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# Pricing Transparency in the Recycled Plastics Supply Chain in India, Indonesia, Thailand, and Viet Nam

## Frequently Asked Questions



The  
Circulate  
Initiative

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### General Information

#### 1 Why did The Circulate Initiative embark on a study on pricing transparency?

The economics of plastic recovery and recycling are opaque. Those who wish to improve the system and markets for recycled plastics are greatly hampered by the lack of pricing transparency in the value chain. This opacity results in fluctuating demand and supply, poor capacity utilization at recycling facilities, poor information for strategic planning, and, ultimately, challenges for brand owners to meet commitments on using recycled content in plastic packaging.

This study seeks to shed light on pricing as a critical lever to unlock further demand for recycled plastics. We believe that increasing clarity on the current and future feedstock availability, fixed and variable costs, and pricing of different recycled polymers will help stakeholders across the value chain better understand the addressable market opportunity and make more informed decisions.

#### 2 What are the key objectives of this study?

- To provide insights into the pricing structure of the plastics supply chain, i.e., the market structure of the plastics supply chain, the drivers of the price of recycled plastics, and the potential margins for each player along the supply chain (i.e., collectors, aggregators, and recyclers).
- To highlight any price imbalances along the supply chain, which can indicate a lack of pricing transparency or failures in the market.
- To assess the potential impact of various policy interventions on the volume of plastic waste collected and recycled.
- To model the potential distribution of the additional generated value across the supply chain.

#### 3 What are the benefits of improved pricing transparency?

Improved information on prices along the recycled plastics value chain will:

1. Provide better bargaining power, especially for informal collectors, who are the most fragmented and most disadvantaged in terms of the total gains from trade.
2. Allow for more equitable distribution of the total gains from trade in the value chain.
3. Provide better understanding of recycled plastics material pricing.
4. Improve overall efficiencies in the value chain as each actor seeks to improve their performance to get maximum value from their operations.
5. Supply better quality information to all participants in the value chain.

#### 4 Why is there a need to implement interventions to improve pricing transparency?

If rising market demand and a resulting potential increase in the price of recycled material are not distributed through the value chain, the correct economic signals are not being provided to stimulate local investment. This will make it difficult for the plastics value chains to capitalize on the tailwinds provided by global policy measures, such as minimum recycled content targets and taxes on virgin polymers, thereby lowering the impact of the various efforts undertaken to tackle plastic pollution.

## 5 Who are the target audiences of this study, and how can they benefit from using it?

### Recycled Plastics Value Chain Actors

- Collectors, aggregators, and recyclers can assess the impact of policies on the prices and volumes of recycled plastics. This information will allow for better planning and target-setting by collectors, aggregators, and recyclers.

### Buyers of Recycled Plastics

- Through understanding the impact of policies on recycled polymers, buyers of recycled plastics can make informed decisions around incorporating recycled materials in their products. They can set more realistic targets for procuring recycled content, and the budget allocated for the purchase of recycled material.

### Investors

- The tool helps investors to assess the financial viability of potential investments in the recycled plastics value chain, and to identify profitable opportunities in the sector. The modeling aspect of the tool allows investors to anticipate the impact of emerging policies on their investments.

### Policy Makers

- Policy makers can use the tool to model the impact of the policy interventions on the volumes, share, and prices of recycled plastic polymers. This will support informed policy planning to drive positive change in the sector.

## 6 What are the limitations of the study?

The following limitations apply:

- Data ranges are skewed by outliers within survey responses – it can be more difficult to identify outliers in smaller sample sizes.
- Data points are combined for use – due to the smaller sample size, certain data points have been combined. The data points include regional data and data on the different output products (flakes and pellets). This could explain some of the ranges in data.
- Timeliness of data – data was collected from June to September 2022. The survey data represents a point in time and does not capture the full complexity of the dynamic polymer markets within each country.

## 7 When was the research conducted?

Stakeholder interviews were conducted from June to August 2022 to obtain data on the prices of recycled plastics. To validate the data, subsequent interviews were conducted in September 2022.

Aside from the interviews, two roundtable discussions were held in July 2022 and October 2022 – initially for the selection of the policies for modeling and subsequently to allow for feedback on the model developed. A working session was also held with experts in January 2023 to gather feedback on the analysis and insights that emerged from the study.

