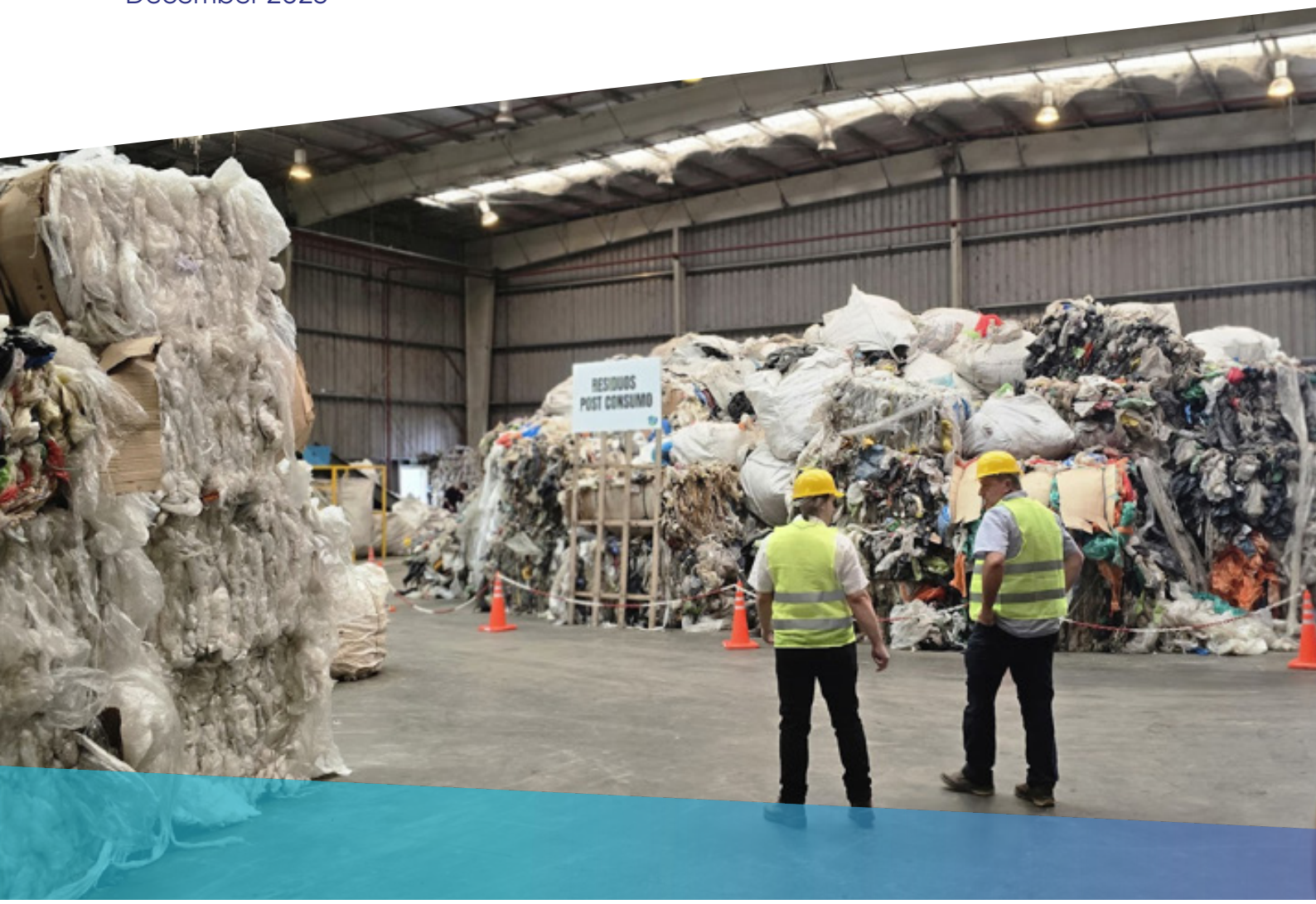
Unlocking flexible plastics recycling at scale in Buenos Aires

December 2025



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ALLIANCE TO END PLASTIC WASTE

DOW

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Foreword

As we look ahead to a more circular future, I am encouraged by what this report shows: even the most difficult to recycle materials can become part of a viable and scalable value chain when partners work together with ambition, rigor and a willingness to innovate.

