capitalize on synergies.
- Start small to gain expertise and experience with using PCR in your packaging portfolio, and then slowly look to increase PCR levels and expand to more product lines/SKUs.

3. Establish internal buy-in

- The journey to recycled content will be collaborative. Internal buy-in from those affected by the change is key.
- It is recommended to develop a change management plan to effectively engage and educate your team. Doing so early and consistently significantly boosts your likelihood of success.
- Use your circular packaging vision and targets to provide your team with context.
- Preemptively develop and provide the resources, education, and support needed to generate internal buy-in. In doing so, consider the following roles and potential impacts:
  - **Senior Management** will want to understand the financial, operational, and branding implications.
  - **Buyers** may need sourcing guidance and to understand that PCR may increase the cost of the product.
  - **Operations** may need to run the lines with different material formats and technical considerations.
  - **Marketing** may need to know that package colouring can be affected and/or that slight defects may be visible in the package's look and feel.

4. Engage and collaborate early with suppliers

- Communicate your recycled content objectives externally to help partners identify possible solutions. Look to establish relationships with key value chain partners (e.g., suppliers, converters, recyclers, etc.) who have PCR experience.
- Design your packaging for recyclability, as well as for the incorporation of recycled content. This allows for packaging to be reintegrated back into the supply of PCR at end of life, which can then be re-incorporated into packaging (creating the supply to support the demand).
- Anticipated future growth in demand for PCR means it will be important to establish relationships with PCR sellers to ensure available supply.

5. Determine available sources of PCR and their suitability for your application

- Given the limited availability of some PCR grades and the effort required to qualify a material, it is important to secure long-term contracts for a steady supply of PCR (refer to the Factors for Consideration in PCR Use of this guide for more details, specifically on Purchasing Contracts).
- There are multiple PCR streams commercially available, so careful selection of the right material for your application will be required. Examples include:
  — Polyethylene terephthalate (PET)
  — High-density polyethylene (HDPE)
  — Low-density polyethylene (LDPE)
  — Polypropylene (PP)
- Ensure that your organization is familiar with resins, price, quality, and volume available in the market (refer to the Factors for Consideration in PCR Use of this guide for more details, specifically on Availability). This section as well as 'Sources of PCR' provide more details on Canadian suppliers.

6. Complete trials with different PCR content levels to create prototypes and understand processing & quality variation

- Establish maximum PCR percentages while maintaining desired package properties and aesthetics.
- The best approach is usually empirical results via prototypes, testing, and pilots to understand the performance and visual aspects of the new package.
- Consider how PCR will be integrated as part of the packaging design early in the process (e.g., at the mold stage), which is often easier than having to change the production process.
- After prototyping and investing in pilots, consider conducting larger trials using a few different lots of PCR to understand potential challenges due to variability of recycled materials.

7. Verify PCR content

- Verify "recycled content" claims through credible organizations, and obtain documented proof prior to making public claims.
- PCR certification programs ensure the validity of PCR claims. There are several PCR certifications to choose from. The Association of Plastic Recyclers (APR) and GreenBlue have developed relevant certification programs.
- Comparison reports from GreenBlue and Eunomia Research & Consulting help companies throughout the plastics value chain determine which standard or recognition program best suits their needs.

NOTE: Guidance on certification principles for recycled content is currently under development by the CPP and is expected to be released in early 2024.

8. Launch your new packaging and communicate your efforts

- Communicating recycled content packaging efforts can help to elevate a brand, so long as any statements or labelling are accurate and verifiable.
- Best practice approaches recommend that companies seek independent legal advice in relation to any public claims. Once that is achieved, consider the storytelling of your journey, including the benefits, challenges, and lessons learned to share with the public and other stakeholders within the plastics value chain.
- First, connect with your team to continue building buy-in for the shift to recycled content. Then, communicate publicly to foster a shift to circular plastic packaging through consumer education.
  - A collaborative press release involving the brand, converter, and recycler showcases a collective dedication to sustainable packaging, informing consumers about forthcoming changes in packaging.
- Learn from the first round of efforts to improve efficiency, expand the applications and packaging options, and strengthen relationships with PCR suppliers.

