

The Plastics Circularity Investment Tracker: Monitoring Capital Flows to Tackle the Plastic Pollution Challenge



Disclaimer

The Circulate Initiative's Plastics Circularity Investment Tracker report (the "Report") and the Plastics Circularity Investment Tracker tool (the "Tool") is provided for general informational purposes only and should not be construed as professional, investment, financial or other advice. The Tool and Report are intended to help users understand the types of investments that have been made for transitioning to a circular economy for plastics in emerging markets. The information shown in this Report is based on data available at the time of our study (November 2022). The information is subject to change without notice. The Report and the Tool are for individual use only and no part of the Report or the Tool may be copied, shared, or used in any way other than for its intended purpose without The Circulate Initiative's prior written consent. All legal rights, including intellectual property rights of the Tool and Report are reserved by The Circulate Initiative. The Circulate Initiative disclaims all liability and damages arising from your use of the Report and Tool, or any information provided thereby. By using the Report and Tool, you accept these terms and agree not to hold The Circulate Initiative or its affiliates or any third party service provider liable for any possible claim for damages arising from any decision you make based on information or other content made available to you through the Report and the Tool.





The Circulate Initiative's Plastics Circularity Investment Tracker report and the accompanying Plastics Circularity Investment Tracker tool (hereinafter referred to as the Investment Tracker) are the first resources of their kind to provide insights to measure and characterize investments made to drive a circular economy for plastics.

The purpose of the [Investment Tracker](#) is to explore the role of finance in tackling the plastics pollution challenge by tracking investments taking place in emerging markets, and to move the needle on the scale of private investments coming in.

The Investment Tracker highlights the areas of opportunity and growth in the plastics circularity market. With the aid of the Investment Tracker, investors can better understand the plastics circularity market trends, and compare and gain insights into different areas for investment, e.g., by region, country, solution, etc.

The Investment Tracker and its periodic updates serves as a reference point for investors and investees to identify investment trends and capitalize on growth opportunities in the plastics circularity ecosystem.

[Access the tracker](#)

Contents

Abbreviations and Acronyms	05
Executive Summary	06
Scope and Methodology	08
The Current State of the Plastics Market	11
Plastics Circularity Investments Overview	12
Plastics Circularity Investments by Region	13
Plastics Circularity Investments by Investment and Deal Type	14
Plastics Circularity Investments by Circularity Solutions	17
Plastics Circularity Investments: Key Investors	19
Case Study: Recycling startup expands into international markets due to blended finance investment	21
Paving the path for new investments in plastics circularity	22
References	23
Acknowledgements	24
Appendices	25



Abbreviations and Acronyms

ADB	Asian Development Bank
DEG	Deutsche Investitions- und Entwicklungsgesellschaft
DFC	United States International Development Finance Corporation
EPR	Extended Producer Responsibility
EU	European Union
IFC	International Finance Corporation
IPO	Initial Public Offering
LBO	Leveraged Buyout
M&A	Mergers and Acquisitions
PE	Private Equity
PET	Polyethylene terephthalate
PVC	Polyvinyl chloride
rPET	Recycled polyethylene terephthalate
SMEs	Small and Medium Enterprises
US\$	United States Dollar
VC	Venture Capital





The critical need for tracking investments into plastics circularity

According to a report by The Pew Charitable Trusts and SYSTEMIQ, the opportunity exists to tackle plastic pollution and reduce the present value of global investments in the plastic industry to US\$1.2 trillion through systems change.¹ However, data on the deployment of capital into circular economy solutions remains unreported, unavailable, or scattered. Even when capital is deployed, the lack of access to baseline data makes it challenging to quantify and assess the extent of the investment's impact. Without access to this data, it is impossible for investors to pinpoint gaps and deploy capital for the most critical needs. The Circulate Initiative's **Plastics Circularity Investment Tracker** for emerging markets – the first tool of its kind globally – has been created to address this gap, providing critical investment information for mobilizing further private capital to drive a circular economy for plastics.

The current value of investments in plastics circularity

The Plastics Circularity Investment Tracker reveals that US\$4.1 billion was invested in plastics circularity solutions in emerging markets between January 1, 2018 and September 30, 2022 (see Appendix A for emerging markets considered for the purposes of the Tracker). Annual investment varied each year, with the highest annual total across the review period (US\$1.08 billion) recorded in 2019. As of September 2022, US\$539 million has been invested in plastics circularity in 2022.