In Greater Buenos Aires, flexible plastics make up most of the plastics in the municipal solid waste system – yet less than 3% are recycled today. For years, low value, high contamination, underused infrastructure and volatile demand kept these materials out of the recycling system. Over the past two years, in partnership with Dow and the Alliance to End Plastic Waste, we set out to change that.

Together, we proved that with the right incentives and operational improvements, flexible plastics can be recycled profitably at scale. By doubling the recovery of post-consumer flexibles from sorting centers, helping recyclers improve efficiency and quality and opening new end markets for lower grade pellets, we strengthened the economics of the entire value chain. We also tested recovery from mixed waste at the CEAMSE Mechanical Biological Treatment facility, confirming the feasibility of unlocking much larger volumes in the future from mixed waste.

This work demonstrates the power of a systemic approach that pairs short term incentives with capacity building, improves recycler economics and connects supply with stable demand. It also highlights the critical role of partnership. Waste worker cooperatives, municipal sorting centers, recyclers, converters and many local collaborators in Buenos Aires played a vital role in making this progress possible. I'm especially proud of our Delterra Argentina team, whose thoughtful experimentation, steady problem-solving and on-the-ground leadership brought all these partners together and carried this work from ambition to reality.

We hope that this work will serve as a blueprint that can be adapted across large cities in Latin America and an example for others across the Global South.

Warm regards,

Dr. Shannon Bouton
President & CEO, Delterra

Summary

Flexible plastics make up the majority of plastics in municipal solid waste in Greater Buenos Aires but are rarely recycled due to low value, high contamination and uncertain demand. Over the last two years, Delterra, in partnership with Dow and the Alliance to End Plastic Waste, ran a project demonstrating that these barriers can be overcome by aligning economic incentives with operational improvements.

By introducing a short-term subsidy and training hundreds of waste workers to accurately sort flexible polyethylene, we dramatically increased recovery volumes. At the same time, we **helped recyclers improve efficiency and scale, enabling them to produce pellets at competitive prices and expanded demand by linking these pellets to end markets** such as garbage bags and construction materials. As the demand for these pellets grew, the subsidy was gradually phased out, **creating confidence in the system and proving that flexible plastics can be recycled profitably at scale.**

Barriers to recycling flexible plastics can be overcome by aligning economic incentives with operational improvements and synergies of scale.

Together, these steps provide a **replicable model for Global South megacities:** use short-term subsidies and training to quickly boost supply, grow diverse demand markets to stabilize the system and invest in recycler capacity to strengthen economics.

Mixed waste offers larger, more affordable volumes of feedstock but requires investment in sorting, washing and extrusion capacity.

While existing approaches can increase flexible plastic recycling rates from the current 1-3% up to 10%, **the next major opportunity is sourcing feedstock directly from mixed waste streams.** This shift requires automated separation technologies to unlock larger, more affordable volumes.

To test this potential, we partnered with Benito Roggio Ambiental (BRa) at the Mechanical Biological Treatment (mixed waste) facility in CEAMSE, Buenos Aires province. We conducted a trial by separating flexibles from household waste, followed by secondary sorting (by polymer and color) and assessing the final pellet quality. The trial confirmed technical feasibility, but proved that manual secondary sorting is economically prohibitive.

Therefore, **scaling flexible plastics recovery from mixed waste will require significant investment in sorting automation, washing and extrusion capacity.** Dow and BRa are now embarking on a long-term, structured journey through 2030 to overcome the technological and commercial challenges of large-scale post-consumer flexible plastic recycling in Argentina. The aim is to validate viable circular solutions by combining expertise, characterizing waste and building a competitive business case that transforms the national recycling and waste management ecosystem.