## Project-specific questions

### 8 What is pricing transparency?

Pricing transparency refers to the degree to which information on the prices of plastic waste and the finished products at each point in the recycled plastics value chain is available to all buyers and sellers in each market.

### 9 What are the five policies that were selected for modeling and what was the rationale for selecting these and not other policies?

A list of 11 policy interventions that (1) support the availability of recycled plastic, (2) impact the price of input goods or (3) support output prices were identified.

This list of policies was discussed with industry experts regarding their potential impact on improving pricing transparency in the recycled plastics value chains. Based on this discussion, five interventions were identified in discussion with the country experts for modeling, with some of the interventions overlapping across countries:

- Extended Producer Responsibility (for all four countries)
- Implementation of a Deposit Return System (India and Indonesia)
- Minimum Recycled Content Targets (India and Indonesia)
- Formalization of the Collection System (Thailand and Viet Nam)
- Taxes on Virgin Polymers (Thailand and Viet Nam)

The scope of these policies was intended to be nationally applicable and focused on shifting market dynamics at an aggregate scale. Most of these initiatives are not set up to address pricing transparency directly, but might provide catalysts for the implementation of direct and practical solutions.

### 10 How will the selected interventions lead to an improvement in pricing transparency in the recycled plastics value chains?

The five policies selected for modeling and their impact on transparency in recycled material prices have been explained below.

#### 1. Extended Producer Responsibility (EPR)

EPR involves the implementation of an additional fee that is paid per unit of plastic packaging placed on the market. This fee can be either:

- Producer obligations paid by producers of goods to cover some of the cost of recycling or disposal of the plastic waste.
- Distributor obligations paid by distributors to cover the cost of collection of plastic waste items placed on the market by these distributors.

The core aim of the policy is to provide additional monies to cover the costs of management of the plastic waste. The implementation of EPR will impact pricing transparency within the value chain in a number of ways:

1. Calculation of producer fees will need to be based on typical costs of collection, aggregation, sorting, and recycling of plastics. This will require greater transparency around the processing costs and will lead to much greater interest in vertical integration.
2. Allocation of EPR fees will provide a certain level of transparency to the revenue model of operators within the value chain; i.e., within business models for operations, a known proportion of costs should be covered by EPR.

3. Fees can be modular in nature to reflect the costs associated with difficult to recycle material streams and support a transition towards greater recyclability of products placed on the market.

## 2. Implementation of a Deposit Return System

A Deposit Return System or scheme involves the imposition of additional fees to plastic items on their purchase by consumers. This fee can be redeemed on return of the item to a recognized recycling destination/scheme. The scheme is designed to improve the collection of recyclable material (providing higher volumes), but also better the quality of source-separated plastic waste feedstock.

The implementation of a Deposit Return System will impact pricing transparency within the value chain in a number of ways:

1. Setting a deposit return can be used to set a minimum guaranteed value for the material when collected or returned by an informal picker as they can be rewarded for returning the plastic items to an aggregator.
2. Dependent on implementation pathways, this also provides an element of transparency in terms of the cost associated with the purchase of scrap plastic, as it will be the material value plus a set token rate when redeemed by collectors. This token rate will either be a pass-through cost to a compliance scheme, or it could simply be a fixed cost covered within the value chain.
3. Value chains for managing single polymers become more transparent than mixed polymers, as there is a much more tangible link between single polymer streams and recycled polymer outputs at the end of the value chain.

## 3. Minimum Recycled Content Targets

The application of minimum recycled content targets for plastic items sold domestically. Minimum recycled content targets may potentially be supported by fiscal initiatives, such as a plastics tax. This provides a demand-pull to support recycling as brands are compelled to source recycled content for manufacturing.