Asia is the focus of the vast majority of emerging markets investment - receiving 87% or US\$3.5 billion of the total investment since 2018.

Early-stage and small-value deal sizes dominate deal count but fade in deal value

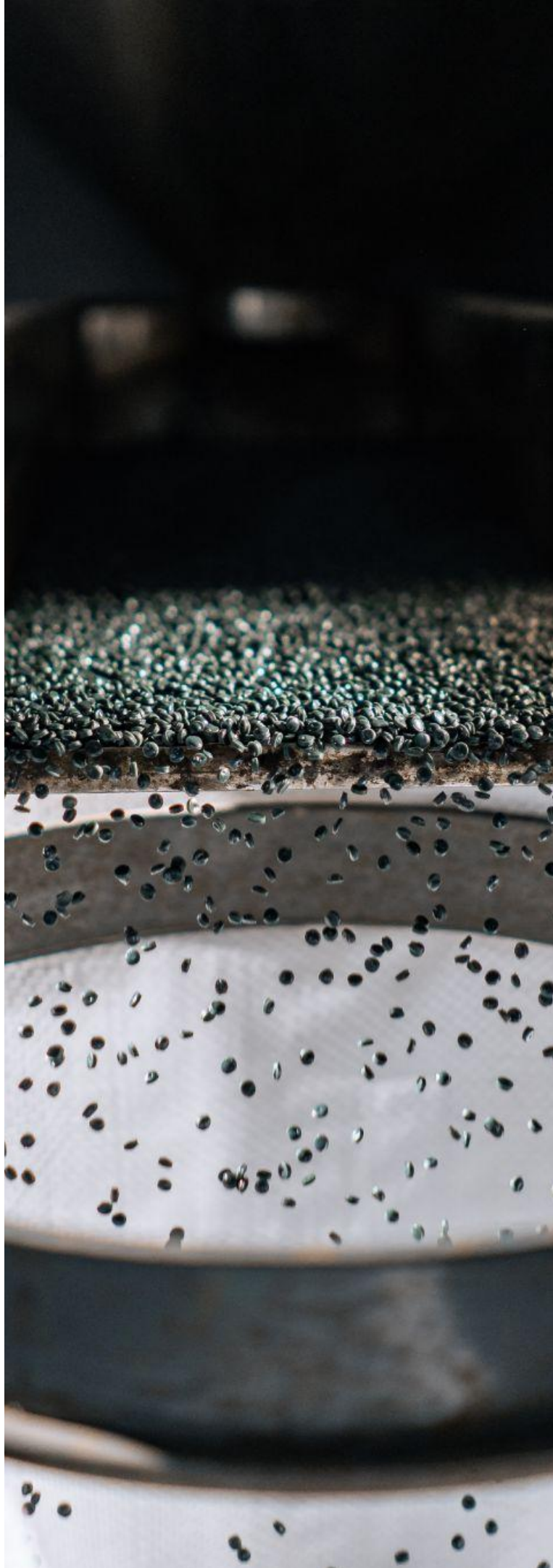
On average, approximately 87 deals were recorded each year, with 2021 recording the highest at 97 deals. Most investments in plastics circularity in emerging markets are characterized by early-stage investments. Median deal value sizes across all stages of investment range from US\$52,500 for seed investments to US\$15.4 million for exit funding. While firms in the seed and early stages of development accounted for 62% of the deal count, they only received 5.1% of investments during the review period.

Investments currently focused on closing the gap

Of the US\$4.1 billion investments in plastics circularity, downstream solutions, particularly recycling and recovery firms, received the majority of investments during the period, at US\$3.6 billion. Investor interest in firms offering recycling and recovery services is due to their more established nature vis-à-vis solutions such as materials or refill/reuse, which are still considered emerging solutions to tackle the plastic pollution challenge by most investors.

Need of the hour: increase in scale and diversity of investments

An increase in the number and diversity of investments across the plastics value chain and across regions is required to ensure a circular economy for plastics. As the focus shifts to reduction and avoidance of plastics, more innovative companies operating upstream or with business models that cut across the whole plastics value chain are expected to come to the fore and make the business case for investment. Well-placed strategic impact investment to develop plastics circularity will be critical to solving the ocean plastic pollution challenge and founding a new type of economy based on the principles of circularity and sustainable development.