Factors for Consideration in PCR Use[13]

To follow is a list of factors to be considered when looking to integrate PCR into packaging. Where you are in the plastics packaging value chain will impact the factors to be considered with PCR use and, as such, some may not be applicable for your company. In some cases, the considerations are evolving, but as they change or new considerations emerge, this PCR Guide will be updated accordingly. Note that most of the factors may have an impact on cost.

Factors include:

- **Availability**
- **PCR Specifications**
- **Purchasing Contract**
- **Recycler versus Converter**
- **Golden Design Rules for Plastics Packaging**
- **Choice of Converter**
- **PCR Quality Assurance**
- **Appearance, Odour & Taste**
- **Government Regulations**
- **Food-Grade PCR**
- **Testing for PCR Content Targets**
- **Emergence of Chemical Recycling**

[13] Source: This section draws almost entirely from the US Plastics Pact information on Integrating PCR and Purchasing PCR

Availability

Securing PCR supply is a top concern among brands and retailers looking to incorporate recycled content into their packaging. It may be difficult to obtain suitable quantities of PCR, and higher market demand for PCR from both packaging and non-packaging uses will likely increase price in the short to medium term until such time when available supply increases.

When sourcing PCR, consider the following to minimize this risk:

Evaluate and qualify multiple PCR sources to increase supply reliability.

Canadian PCR sellers include:
EFS Plastics
Enviroplast
Fraser Plastics
Merlin Plastics
NOVA Chemicals
Plastrec
ReVital Polymers
Soleno Recycling

Actively reach out to industry players to understand and to arrange recycled content sourcing.

Remain engaged and attend industry events and seminars to identify and make connections.

Over the medium to long term, it's expected that increased demand for recycled content will drive innovation and investment in collection and processing of PCR. This will allow for the much-needed increase in recycling rates for both rigid and flexible plastic packaging, and thus will increase available PCR supply.

Factors for Consideration in PCR Use (cont'd)

PCR Specifications

The price of PCR can be influenced by specifications requested by the brand owner. Consider the following:

Bale specifications — less contamination costs more

Certification requirements — special PCR certifications (e.g., "Ocean Plastic") may cost more

Colour — higher clarity generally costs more

Consistency — a narrow range of acceptable PCR may cost more due to additional sorting/processing

Material origin — source material collected from oceans or through non-traditional methods may cost more

Grade of PCR — food-grade PCR may require additional processing steps and government approvals, and thus cost more than non-food grade PCR

It will be important to keep costs in perspective. Depending on the product, packaging costs can be a small percentage of the total product cost. A 20% cost differential in packaging may translate to pennies on the overall product cost.

Purchasing Contract

When entering into a contract for PCR, the following should be considered:

Length of term — long-term contracts for PCR can drive a reliable and robust market for PCR supply, which can result in discounted prices.

Contract volume — higher volume purchases or commitments (via contract) may result in discounted pricing.

Source of PCR — recycled content can be purchased directly from a recycler or through a converter. A listing of some Canadian plastic recyclers and converters can be found under Availability.

Factors for Consideration in PCR Use (cont'd)

Recycler versus Converter

Brands can purchase their PCR either directly from a resin producer, recycler, and/or through their converter(s).

A **recycler** focuses on the collection and recycling of plastic packaging, and creates new raw materials (plastic resins) to be used in the production of new packaging.

A **converter** buys from a resin producer/manufacturer and/or recycler (generally) and uses the 'new' plastic raw materials to manufacture the packaging containing recycled content.

The choice between purchasing from a resin producer/converter versus a recycler entails the following considerations[14]:

[14] US Plastics Pact (n.d.). *Purchasing PCR.* https://usplasticspact.org/purchasing-pcr/

Purchasing Through a Resin Producer/Converter

- This is the more traditional approach.
- Converters may purchase larger volumes for multiple customers and be able to secure better pricing.
- Resin producers/converters process the PCR and are able to set quality expectations and address quality concerns as they arise.
- Converters can select PCR that is most compatible with their processing equipment.
- Handling numerous grades of PCR is not desirable for a converter; they prefer to use one across several customers.
- Brands have less transparency into PCR price.
- Brands cannot track volume usage directly (via purchase orders).

