

reciChain Canada, pilot program

capturing the value of
plastics through the
circular economy

APRIL 2020



Document objectives

The objective of this document is to provide a high-level overview of the reciChain pilot program, including what it is, the goals and objectives, and the ultimate benefits that will result from enabling a circular economy.

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Reducing plastics waste by incentivizing the reuse of secondary plastics

Globally, of the 8.3 billion metric tons of plastic that have been produced, 80% has become plastic waste. Of that, 91% is not recycled, often ending up in landfills, or the environment¹, paving the way for an opportunity to promote plastics circularity.

As a whole, Canada recycles just 9% of its plastics².

Of the remaining 91%:

- 86% ends up in landfills
- 4% is incinerated
- 1% leaks directly into the environment



The result is:

\$7.8 billion

of total trapped value from non-recycled recyclables.
There is a need to improve recycling to capture this value.

So why is the reuse of plastics so low today?

An education opportunity exists to increase consumer awareness of collection standards to reduce recycling contamination and avoidance

It is cheaper to use virgin material over recycled material due to guaranteed purity, so there is less incentive to pay a premium for recycled material

Cross-contamination of recycled plastics is high, as plastic packaging often contains multi-layer plastics or non-recyclable fixtures (e.g. closures, handles, etc.)

Mechanical sortability often poses a challenge as many plastics look alike, so cross-contamination and inaccurate sorting remains high

Current products are designed with linear business models in mind, with need to pivot towards designing for circularity while involving the entire value chain

The aim of reciChain involves tackling key plastics challenges

Incentivising the use of recycled materials

Improve the identification of plastic types by package/layer

Improve the sorting of plastics by material type

Build circularity to involve the entire value chain

◆ Key areas to be addressed by the pilot

A vision for plastics circularity enabled by blockchain technology

reciChain is a blockchain-enabled platform that aims to prove circularity is already feasible, cost effective, and enabled through continuous recycling to unlock trapped value. The platform will look to build a participant-led, and scalable solution to

address a **global** circularity problem.

Our vision is to incentivize all platform participants across the plastics value chain to prioritize the shift towards plastics circularity, first through pilots in **Sao Paulo, Brazil** and **British Columbia, Canada**, and then, expanding the benefits of the solution across the globe.



Designing a B.C.,
Canada based pilot
ecosystem

Ongoing pilot
program in Sao
Paulo, Brazil

Where are we today?

1

The reciChain project began at an ideathon in **Brazil**, when BASF partnered with **Kryha**, a digital blockchain studio, to design a solution to fight waste certificate fraud in Sao Paolo.

BASF and Kryha partnered with Brazilian recycling NGO **Recicleiros** to conceptualize and develop the blockchain platform, now called **reciChain**.

reciChain Brazil focuses on supporting cooperatives and waste pickers.

Cooperatives issue sustainably sourced recycling certificates to waste pickers, promoting a safer and fairer recycling system in Brazil.



2

BASF then looked to expand the use case to Canada in order to test and prove the broader vision of circularity in a new market.

Vancouver, B.C., was chosen as pilot location due to the maturity of its recycling market and infrastructure, and progressive EPR policies.