Scope

PLASTICS CIRCULARITY

Plastics circularity is defined as a system that drives a circular economy for plastics. This includes technologies, business models or other solutions that tackle the plastic pollution challenge by eliminating, reducing or reusing plastic, or by keeping plastic materials in circulation without them leaking into the environment.

COVERAGE

Investments in firms that tackle plastic pollution across eight archetypes of solutions are included (see Appendix B for a list of definitions for each archetype):



Materials



Redesign



Refill/Reuse



Services (driving plastics circularity or plastic waste management)



Operational Platforms (enabling plastics circularity)



Digital Mapping



Recycling



Recovery

GEOGRAPHIES

The Investment Tracker focus is on plastics circularity-related investments in emerging markets, which are defined as low-income economies, lower-middle-income economies, and upper-middle-income economies, as identified by the World Bank.² Following this definition, 135 countries are considered emerging markets. Of these, information on deals was recorded in 38 countries across Africa, Asia, Europe, and Latin America and the Caribbean and included in the Investment Tracker.

TIME FRAME

Data provided is for the period January 1, 2018 to September 30, 2022. The period of January 1, 2022 to September 30, 2022 is hereinafter referred to as 9M 2022.

INVESTMENT

The Investment Tracker reports on the total value of private, third-party investment deals. Investment categories include (see Appendix C for a list of definitions for each investment category):

- Accelerator/Incubator funding
- Corporate/Strategic Investments
- Debt Financing/Loans
- Development Bank Financing
- Impact Investments
- Individual/Crowdfunding
- Philanthropy
- Private Equity (PE)
- Public Investment/Initial Public Offerings (IPOs)
- Venture Capital (VC)

Methodology

The Circulate Initiative's Plastics Circularity Investment Tracker seeks to capture all third-party investments in plastics circularity (i.e., business models, technologies or other solutions across the plastics value chain which tackle the plastic pollution challenge).

The Circulate Initiative consulted various databases covering private market transactions and filtered data for third-party investments made in plastics circularity solutions in emerging markets for the period of January 2018 to September 2022. The information compiled from these databases was cross-checked against publicly available information where available. Known deals from publicly available sources that were not captured by the databases were also included. Investments were categorized according to investment categories and archetypes, and the data was aggregated to generate insights while maintaining the transactions' anonymity.

Transactions included in the Investment Tracker were first filtered to only include investee companies based in emerging markets (see Appendix A), and subsequently screened to meet one or more of the following criteria:

- Plastics circularity is a core function of the business operations of the investee company.
- Where plastics circularity is not a core function of the investee company, the investment should be directly attributed to a plastics circularity-linked purpose.
- The use of proceeds of the investment falls within one of the eight archetypes of solutions tackling the plastic pollution challenge (see Appendix B).

The following additional considerations apply to debt financing, including loans, sustainability-linked bonds, green bonds, and blue bonds:

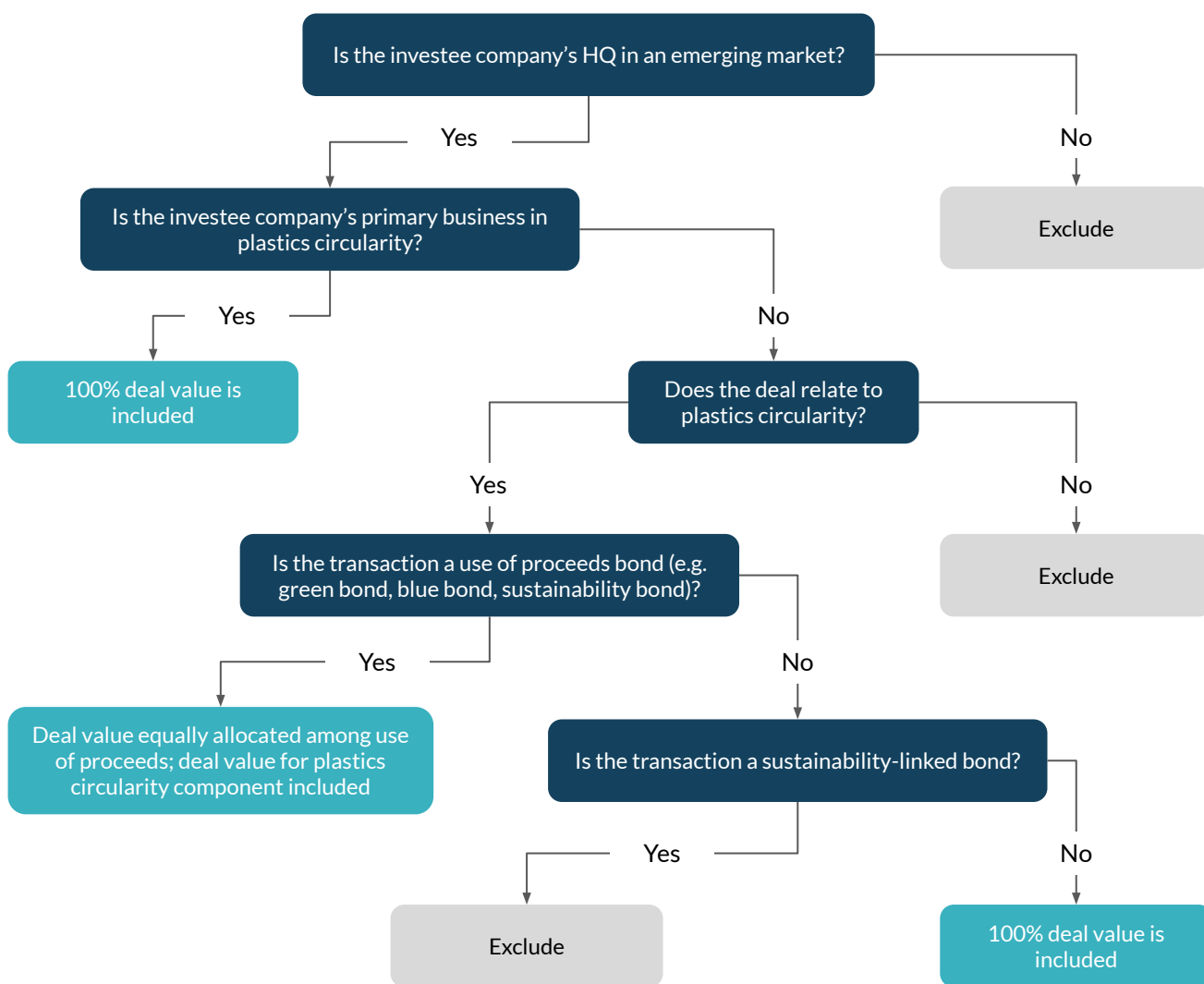
- Loans – syndicated or otherwise – for which information is not available in the public domain are excluded.
- Sustainability-linked bonds:
 - Those issued by plastics circularity-focused companies are included in their entirety.
 - Those issued by other companies are excluded. Proceeds of sustainability-linked bonds are intended to be used for general purposes and information on the exact quantum of money applied to plastics circularity is typically unavailable. For example, a US\$100 million sustainability-linked bond issued by a fast-moving consumer goods company is excluded, even if one of the key performance indicators relates to recycling.
- Use of proceeds bonds (e.g. green bonds, blue bonds, sustainability bonds):
 - Those issued by plastics circularity-focused companies are included in their entirety.
 - Those issued by other companies, and where a part of the use of proceeds is allocated for plastics circularity, are included as the use of proceeds statements for these bonds are more specific. For these transactions, the total quantum of the investment has been divided into equal proportions among the various use of proceeds indicated by the issuer. For example, US\$25 million is included in the year of issue from a US\$100 million green bond issued by a fast-moving consumer goods company that has reported four types of use of proceeds, one of which relates to recycling.

Methodology (continued)

The following exclusions also apply:

- Public funding (e.g., local government investment in waste management services).
- Investments in alternative materials, if the products were not intended to replace plastics (e.g., firms producing glass and paper packaging).