Purchasing Direct from Recycler

- Can negotiate pricing based on PCR usage company-wide and across multiple converters.
- Transparency in pricing.
- Easy to track volume/usage.
- Creates a direct relationship with the PCR supplier.
- Additional work for the brand owner.
- Converters are accustomed to buying materials and may not agree to this arrangement.
- Brand may not understand the material handling, equipment requirements, quality standards, or processing procedures when purchasing on behalf on the converter.

Factors for Consideration in PCR Use (cont'd)

Golden Design Rules for Plastics Packaging

Companies can help generate an adequate supply of PCR by ensuring their current packaging can be recycled. The Canadian Guidance for the Golden Design Rules for Plastics Packaging (GDRs) aims to change how packaging is designed in the first place to keep it in the economy and out of the environment. The nine GDRs provide a clear framework that aims to drive innovation and scalable actions that will result in less plastics packaging overall and easier to recycle plastics packaging.

APR's Design Guide is another great resource for packaging design in North America, with guidance for NearIR black, releasable PSAs, CPET shrink sleeves and now HDPE-compatible tubes.

Taking these actions will help to create cleaner recycling streams and, in turn, greater opportunities for recycling these materials. This in turn will increase the availability of PCR supply. Companies are encouraged to endorse and implement the Canadian GDRs.

Choice of Converter

When choosing a plastics converter, ensure that they are readily able to integrate PCR into plastic packaging by checking on the following:

Available capacity — producing packaging with PCR content will require a reliable supply, and may require equipment changeovers and the ability to run production lines at reduced speeds (the use of recycled content sometimes requires production lines to be slowed).

Receiving ability — has a system and the infrastructure to physically receive and store PCR until needed.

Experience with PCR — ensure the converter has sufficient knowledge of PCR needs and behaviour during production.

Technical expertise — has the ability to problem solve PCR integration issues as they arise.

Transparency & Accountability — ensure the converter has access to quality, certifiable PCR and that you are able to track its source to improve the transparency of your recycling and broader sustainability claims.

Guidance (cont'd)

Factors for Consideration in PCR Use (cont'd)

PCR Quality Assurance

PCR quality can vary, and those variations can impact the final packaging. For mechanically recycled PCR (currently the main recycling process used in Canada), consider the following two steps in the PCR process:

The PCR quality for incoming recycled content resin/flake used by the converter making packaging material; and

The quality of the finished packaging materials containing PCR.

In each case, a Certificate of Analysis (COA) can help measure the critical characteristics. See the PCR Quality Checklist developed by the US Plastics Pact for additional considerations.

The PCR purchased and used can also affect the recyclability of new PCR content packaging. Ideally, the new packaging can also re-enter the system after its intended use and become PCR itself. Check with your supply chain to confirm that the packaging can be easily identified (by optical sorter), washed, and eventually processed into a resin that can be reused in new packaging.

Appearance, Odour & Taste

Recycled content can have a hazy or coloured appearance, which can be a challenge for consumer-facing branded products. Consider taking the following steps to address this issue:

Work with your vendor and/or packaging company to determine the percentage of recycled content that can be implemented before the brand image is impacted.

Measure the benefits of recycled content, then engage with marketing teams to tell the positive story around the value of recycled content.

PCR odour and taste (impact on food) may differ from that of virgin resin (refer to detailed section on Food-Grade PCR below). Ensure that these factors are evaluated properly based on intended use. Additional processing may minimize these issues, but will likely add to the cost.

Factors for Consideration in PCR Use (cont'd)

Government Regulations

Current or pending regulations can affect both where PCR in packaging **can** be used, as well as where it is **required** to be used. At the time of publication, the Canadian Federal Government is developing regulations for recycled content requirements, including percentage of PCR, labelling, and certification/verification. It is helpful to maintain ongoing communication with suppliers and applicable government agencies on the evolution of regulations and acceptable PCR packaging.