The implementation of minimum recycled content targets will impact pricing transparency within the value chain in a number of ways:

1. The establishment of minimum recycled content targets within the value chain creates a quantifiable demand for recycled polymers.
2. Any fines for non-compliance with minimum recycled content targets become a very tangible and quantifiable opportunity cost of not using recycled content. This opportunity cost acts as a clear indicator of the pricing premium that can be expected on the purchase of recycled content; i.e., manufacturers are willing to pay up to a certain premium in order to avoid the opportunity cost of missing their recycled content targets. In this regard, the minimum recycled content target supports the differentiation of recycled polymers from virgin polymers as one is a “green product” and has a different cost structure.
3. Trade in recycled polymers is also more developed as a result of implementing minimum recycled content targets. Manufacturers will need to consider the cost of accessing material from outside the domestic market. International markets will therefore provide an indication of the trade value of recycled polymers, stimulating investment domestically in the process.

## 4. Formalization of the Collection System

Formalization typically takes place via (1) one or more informal worker organizations, such as cooperatives or associations, (2) employment in waste management systems operated by municipalities or private players, or (3) organization through community-based bodies or micro-, small-, and medium enterprises.

The formalization of the plastics collection system could support pricing transparency in a number of ways:

1. Collection costs for polymers will be better understood as they will be accounted for within contracted terms and values.

2. Contracting of polymer collections often also includes some element of profit share on material values. In this regard, not only are the costs of collection better understood but the offtake value of plastics is also included (normally linked to some sort of material price index) so that increased revenue derived from the increasing value of polymers collected can be shared with the municipality the waste is being collected from.
3. In addition to adding transparency, the formalization of collection may also improve the security of polymer prices for collectors (informal or other), as part of the collection costs are fixed, with less exposure to fluctuations in material prices.

## 5. Taxes on Virgin Polymers

In support of minimum recycled content targets, a tax or fee that is applied to producers not meeting the required recycled content target. This fee should act as a significant opportunity cost for not using recycled content within products sold.

The implementation of taxes on the use of virgin material will impact pricing transparency within the value chain in a number of ways:

1. The establishment of a tax on virgin material within the value chain creates the most direct and transparent price indicator for manufacturers and producers.
2. The tax level becomes a very tangible and quantified fixed cost of using virgin polymer. This additional cost artificially inflates the price of virgin material; i.e., manufacturers have to pay more for every tonne of virgin polymer they use in their products.
3. This artificially inflated price therefore becomes the opportunity cost of not using recycled polymer within the manufacturing process. This essentially differentiates recycled polymer from virgin material as a “green product” and a means to avoid taxation.
4. As a price point, a reference point is available as manufacturers are able to pay up to the cost of virgin polymer plus the cost of the tax for recycled equivalent material. At any point below this, recycled content is more viable. Therefore, by raising the price of virgin material, the market rate for recycled content can increase to reflect the additional cost of collection and recycling associated with production of recycled content.
5. Pricing transparency is therefore added, defined by the competitive price point for recycled polymer.

## 11 From the policy intervention assessment, what are the key considerations when implementing each of the policies?

### 1. Extended Producer Responsibility (EPR)

Due to the informal nature of the value chain across the four markets, there is limited transparency around market players and material flows. In such a scenario, the various actors lack clarity on how the EPR fees levied against producers are likely to benefit or trickle down to them. In the absence of this transparency, EPR is unlikely to be an effective policy instrument in significantly increasing the collection of material for recycling, the distribution of profits through the value chain, and, resultantly, the overall transparency in pricing in the value chain.

### 2. Implementation of a Deposit Return System (DRS)

Policy makers should not set up a collection system that operates parallel to, or separate from, the systems already available in countries where DRS is considered for implementation. For example, infrastructure, such as waste banks in Indonesia, which have already been established for the collection of material, can be used as collection points. Further, considering the significant contribution of the informal workforce to the collection and recycling of plastic waste in the four countries, any DRS implementation has to be inclusive and integrate waste collectors. The implementation of DRS could be supplemented via “new” return points for consumers, but the intervention should not exclude waste collector access to the materials or redemption centers. When DRS is implemented, steps must be taken to ensure that waste collectors are not left out due to the need for registration processes or collection infrastructure.

### 3. Minimum Recycled Content Targets

When minimum recycled content targets are implemented in India and Indonesia, the additional demand and profits should be used to encourage and incentivize the informal sector to collect additional material for recycling. This will improve the livelihoods of informal waste workers, while increasing the quantity of plastic waste feedstock for recycling. It is therefore in the interest of recyclers to share some of the pricing benefits with collectors and aggregators in order to maximize the output of recycled polymers and increase revenue generation and profitability. Changes in output price should translate to changes in prices of scrap collected and the incremental income must be passed through the value chain to improve collection.