Figure 1: Decision Tree for Screening Plastics Circularity Deals and Deal Value



The Current State of the Plastics Market

Plastics have many useful characteristics - durability, affordability, versatility, and more - that have made them ubiquitous in daily life. Their utility, however, is at odds with growing evidence that plastics are harmful to the environment and human health.³ A transition to a circular economy is essential to mitigate the increasing health and environmental impacts. According to a report by The Pew Charitable Trusts and SYSTEMIQ, the opportunity exists to tackle plastic pollution and reduce the present value of global investments in the plastic industry to US\$1.2 trillion through systems change.⁴

The global recycling rate for plastic is estimated to be only 9%,⁵ and the majority of plastics in the global market are virgin plastics. The mismatch between the current unsustainable practices in plastic production and consumption and the state of the market required to solve the plastic pollution challenge is known as the plastics circularity gap.⁶

To remedy the growing environmental, health, and financial costs of plastic waste stemming from plastic pollution, the public and private sectors have initiated voluntary and mandatory commitments and mandates to drive demand and innovation in the space. For example, leading food and beverage brands, personal care brands, and brands in other sectors have made substantial, near-term commitments to transition to sustainable packaging. The Ellen MacArthur Foundation's Plastics Pact Network connects global companies and initiatives to circular solutions for plastic waste and encourages company commitments to reduce plastic use.⁷ In particular, the U.S. Plastics Pact has been adopted by nearly 100 organizations and global brands, including Coca-Cola, General Mills, and Unilever, with the companies committing to using a minimum of 30% recycled content or bio-based content for plastic packaging by 2025.^{8,9}

In addition to voluntary commitments, there are a growing number of extended producer responsibility (EPR) mandates worldwide that hold producers along the entire supply chain, e.g., brands, importers, and manufacturers, accountable for managing the end-of-life stage of their products or packaging.



The European Union (EU) has long-standing directives for EPR,¹⁰ and now many countries in emerging markets are following suit. Several countries in Asia, including India, have already implemented EPR requirements for plastic packaging, while others, such as the Philippines and Vietnam, are in the process of doing so. For example, the newly implemented EPR legislation in the Philippines specifically targets large enterprises producing or utilizing plastic packaging along the value chain and requires 80% plastic packaging recovery or diversion by 2028.¹¹

With these developments, an anticipated increase in the interest in tackling the plastic pollution challenge is expected, and it is more timely than ever to channel funding to address the plastics circularity gap. To do so, we need to understand the financing gaps in the ecosystem and the types of capital being deployed, so that targeted funding can be deployed and the impact of the allocated capital can be evaluated.

Plastics Circularity Investments Overview

Investment activity between 2018 and 2022

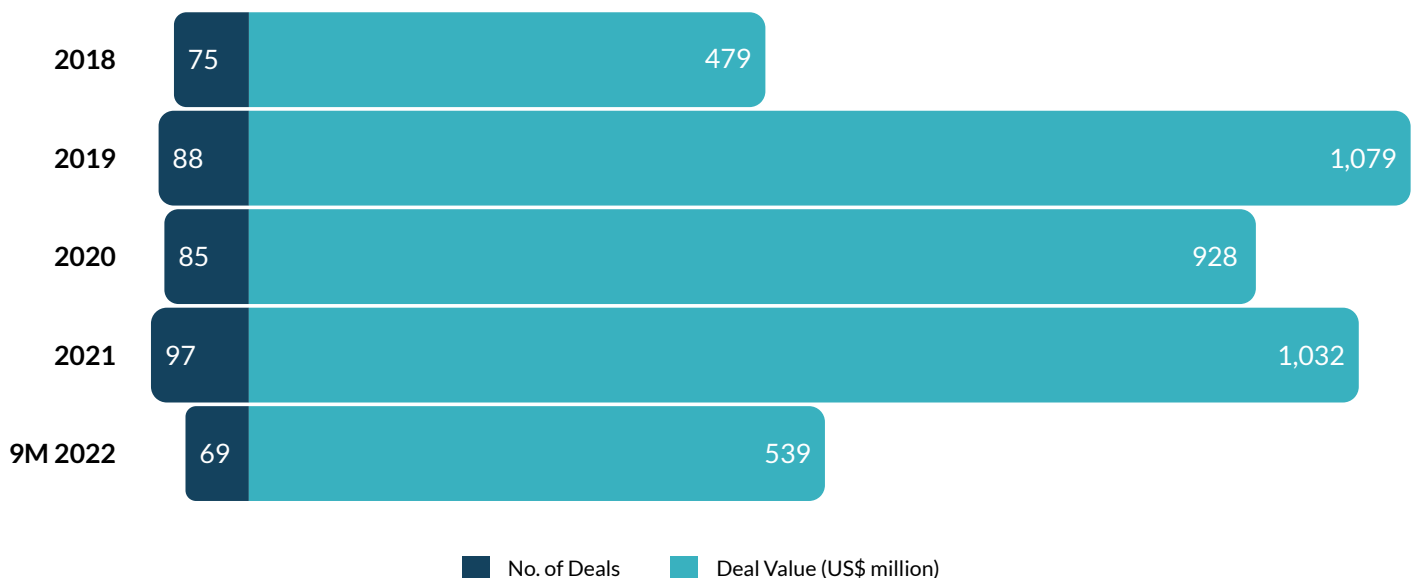
Global investors injected over US\$4.1 billion of private investments into plastics circularity solutions in emerging markets between January 2018 and September 2022.[†] The number of deals recorded each year has remained relatively stable. Between 2018 and 2021, 75 to 97 deals were recorded per year, with 69 deals recorded during the first nine months of 2022.