Regulations (including international requirements) can also dictate where PCR cannot be used (i.e., Transportation of Dangerous Goods Regulations prohibit the use of PCR in pool chemical containers in Canada). Furthermore, the UN Plastics Treaty is working on rules with respect to PCR use and recycled content, as are governments in other countries (including the United States and the European Union).

Government regulations also provide guidance on making environmental claims on on-pack labels. Ensure that you consult the applicable provincial and/or federal regulations.

Food-Grade PCR

The proposed regulatory framework in Canada, particularly for food contact, has exempted certain food categories from incorporating PCR due to the challenges with obtaining food-grade recycled resins in Canada at present. More mechanical recycling processes and raw materials are being approved for food contact; as such, additional food contact materials are expected to become available to the market in the future as this is a focus of industry.

The Canadian Federal Government (via Health Canada) regulates the use of recycled plastics in food packaging. While current regulations don't require pre-market clearance of food packaging materials, Health Canada conducts case-by-case evaluations of the chemical safety of food packaging products, upon request, based on information submitted by petitioners.[15]

"If Health Canada considers a product to be acceptable from a food chemical safety perspective, for its proposed or intended use, a 'letter of no objection' (LONO) is issued to the petitioner for the specified food packaging end use. This letter is an opinion from Health Canada on the acceptability of a material based on the information received from the petitioner and doesn't absolve the food seller of its responsibility under Section B.23.001 of the Food and Drug Regulations and other regulations that are relevant to its use."[16]

Additional information on the Government of Canada's guidelines for using recycled plastics in food packaging can be found here, as well as the requirements for food packaging submissions here.

[15] Government of Canada (n.d.). *Guidelines for using recycled plastics in food packaging: Overview.* https://www.canada.ca/en/health-canada/services/food-nutrition/legislation-guidelines/guidance-documents/guidelines-determining-acceptability-use-recycled-plastics-food-packaging-applications.html

[16] Government of Canada (n.d.). *Guidelines for using recycled plastics in food packaging: Overview.* https://www.canada.ca/en/health-canada/services/food-nutrition/legislation-guidelines/guidance-documents/guidelines-determining-acceptability-use-recycled-plastics-food-packaging-applications.html

Factors for Consideration in PCR Use (cont'd)

Testing for PCR Content Targets

Testing different percentages of PCR in packaging establishes a threshold percentage target given current technology. For example, 25% PCR in non-film applications is considered the norm. Consider running pilots with varying amounts of PCR to determine the current threshold.

Emergence of Chemical Recycling

Chemical recycling offers the potential to produce recycled plastic resins that are indistinguishable from the properties of virgin resins. It has the ability to remove several of the technical challenges that limit mechanical recycling, but has yet to be proven at scale. Chemical recycling also faces many of the same supply-side challenges as the existing mechanical recycling system, in terms of effective collection and sortation of plastic packaging upstream. In addition, there have been some concerns raised with respect to the human and environmental health effects of chemical recycling.

As such, chemical recycling as a solution is still considered to be a few years away from broader implementation.[17] These recycling technologies are expected to scale up within the next ten years and are anticipated to be complementary to established mechanical recycling and PCR production processes.

[17] Ocean Conservancy (2022, February). *Recommendations for Recycled Content Requirements for Plastics Goods and Packaging*. https://oceanconservancy.org/wp-content/uploads/2022/02/RRS_OceanConReport_Feb2022_Final.pdf

The Special Case of Flexibles & Film

Incorporating recycled content into film and flexible plastic packaging is challenging at this time, especially as it pertains to food and beverage products. Polyethylene (PE) and polypropylene (PP) are the most commonly used film resins; however, currently only PE is routinely collected and recycled as PCR in Canada (and North America).

When identifying opportunities to incorporate recycled content into flexible plastic packaging, some trade-offs around processing, performance, aesthetics, and cost will need to be considered. Here is what you can expect when you start to use recycled materials:

- Coloured recycled plastic (e.g., green and gray) is more widely available than clear or white recycled plastics, and more cost effective.
- Differences in processing may require adjustments to settings on plastic production equipment.
- Observation of more odour than when extruding virgin plastics.
- Blemishes in the film such as bubbles, fisheyes, or gels are likely to be observed due to polymeric contamination in the PCR. These imperfections may impact film and print quality.