### 4. Formalization of the Collection System

In highly fragmented, informal collection systems, formalization should be a choice offered to informal waste workers and any formalization measures developed should be carried out with the participation of the workers. Top-down measures can disrupt the positive impact of the informal sector. A formalized market structure should support informal waste workers through greater transparency and data collection on activities undertaken. This transparency should also support them in delivering a better audit trail of the material collected, which will be valued by recyclers and producers seeking recycled content. In value chains with a more formalized structure, investments made to improve contracted collections and processing can be specifically directed to support parts of the supply chain that need to be improved or supported beyond simple market incentives.

### 5. Taxes on Virgin Polymers

To lead to greater recycling output, taxes on virgin plastics have to be combined with an additional market incentive for collectors and aggregators that is directly linked to material collection. However, this market incentive is difficult to create in less well-developed supply chains, particularly if there is an existing lack of transparency, or instances where market power is concentrated among a few more commercial actors who control output.

As a purely market-based incentive focused on the final product output, taxes on virgin products improve the overall recycling output in markets with greater transparency. In the absence of market transparency, operators improve their profit margins rather than incentivizing expansion of recycling performance. In particular, this is true if these market incentives are not transparent and cannot provide signals for new operators to enter the market. In this regard, taxes on virgin polymers are not the ideal type of intervention to support collectors and informal workers within the supply chain in emerging economies such as Thailand and Viet Nam.

## 12 What is the goal of the economic modeling exercise?

Economic modeling strives to show economically rational responses to policy interventions aimed at improving pricing transparency and increasing the recycling of plastics. This means that actors within the value chain are expected to behave in rational ways, and consider options and decisions within logical structures of thought to achieve simple goals such as maximizing profit, as opposed to involving emotional, moral or potentially strategic thinking that may distort the market.

## 13 How should the tool be used?

The outcomes of the policy intervention assessment should be seen as example outcomes, as the model provides a flexible tool in which the assumptions around the policy impact can be changed based on users' selection of the assumed values, leading to different outcomes. The tool allows users to model the impact of selected interventions on the output volumes, market share, prices of recycled plastics, and associated profits at each stage of the value chain.

## Recycled Plastics Policy and Pricing Tool

### 14 What is the tool not intended to be used for?

The tool is based on baseline data gathered through interviews conducted during the first half of 2022. The data on prices have not been updated based on current market prices and output volumes, hence the tool should not be used to forecast values on future output volumes, market share or changes in profits for value chain actors.

The tool also models the impacts based on an assumption of economically rational responses to policy interventions. However, in the real world, value chain actors may not make economically rational decisions. Their responses can be influenced by a variety of factors beyond economic rationality, such as information asymmetry.

### 15 What are the limitations and assumptions of the tool?

#### Limitations:

- Users cannot customize the input for each of the interventions and have to select from a list of preset values.
- The quantified values of the impact of each of the interventions can appear to be arbitrary without an understanding of the backend calculations.
- For polymers that have limited pricing data available, it is not possible to model the impact of interventions.

#### Assumptions

- In setting up the baseline model, economic principles were applied in what is assumed to be a linear value chain. This means that material takes a straight path from production to consumption, and finally to disposal. In this value chain:
  - Collectors use their own labor to collect plastics. They add value in the separation of plastic scrap from other waste streams.
  - Collectors sell the plastics to aggregators.
  - Aggregators buy plastics from collectors, treat the plastic, adding value via aggregation and further separation (inputs of capital and labor), and sell the plastics to the recyclers.
  - Recyclers buy plastics from the aggregators and add value through recycling processes (inputs of capital and labor), producing recycled plastic products (i.e., flakes or pellets). The products are sold onwards to the buyer at a price that corresponds with the maximum global average market price for corresponding virgin plastic.

### 16 Can I cite data from the Recycled Plastics Policy and Pricing Tool?

Yes, please attribute all data citations to “Source: The Circulate Initiative’s Recycled Plastics Policy and Pricing Tool” and direct audiences back to the website.





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