As a final note, while this paper focuses on actions for the local recycling value chain, **supportive regulatory measures -such as Extended Producer Responsibility (EPR) or mandatory recycled content targets for non-food packaging- are critical.** National governments can play a key role in accelerating this transition and improving the financial business case.

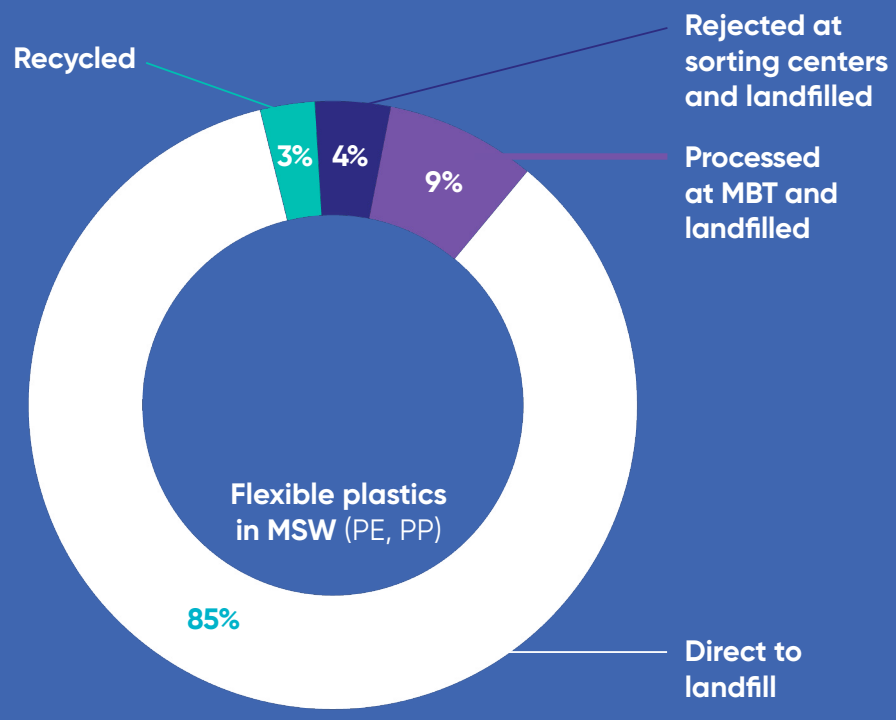
Supportive national policies are essential to accelerate flexible plastic recycling at scale.

Barriers to **recycling post-consumer** flexible plastics

Flexible plastics represent a large share of plastics in municipal solid waste (MSW), posing significant environmental challenges. Their greater prevalence in municipal waste composition, lightweight nature and collection issues mean that they have a greater risk of leaking into the environment. **The generation of plastic waste is projected to triple by 2060,** according to the OECD[1] and the mismanaged waste will also triple if left unaddressed. A large proportion of this waste consists of flexible, polyethylene (PE) and polypropylene (PP), which can be mechanically recycled, highlighting a substantial lost economic and environmental opportunity.

3% of post-consumer flexible plastics in Municipal Solid Waste (MSW) is recycled in Greater Buenos Aires

Destination of flexible plastics in Greater Buenos Aires, %



Source: Waste management characteristics and sorting center data from cities across GBA; recyclers

1 "Global plastic waste set to almost triple by 2060," OECD, 2022

The Greater Buenos Aires region provides a unique case study because of its large population and significant, though underutilized, waste management infrastructure. The metropolitan area has extensive waste collection coverage and over 50 sorting centers operated by thousands of waste workers. However, this **infrastructure has not been effectively leveraged for flexible plastics, leading to low recycling rates.**

Several **interrelated challenges contribute to these low recycling rates:**

- **Low Source Separation**
  A significant majority (93%) of flexible plastics from households and businesses are disposed of in mixed waste[2]. Unlike rigid plastics, **citizens are often unaware that flexible plastics are recyclable and can be placed in segregated collection streams.** Municipal behavior change campaigns indicate that all plastics should be separated for collection (contrary to countries where flexible plastics are discouraged from collection such as in many US cities for example), but adoption compared to rigid plastics is lower.