Regardless of the scale of application, companies should assess the diversity of flexible plastics in use, including pallet wrap, shrink wrap, trash bags, liners, etc., and determine where recycled content can be included. Every action provides market confidence and stimulates investments and improvements throughout the supply chain. The

amount of PCR to include is determined on a case-by-case basis. A balance needs to be struck between recycled content and functionality. Small design changes will result in acceptable film and help meet brand owner targets for recycled content.

Where to Start? Less demanding or thicker film applications are an ideal place for recycled content. Well separated, clear, or white flexible plastics can be re-used to make a wide range of plastics packaging containing PCR.

Sources of PCR

There are multiple directories available to assist in finding a supplier of mechanically recycled PCR materials. Recyclers typically only process one or a few types of resins, so multiple recyclers may be needed to use PCR in a diverse packaging portfolio.[18] The directories highlighted below can assist in identifying a source of PCR.

The Association of Plastics Recyclers (APR) is an international trade association committed to the success of plastics recycling through networking, design guidance, and technical training. The APR's buyers and sellers directory is a comprehensive catalog, outlining a list of materials APR members purchase and sell. Additionally, it lists various services like grinding, densifying, washing, pelletizing, compounding, and solid stating.

Circular Innovation Council developed the **Plastic Action Centre**, an independent open-source knowledge hub that gathers information to educate, engage, and empower action on plastics. Their directory includes a referral list of Canadian plastic recyclers, their contact information, and services offered.

Circular.co connects a global network of collectors, recyclers, manufacturers, and brands on one digital platform. Their platform allows buyers to source efficiently from thousands of suppliers, decrease supply chain risk, and simplify deal flow.

Plastics News covers the business of the global plastics industry. It focuses on commercial, financial, legislative, and market-related developments worldwide that affect North American plastic product manufacturers and their suppliers and customers.

Collaboration!

The Sustainable Packaging Coalition offers a great initiative called "Next Markets Collaborative," which is exploring how companies work together to support current and future end markets to create more demand for recycled materials.

[18] US Plastics Pact (n.d.). *Purchasing PCR*. https://usplasticspact.org/purchasing-pcr/

Appendix A: **Abbreviations & Definitions**

Brand Owner	A brand owner is a person or company who sells any product under a registered brand label. Examples of brand owners include Unilever and Kraft Heinz.
Chemical Recycling	Chemical recycling typically involves shredding plastics into smaller pieces then mixing the pieces with water, a catalyst or enzyme to break the plastic down into smaller polymer chains or its monomer constituents. These monomers are then separated and recombined into new polymers for use in new products or packaging.
Circular Economy	An economy that is restorative and regenerative by design. It is focused on economic activity that builds and rebuilds overall system health. The concept recognizes the importance of the economy needing to work effectively at all scales — for big and small businesses, for organizations and individuals, globally and locally. It is based on three principles: design out waste and pollution; keep products and materials in use; and, regenerate natural systems.
Circular Packaging	Circular packaging is focused on the reduction and extended use of virgin materials to more sustainably package the products consumers use every day. Circular packaging puts the focus on: • Making packaging recyclable or compostable • Creating packaging from post-consumer recycled materials • Making packaging reusable
Converter	A plastic packaging converter is a company or facility that transforms raw plastic materials into finished packaging products. These converters take plastic resins, pellets, or other forms of plastic and process them into various packaging items such as bottles, containers, films, trays, and more. They typically use manufacturing processes like extrusion, injection molding, blow molding, or thermoforming to shape the plastics into the desired packaging forms. The converters may also add other materials or additives to enhance the packaging properties, such as strength, flexibility, or barrier properties.
Film	Plastic film is typically defined as any plastic less than 10 millimeters thick. The majority of plastic film is made from polyethylene (PE) resins, including both low-density and high-density materials. Examples include retail grocery bags, bread bags, produce bags, newspaper sleeves, bubble wrap, PE based film mailers, air pillows and case wrap. Polypropylene (PP) is also used for packaging in similar applications. These film categories are often referred to as "mono-material flexible" or "monolayer" film.[19]