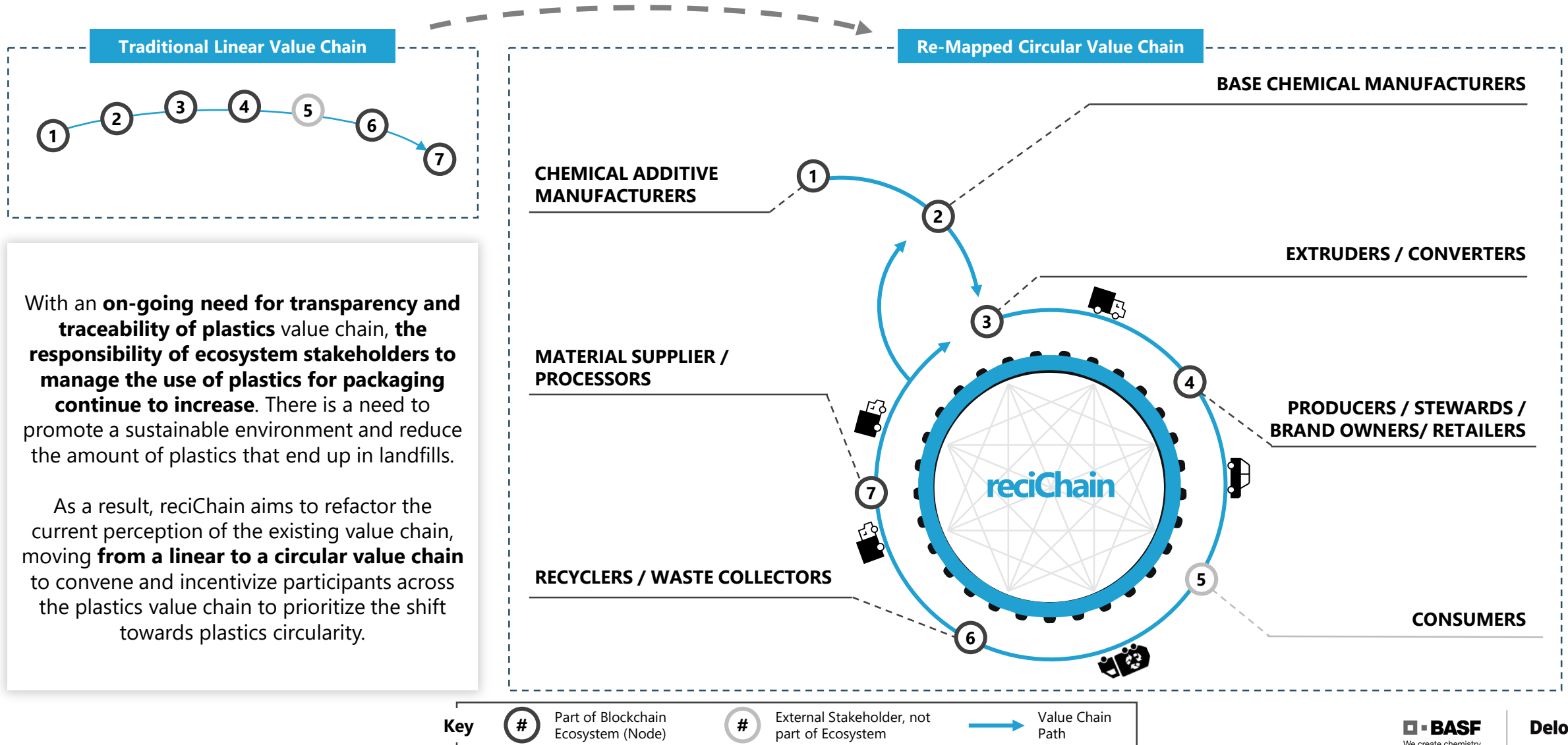
BASF engaged **Deloitte** to act as a strategic partner to provide project governance, help manage the program and work with the local stakeholders in the plastics value chain.

3

BASF, Deloitte, and Kryha are now jointly working to create reciChain Canada to **enable a circular plastics economy** in B.C.

Unlocking value from the existing plastics value chain

The goal is to unlock value from the value chain currently trapped in materials ending up in the landfill and environment, and to promote the use, recycling, and reuse of recycled plastic.



With an **on-going need for transparency and traceability of plastics value chain, the responsibility of ecosystem stakeholders to manage the use of plastics for packaging continue to increase.** There is a need to promote a sustainable environment and reduce the amount of plastics that end up in landfills.

As a result, reciChain aims to refactor the current perception of the existing value chain, moving **from a linear to a circular value chain** to convene and incentivize participants across the plastics value chain to prioritize the shift towards plastics circularity.