- **Collection and Sorting Economics**
  Flexible plastics are less attractive to informal waste pickers and waste worker cooperatives because they are lightweight, can differ in polymer composition, size and color and have a lower market value than other materials like rigid plastics. As a result, even when they reach municipal sorting centers, **they are often not sorted for recycling because the price does not justify the manual effort.** Half of the flexible plastics that do arrive at sorting centers in Greater Buenos Aires are rejected and sent to a landfill.

Low separation, weak economics, contamination, and volatile demand keep flexible plastic recycling rates extremely low.

- **Contamination and Cost**
  The flexible plastics that are sorted and sent to recyclers are **often contaminated** with food scraps, dirt and paper, requiring costly washing and clogging up extruders of recyclers. As a result, approximately **20-30% of the material at recyclers is rejected**[3]. The lack of distinction between transparent/translucent and colored plastics also reduces their value, as colored plastics cannot be mechanically recycled back into clear ones.

- **Volatile Demand and Competition**
  The demand for recycled plastic resin is highly sensitive to the volatile price of virgin plastics. As virgin plastic prices have decreased, recycled resins are sometimes more costly and cannot match the superior, highly stable quality of virgin plastics, posing a challenge for high-performance applications. Meanwhile, dealing with recycled resin requires extra effort from converters and can lead to production losses. However, **our research shows that, when recycling is done correctly and at scale, recycled plastic resin can be cost competitive** and fit for applications that are not limited by regulations in the adoption of PCR and do not require high performance, such as garbage bags or construction materials.

These factors have led to a system where the majority of plastics disposed in municipal solid waste in Greater Buenos Aires is flexible and less than 3% is recycled, ending up in landfills or unmanaged garbage dumps instead.