[19] The Recycling Partnership (2021). *Addressing the Challenge of Film and Flexible Packaging Data*. Recycling Partnership. https://recyclingpartnership.org/wp-content/uploads/dlm_uploads/2021/04/FF_Whitepaper_Final.pdf

Appendix A: **Abbreviations & Definitions**

Mass Balance	Mass balance is a chain of custody approach that allows for tracking how much sustainable material, like recycled feedstock, is used throughout a system or supply chain. It tracks the amount of this material from its origin to its use in creating new products. This method ensures that the right amount of these materials is allocated and used, keeping a clear record that can be checked and verified.[20]
Multi-Material Flexible Packaging	In contrast to mono-material film, flexible packaging is often comprised of multiple materials or multiple layers of plastic film. The different properties in each layer contribute different performance characteristics to the package. The layers within a flexible package can be aluminum foil or paper in addition to plastic. Flexible packaging often includes pouches, sleeves, sachets, and bags[21].
Mechanical Recycling	The process of recycling plastic or other materials by physically breaking them down and reshaping them into new products. Cleaned plastic flakes are melted and reprocessed into granules or pellets. These pellets can be used as raw materials for manufacturing new plastic products.
'Pre-consumer' (or 'post-industrial') Recycled Content (PIR)	A material diverted from the waste stream during a manufacturing process (excluding rework) — typically called post-industrial recycled content, or PIR. For example, a mask manufacturer purchases roll stock and trims it into individual masks. The trimmings are sent to a recycler, and made into recycled content feedstock. The distinction between post-industrial recycled content and rework lies in the source of the recycled materials. Post-industrial recycled content includes materials sourced from external recycling processes, while rework involves using internal by-products or defective items within the same production cycle. Rework is still an important part of the circular economy, as it does eliminate waste.
Primary Packaging	Primary packaging is the packaging that comes in direct contact with the product itself. The main job of primary packaging is to protect and preserve the product inside. The plastic bottle in which bottled water is held is considered primary packaging.[22]

[20] Ellen MacArthur Foundation. *Enabling a Circular Economy for Chemicals with the Mass Balance Approach*. https://emf.thirdlight.com/link/f1phopemqs36-8xgjzx/@/preview/1?o.

[21] See Page 9 of The Recycling Partnership's *Addressing the Challenge of Film and Flexible Packaging Data*. Recycling Partnership. https://recyclingpartnership.org/wp-content/uploads/dlm_uploads/2021/04/FF_Whitepaper_Final.pdf

[22] The Recycling Partnership (2023, November 2). *The 3 Levels of Packaging: Primary, Secondary and Tertiary Packaging*. Refine Packaging. https://refinepackaging.com/blog/primary-secondary-tertiary-packaging/

Appendix A: **Abbreviations & Definitions**

Reclaimer	A plastics reclaimer is a specific type of plastics recycler that specializes in the more advanced process of decontaminating and purifying recycled plastics, especially those used in more demanding applications like food packaging or medical devices. Reclaimers focus on producing high-quality recycled plastics that meet strict purity and safety standards. They use specialized equipment and technologies to remove impurities, additives, and other contaminants from recycled plastic materials, ensuring that the resulting materials meet the necessary quality requirements for their intended applications. Plastics reclaimers often work closely with manufacturers and brand owners who require recycled plastics that meet specific performance and safety criteria.
Recycler	A plastics packaging recycler is an organization or facility that specializes in the recycling of plastic packaging waste. Their primary objective is to collect used or discarded plastic packaging materials, process them, and convert them into raw materials that can be used to manufacture new plastic products. The recycling process typically involves steps such as sorting, cleaning, shredding, and melting of the plastic packaging waste. Through these processes, the plastics are transformed into plastic pellets or flakes, which can then be used by converters or manufacturers to produce new packaging or other plastic products.
Secondary Packaging	Secondary packaging is generally used to group a certain amount of products together into a cohesive unit that's easy to identify and track. Everything from the branded ecommerce packaging that you receive in the mail to the customized boxes that line the shelves at a local retail store are part of the secondary packaging level.[23] The plastic wrap and/or cardboard that forms the case of water bottles is an example of secondary packaging.
Tertiary Packaging	Tertiary packaging is often known as bulk packaging or transit packaging. It's used to transport larger numbers of goods safely and securely to their destination. This kind of packaging makes it easy to handle, store and ship goods as single, self-contained units.[24] Bottled water is often transported on a pallet, with the cases tightly held together via shrink wrap. The shrink wrap is considered tertiary packaging.