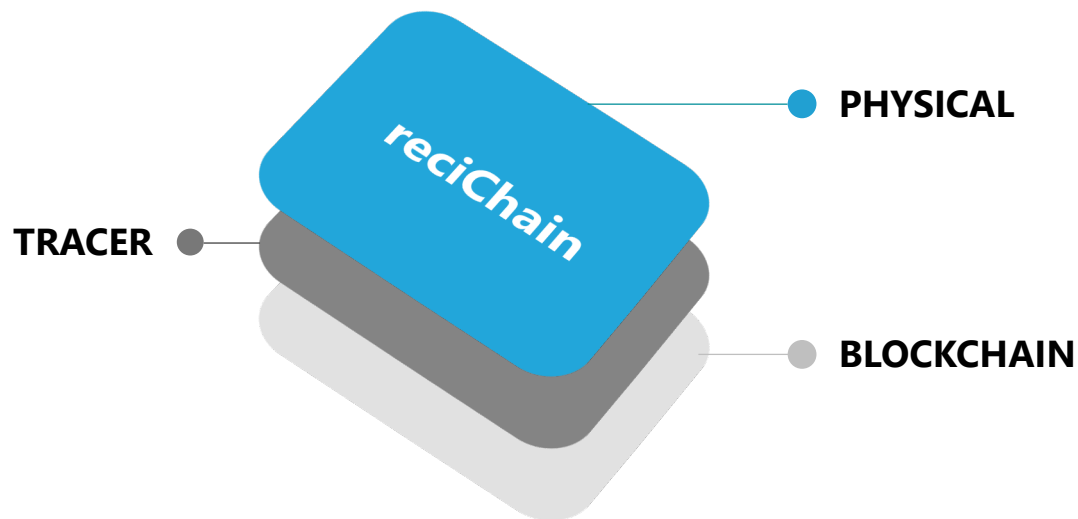
reciChain will support plastics circularity by tracking the movement of consumer products using digital tracer technology

Powered by **blockchain**, reciChain is designed to allow **safe and compliant data sharing** throughout the value chain, **ensuring data integrity and verification of transactions.**

The blockchain technology, complemented with an innovative **digital plastic tracing technology**, embedded in the plastic polymers which survives extrusion and physical recycling processes, will help **realize the vision of a circular economy for plastic packaging.**

Plastics circularity will be enabled by reciChain through three layers:

1. Physical // 2. Tracer // 3. Blockchain

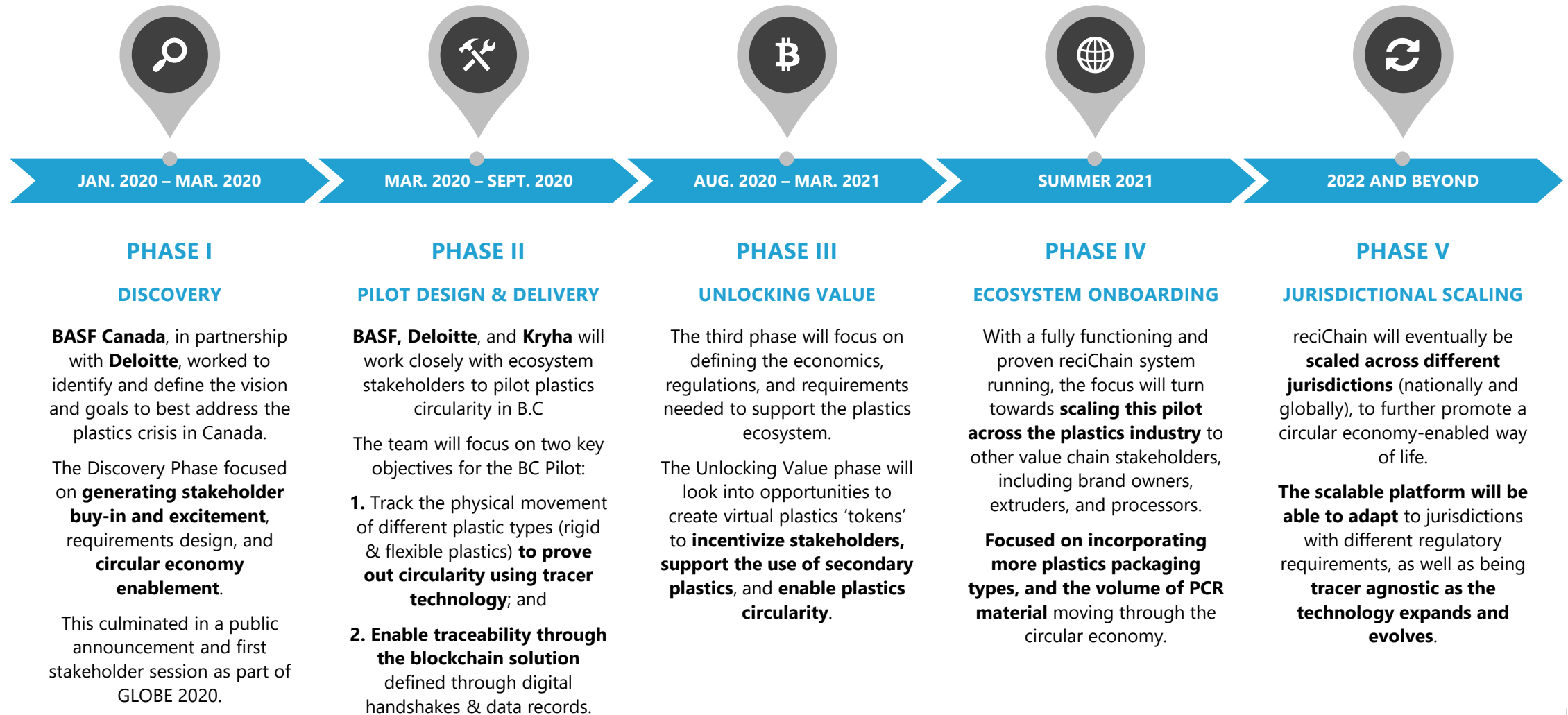


ENVISIONED OUTCOMES FOR THE RECICHAIN PLATFORM

-  Address concerns around recyclability and viability of recycling via the establishment of a decentralized ledger (blockchain) platform
-  Prove circularity using digital tracer technology combined with blockchain
-  Make the value chain transparent through auditable and immutable data, resulting in easy compilation and consolidation
-  Increase diversion of plastic waste from landfills by leveraging transparent data to maintain accountability and responsibility from stakeholders
-  Gain additional understanding of barriers and pain points to digitizing circularity, and how overcoming them can be incentivized

The future vision for the reciChain Canada program

The program has set a long term vision that will enable plastics circularity through a self-sustaining ecosystem.





Appendix



Addressing a number of current pain point across stakeholders

The long term vision for the pilot is to unlock value in 3 key collaboration areas along the value chain. All stakeholders and users will benefit from aspects of each collaboration area.

PAIN POINTS

- Consumer shifts require innovative solutions from the value chain
- Increased demand / pressure to support plastic recyclability and PCR (post-consumer recycled)
- New regulations for creating sustainable products
- Thin margin on cost due to labour / resource intensive production process
- PCR batch material require more consistency
- Secondary plastics supply is limited
- Pricing pressures
- Reporting requirements
- Mechanical sorting limitations

VALUE CREATED

- Maintaining material value through re-processing and down-cycling based on known loop counts
- Insight into up- and down-stream demand
- Increased brand perception / loyalty
- Eased sourcing
- Verifiable and trusted data
- Improved mechanical sorting accuracy and insight, as well as accurate documentation
- Reduced overall contamination levels

1. Trusted Procurement for Supply and Demand

Accessing secondary materials at a reasonable cost to meet increasing demand and regulatory requirements is difficult.