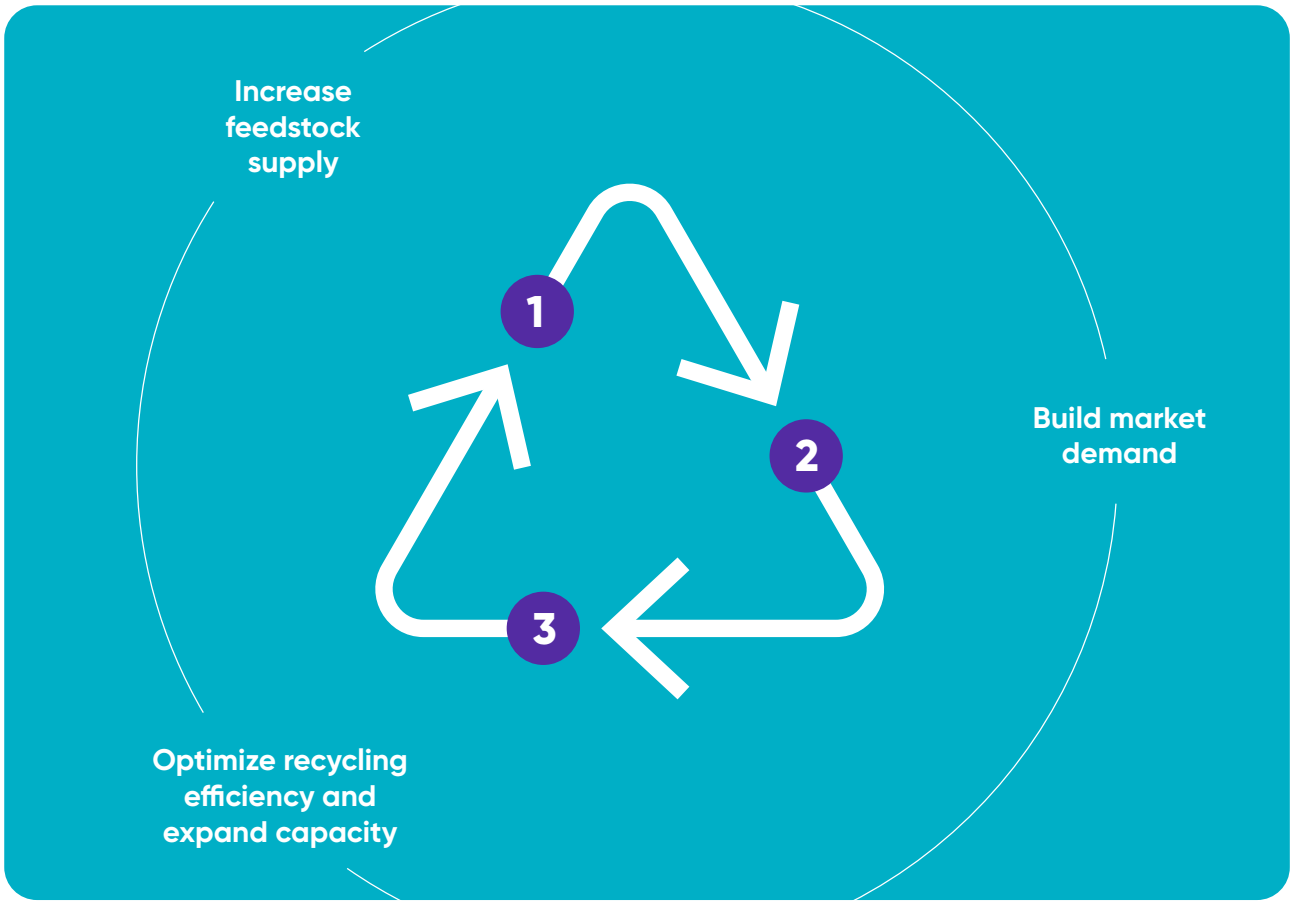
2 Waste management characteristics and sorting center data from cities across GBA; data gathered from recyclers
3 Delterra estimates from plastic recyclers in Argentina

Solution: Recycling flexible plastics at scale

Three actionable steps can increase flexible plastics recycling.

To prove that the barriers to recycling post-consumer flexible plastics can be overcome, Delterra partnered with Dow and the Alliance to End Plastic Waste. We launched a pilot program in Greater Buenos Aires, a metropolitan region of 16 million citizens, focused on aligning economic incentives with operational improvements.

The program consists of three actionable steps to be taken collaboratively across the recycling value chain by municipalities, waste worker cooperatives, recyclers, converters and plastic producers. We believe that **these steps are applicable across megacities in the Global South that have segregated recyclable waste collection in place.**



1. Increase feedstock supply

By creating a short-term subsidy to create favorable economics while training waste workers in the sorting centers to accurately and efficiently sort flexible plastics, we were able to double the volume of flexible plastics feedstock material recovered from sorting centers.

Recycling flexible PE into valuable post-consumer resin (PCR) is challenging, as shredding, washing and extruding the lightweight and easily contaminated material is costly and complex. Recyclers therefore prefer cleaner, more voluminous feedstock such as post-industrial waste from factories or post-commercial waste from shops, malls and offices. This supply of feedstock is relatively reliable, but costly, making it difficult to compete with virgin resins on price.

Short-term incentives and training doubled the supply of post-consumer flexible plastics.

More economical is post-consumer waste separated by citizens and businesses and collected and processed in Material Recovery Facilities and other sorting centers. **Yet in Greater Buenos Aires, over half of the flexible plastics correctly separated by households and businesses and arriving in municipal sorting centers are still rejected.** Waste workers operating the sorting line prioritize the largest and most transparent film, which has a higher value. **They ignore colored or less voluminous flexible plastics unless they have spare capacity and storage space, leading to an inconsistent supply.** Furthermore, without training it can be challenging to manually sort flexible plastics accurately by polymer.[4]