While a notable spike in investment in 2019 is contrasted by a subsequent drop-off in 2020 (likely due to the Covid-19 pandemic), the deal value grew by 1.1 times in 2021 over 2020. However, the increase in traction in plastics circularity investments was not maintained as deal value in 9M 2022 experienced a decrease from 2021 values. US\$539 million plastics circularity investments were recorded during the first nine months of the year; with deal value yet to scale the heights of 2019.

With a combination of factors, such as growing public awareness of plastic pollution and solutions to tackle the problem, increasing regulations including bans on single-use plastics, and other national and local policies, investor interest in plastics circularity is expected to continue to grow.

The continued investments reflect the growing interest and demand for environmentally-focused business practices regarding plastics, as governments and businesses put in place targets and commitments to tackle the plastic pollution crisis. However, despite progress in the right direction, investment activity remains minuscule when referenced against the estimated US\$1.2 trillion required (in addition to a movement away from a business-as-usual scenario) between 2021 and 2040 to transition to a circular economy.

Figure 2: Plastics Circularity Investments in Emerging Markets 2018-9M 2022



—

[†] Deals with undisclosed deal value are included in the deal count but excluded from deal value calculations.

Plastics Circularity Investments by Region

Asia receives bulk of the investments

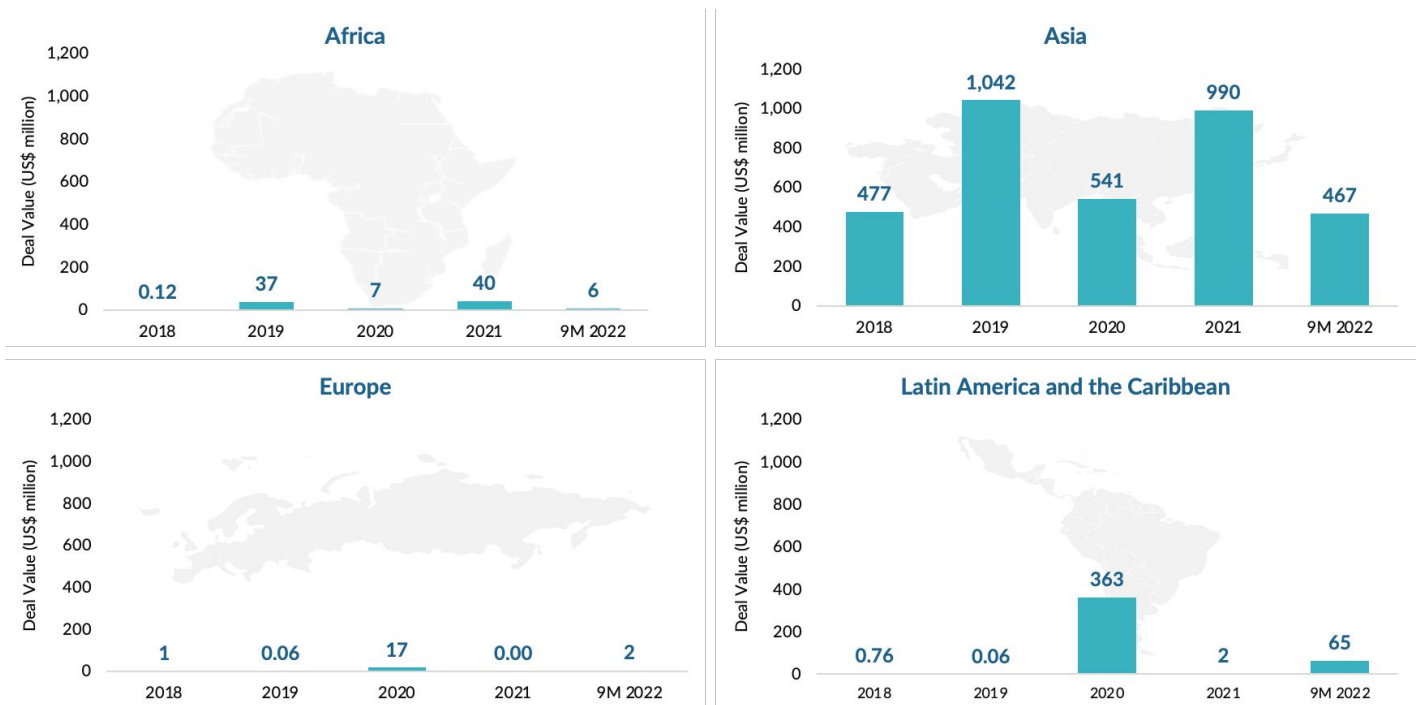
Among the emerging markets covered in this study, the vast majority of capital for plastics circularity was invested in Asia (US\$3.5 billion). This significant investment into Asian infrastructure is unsurprising due to the significance of the plastic pollution challenge in the region. Eight of the top ten countries where plastic leakage into the ocean takes place are in Asia.¹² Within Asia, Southeast Asia received the greatest amount of funding for plastics circularity (US\$1.6 billion), followed by East Asia and South Asia with US\$1.1 billion and US\$678 million respectively.[†] It is worth noting that investments received by companies based in a specific region may be deployed outside the region as well. For example, a global PET recycling company with its headquarters in Asia may use the proceeds of a sustainability bond for expansion to other regions as well.