Focus on building insight and transparency to data within networks will support sourcing and procurement functions across the value chain.

3. Strengthening the EPR Program

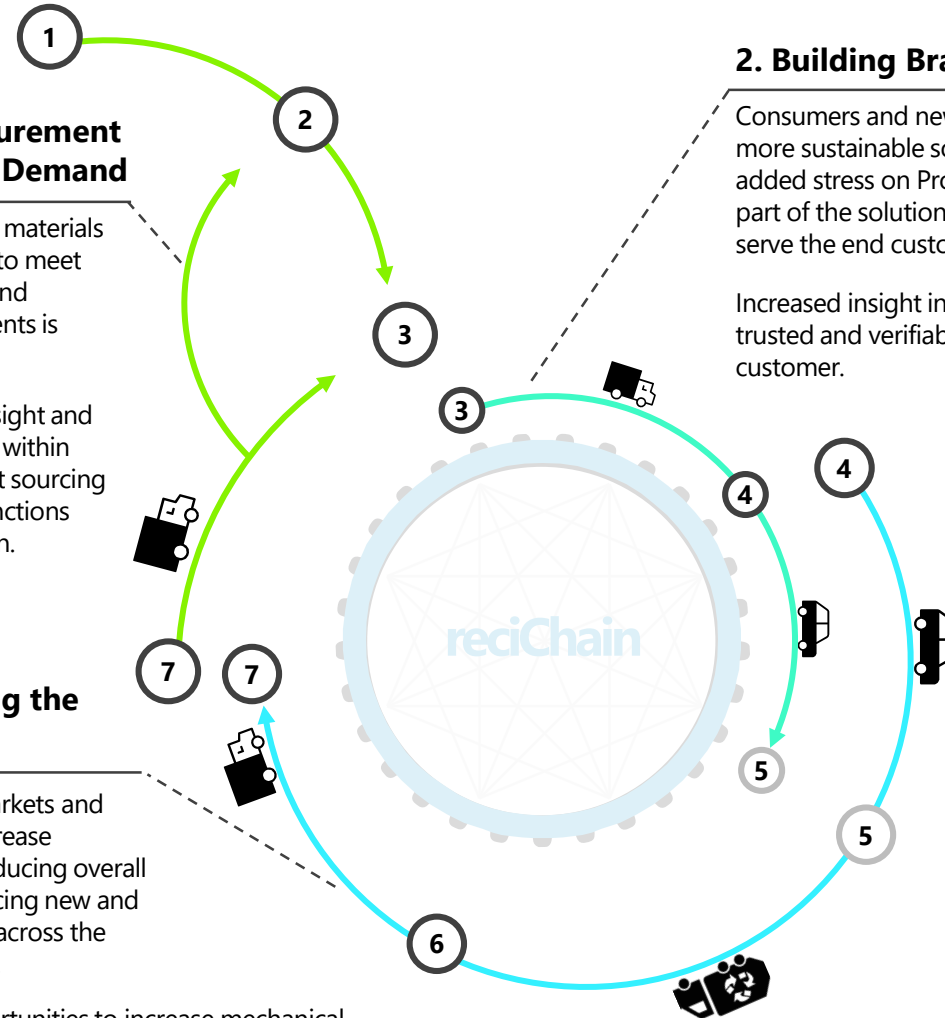
Pressures on end markets and commitments to increase recyclability while reducing overall contamination is forcing new and innovative practices across the reverse supply chain.

Capitalizing on opportunities to increase mechanical sorting and identify sources of leakage will help to strengthen the current EPR program.

2. Building Brand Loyalty

Consumers and new regulation are demanding more sustainable solutions to packaging, placing added stress on Producers and Converters to be part of the solution to reduce plastics and best serve the end customer.

Increased insight into material source can provide trusted and verifiable data directly to the customer.



 **BASF**

We create chemistry

Deloitte.