Our program proved that by creating stable demand from recyclers for baled feedstock, training waste workers to sort these materials correctly, ensuring traceability and not unimportantly establishing trust between supply and demand - a more financially sustainable market for flexible plastics feedstock sortation can be established. Over two years, **this strategy doubled the volume of post-consumer flexible plastics that was sorted** by sorting centers across Greater Buenos Aires (6,500 tons in total). We achieved this by introducing a short-term subsidy in dozens of sorting centers and training hundreds of waste workers to identify and separate flexible PE. The subsidy, which started at 50% above the feedstock price for sorted flexible PE, was gradually reduced and then removed entirely. This served to build confidence that sorting flexible plastics was worthwhile and that the offtake would be reliable.

4 Delterra observations at 20+ sorting centers in Buenos Aires

2. Build demand markets for PCR

By expanding into new end markets that could absorb lower grade recycled plastics, we were able to meaningfully increase demand and create more stable economics for the overall system. However, the demand that exists today is just a fraction of the potential demand if PCR can be produced at scale, with stable quality and competitive prices to virgin plastics.

Increasing feedstock supply is of little value if there is no demand for plastic recycled resin. In Greater Buenos Aires there are no regulations stimulating PCR incorporation, as such the demand for PCR from flexible PE was limited, with applications that have limited performance requirements such as garbage bags or construction materials largely made from virgin resins.

Expanding lower-grade markets is essential to create stable demand for recycled flexible plastics.

The demand that did exist focused on the highest-performance quality pellets (Grade A), which require very clean, homogenous feedstock. However, there is a wide range of applications that could use Grade B or C pellets such as bags (garbage and carrier bags), construction (film, roofing, flooring, tiling) and various other applications (furniture, garden hoses, pots, buckets, etc.). Converters producing these lower-grade applications are price sensitive and it is here where **flexible, lower-grade PE can compete if produced at scale and in acceptable, stable quality.**

Our program **assisted a PE recycler in Greater Buenos Aires, to scale improve the quality of its recycled resin and attract new demand.** We worked together on:

- **Process Optimization:** We helped identify an optimal blend of 70% post-consumer and 30% post-commercial feedstock for 'caramel' (translucent) resin improving both cost-effectiveness and product quality.
- **Extrusion and Quality Control:** We collaborated with Dow to refine the recyclers extrusion process by optimizing temperatures, filter mesh sizes and other key configurations. As the recycler lacked an on-site laboratory, Ampacet supported with sample analysis to test for melt-flow index, moisture, ash content and the presence of non-PE plastics.
- **Operational improvements:** We implemented a system for feedstock traceability, enhanced inventory control and introduced general operational excellence improvements.
- **Accreditations:** We supported the application for a certification of recyclability from Ecoplas (national plastics association), to become a member of CAIRPLAS (the plastics recycling association). Furthermore, we created a roadmap for the recycler to meet ISO 9001, 14001 and 45001 standards, paving the way for future growth and credibility.
- **Market Connection:** With the new, higher-quality resin, Dow helped to find new buyers, including plastic converters, securing a market for their improved product. Furthermore, the recycler expanded its sales by producing its own line of garbage bags and film rolls.

These initiatives were instrumental in building the demand for lower-grade PE post-consumer recycled (PCR) plastics in Greater Buenos Aires. For the recycler, **monthly sales of these materials grew 800% over the course of the project.**

As mentioned, the potential demand for low-grade applications is significantly larger. Recyclers in Buenos Aires can learn from countries with more developed flexible PE recycling, such as South Africa where a large portion of garbage bags and shopping bags are made from recycled resins. **To unlock this potential, in absence of government intervention, the price of PCR must be low enough to compete with virgin resins and make up for its lower performance characteristics.**

Strengthening recycler capabilities boosted demand for low-grade PCR, driving an 800% increase in monthly sales.

3. Optimize recycling efficiency and expand capacity

By increasing the production volume and efficiency of recyclers, we were able to reduce the price of PCR which further increased market demand and the need for feedstock.