Additional terms used in CPP reports and resources can be found here.

[23] The Recycling Partnership (2023, November 2). *The 3 Levels of Packaging: Primary, Secondary and Tertiary Packaging*. Refine Packaging. https://refinepackaging.com/blog/primary-secondary-tertiary-packaging/
[24] The Recycling Partnership (2023, November 2). *The 3 Levels of Packaging: Primary, Secondary and Tertiary Packaging*. Refine Packaging. https://refinepackaging.com/blog/primary-secondary-tertiary-packaging/

Appendix B: **Supporting Resources**

The following are helpful resources that provide further information to support your PCR journey.

APCO Recycled Content Guide: This guide has been designed by the Australian Packaging Covenant Organization (APCO) to support the growing number of individuals and companies considering ways to include recycled content in their packaging.

Comparison of Recycled Material Standards by GreenBlue: This standards comparison offers a side-by-side evaluation of key factors that will help companies throughout the plastics value chain determine which standard or recognition program best suits their needs.

Design for Recycled Content Guide. Sustainable Packaging Coalition: (US — 2019). This guide supports brands and suppliers to incorporate recycled content in packaging; provides practical recommendations to inform strategy and decision making by outlining existing challenges, areas of opportunity, and dispelling myths about the use of recycled content.

Government of Canada Guidelines for Using Recycled Plastics in Food Packaging: These guidelines will assist recyclers, manufacturers, and sellers of plastic materials in determining the acceptability and use of post-consumer recycled (PCR) plastics in food packaging applications. The applicable ISO 14021: 2016 standard defines PCR material as a material generated by households or by commercial, industrial, and institutional facilities, including returns of a material from the distribution chain.

Ocean Conservancy: Recommendations for Recycled Content Requirements for Plastic Goods and Packaging. This report identifies what is within reach currently, as well as an alternate scenario that demonstrates how progress could be accelerated with additional supply-side policy measures, such as extended producer responsibility.

The Association of Plastic Recyclers' Design Guide for Plastics Recyclability: This guide helps package designers measure each aspect of a package design against industry-accepted criteria to ensure that it is truly recycling compatible.

The Comparative Assessment of Standards & Certification Schemes for Verifying Recycled Content in Plastic Products by Eunomia Research & Consulting and Circular Innovation Council: Eunomia was commissioned by the Standards Council of Canada (SCC), in cooperation with Environment and Climate Change Canada, to conduct a study to assess the global landscape of standards and certifications for the verification of recycled content claims in plastic products, compare standards and certifications to determine key differences, gain insight into stakeholder use and choice of existing standards and certifications, and identify future needs related to the verification of recycled content in plastic products.

US Plastics Pact PCR Toolkit: This guide was created to assist companies in making the transition to using PCR.

Taking Action

Interested in joining the conversation, learning more or becoming a CPP Partner?

Get in touch


plasticspact.ca


info@plasticspact.ca


@CanadaPact


canadapact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About the Canada Plastics Pact

The Canada Plastics Pact is leading Canada's response to the escalating plastic crisis.

We exist to eliminate plastic waste by accelerating and scaling the solutions that will keep plastics in the economy and out of people, animals, and nature.

Through fostering innovation and collaboration, our 98+ Partners from across the plastics value chain are taking meaningful steps to eliminate unnecessary and problematic plastics, redesign packaging and bolster their usage of recycled plastic.

CPP is a member of the Ellen MacArthur Foundation's Global Plastics Pact network and is a solution space of The Natural Step Canada in partnership with the Smart Prosperity Institute, whose shared vision is a strong and inclusive economy that thrives within nature's limits.

A full list of CPP Partners is available here.