Recyclers can reduce the price of PCR by securing more economic feedstock and/or decreasing production costs. Feedstock from sorting centers in Buenos Aires was already offered at competitive prices - enough to cover manual sortation costs but with limited room for reduction. Meanwhile, **recycler production costs were relatively high, as recyclers operated at low scale and inefficiently.**

In step 2 we discussed how we supported the recycler to improve efficiency and quality. Next, we **supported them to reach scale by attracting funding to expand its washing and extrusion machinery.** This allowed them to increase their monthly production volume from by 800% over two years and reduced the relative share per tons produced of their fixed costs such as rent, administrative costs and overhead.

Profitability was also improved by producing different PCR pellets: more valuable 'caramel' pellets from translucent feedstock and more economical 'black' pellets from colored feedstock, which could be sold for applications like garbage bags.

Our experience working with recyclers in Greater Buenos Aires is that **there is an opportunity to further reduce prices by growing production volumes.** This can help improve the financial sustainability of recyclers over time. In the below exhibit, we share the cost dynamics of an example recycler at different levels of production (based off of average cost dynamics seen at various recyclers in Buenos Aires). Until 300 tons/month of pellet production, recycling of lower-grade flexible PE was loss-giving for the recycler, as production prices are above the market willingness to pay. However, **at 450 tons/month or more, economies of scale reduced the relative share of fixed costs, allowing recyclers to break even and earn an increasing margin as volumes grew.**

Scaling recycler capacity is essential to reduce PCR costs and unlock sustainable market demand.

Next horizon: unlock feedstock from mixed waste

The above three steps can kickstart emerging flexible plastics recycling markets and are applicable to many large urban areas in the Global South that have some level of segregated collection. However, these steps are insufficient to fully address the challenge, as they are estimated to only raise post-consumer flexible plastics recycling rates in Latin American cities from 1-3% to 10%. **The next challenge is to increase access to affordable and more stable feedstock at scale, in order to reduce PCR prices and expand the demand for it.**

Separating flexible plastics from mixed household waste can unlock large, affordable feedstock volumes.

Cities in the Global South can seize a "leapfrog opportunity" by learning from global leaders in recycling. In Europe, a key strategy being increasingly adopted is the separation of flexible plastics from mixed household waste. This approach requires a central facility that can process a high volume of waste, similar to Attero in the Netherlands or Disan's plants in Turkey. **Separating flexible plastics offers a significant advantage: it unlocks large, stable volumes of competitively priced feedstock.** This is because it repurposes materials that would otherwise be expensively sent to landfills

or incinerated, or converted into less profitable energy sources. However, this method isn't without its challenges. The primary disadvantage is the need for significant investment in automated sorting machinery. Additionally, the resulting materials are often more contaminated, limiting their use to lower-grade PCR that are unsuitable for new packaging. Because of the lower quality of the recycled material, new markets must be developed to create demand for these large volumes of feedstock. For example, the Netherlands has successfully found new uses for these pellets in its construction and agriculture sectors.[5]

In a cross-sector partnership—comprising Benito Roggio Ambiental (a waste management company in Argentina), Dow, recyclers, converters and waste picker cooperatives—we are exploring the technical feasibility of flexible plastic separation at the Norte III Mechanical Biological Treatment (MBT) facility in Buenos Aires. The MBT is located at CEAMSE Norte III landfill. The MBT is operated by Tecsan (part of Benito Roggio Ambiental) processes 1,400+ tons of household waste from the City of Buenos Aires[6]. It focuses on reducing the volume of organic waste sent to landfill,

5 "Navigating Volumes and Value Chains Towards Circularity", Circular Plastics NL, 2025
6 Data received from Tecsan

reducing costs and the environmental impact of mixed waste. It was designed to also be able to separate recyclables, including a flexible plastics stream but this was never operationalized due to lack of demand and uncertainty about whether the material was fit for recycling.

In a proof-of-concept, we partnered with Tecsan to turn on a blower in its line that separates light-weight materials. That allowed it to separate mainly flexible plastics that we sent to a waste worker cooperative sorting center in Greater Buenos Aires, where the PE was separated using criteria such as transparency, polymer type, size and contamination level. Consequently, this material was washed and extruded and recycled into recycled PCR pellets.. These pellets are of low grade, not translucent and contain minor odors. Nonetheless, they are suitable for a range of applications. Sample analysis indicated acceptable levels of Melt Flow Index, Ash and Moisture. When mixed with LLDPE from post-commercial waste, the film was sufficiently puncture resistant and thus suitable for garbage bags and film rolls.

Although the proof of concept is proving successful, the manual sortation of mixed waste is neither financially feasible nor efficient at scale. This is where automated sortation technology (such as optical sortation and ballistic separators) come in. **With targeted investments in automated separation technologies, we estimate that over a 1,000 tons per month of flexible PE arriving at the MBT in Buenos Aires can be separated, sorted and prepared for mechanical recycling.** This is feedstock that is not sorted at source, does not arrive at sorting centers and the MBT is the last stop before it is sent to landfill. It is **an opportunity to significantly scale the feedstock supply while reducing feedstock costs** and a complement to the cleaner materials from segregated collection that are sorted at municipal sorting centers.

Our proof of concept shows that flexible plastics from mixed waste can be recycled – but scaling it requires automated sorting, washing and extrusion.

Conclusion

In conclusion, while recycling flexible plastics from household waste in Global South megacities is possible, it remains challenging.

We believe this approach and the lessons learned can be replicated in large cities that meet specific criteria: a sufficiently large volume of potential feedstock (plastic waste generated by households and business), established segregated recyclables collection, sorting centers with excess capacity and willing polyethylene (PE) recyclers located close enough to keep transport costs manageable. For example, Delterra is now replicating this approach in São Paulo, suggesting other large Latin American cities could follow suit.

Recycling flexible plastics is possible — but only cities with the right conditions can replicate this model successfully.

Successfully replicating this model and achieving financial self-sustainability requires interventions across the entire value chain. This includes investment in sorting, washing and extrusion capacity; continuous improvement of pellet quality; and stimulating and connecting demand with supply.

Our proposed solutions focus on actionable steps that various local actors, including municipalities, can take within the existing recycling value chain. However, these interventions are costly, time-consuming and difficult to implement without further support or external stimulation. We purposely excluded national-level federal government intervention from the scope, as these policies are typically beyond the control of local actors like municipalities, waste worker cooperatives, recyclers and offtakers.

When designed correctly, the opportunity for national governments to unlock recycling value chains is significant. Countries globally are increasingly adopting Extended Producer Responsibility (EPR) schemes, providing subsidies, tax discounts, or other financial incentives to generate dedicated funding for more efficient waste management systems.

Achieving long-term financial viability requires coordinated investments across the entire value chain.

In the case of Argentina, past government administrations have explored the introduction of EPR regulation, but no definitive initiative has come to fruition yet. We strongly encourage the government to implement targeted national policies to address the systemic challenges faced in recycling flexible plastics at scale in Argentina. For example:

1. **Extended Producer Responsibility (EPR) Regulation:** To establish financial responsibility for the post-consumer management of packaging with producers.
2. **Mandatory Recycled Content Targets:** For non-food packaging (where applicable) to create a stable, high-value market demand for recovered plastic.
3. **Financial Incentives:** Such as subsidies, tax breaks, or differentiated fees to encourage capital investment in recycling technology and the valorization of flexible plastics.

The government can benefit from the experience of other Latin American countries, such as Brazil, which has already introduced several of these measures and continues to explore additional ones.

We believe that flexible plastics recycling can be significantly increased in megacities across the Global South with the right conditions.

Thank you to our partners!

Our work in Buenos Aires was completed in collaboration with CABA, Ampacet, Tecsan, BRa, Beiersdorf, GS1, Universidad Austral, Empower and Accenture.

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