Investment in Africa and other regions pales in comparison to Asia

Latin America and the Caribbean followed Asia as the second biggest recipient of investments for plastics circularity. However, at US\$431 million, investment in the region during 2018-9M 2022 was 11% of the total plastics circularity investments.

Africa, which is the second-largest regional source of mismanaged plastic waste, was severely underfunded compared to Asia, with approximately US\$90 million invested in African plastics circularity solutions during the review period.¹³

Figure 3: Plastics Circularity Investments by Region 2018-9M 2022



[†] East Asia includes countries such as China, South Korea, and Taiwan (China is the only country within East Asia that is both (i) an emerging market and (ii) included in the database). Southeast Asia includes countries such as Thailand, Indonesia, and Vietnam. South Asia refers to countries such as India, Bangladesh, and Pakistan.

Plastics Circularity Investments by Investment and Deal Type

Big dollars are from debt financing, but venture capital is funding more businesses

Across the review period, various investors made a range of investments into plastics circularity solutions. Cumulatively from 2018 to September 2022, the top three types of investments in terms of deal value were (1) debt financing/loans, (2) private equity (PE), and (3) public investment/IPOs. These deals were the higher-value transactions with typical deal values in the millions of dollars. It is noteworthy that at least four of the top ten plastics circularity deals recorded between 2018 and 9M 2022 were debt financing/loans.

From a deal count perspective, however, VC investments dominated; 38% of plastics circularity investments recorded during the review period were VC investments. Most funding took the form of seed and early-stage financing – a reflection of the nascency of plastics circularity solutions in the emerging markets.

Table 1: Top Plastics Circularity Investment Categories by Deal Value 2018-9M 2022

Rank	2018	2019	2020	2021	9M 2022
1	Private Equity	Private Equity	Debt Financing/ Loans	Debt Financing/ Loans	Corporate/ Strategic Investments
2	Debt Financing/ Loans	Debt Financing/ Loans	Public Investment/ IPOs	Development Bank Financing	Public Investment/ IPOs
3	Corporate/ Strategic Investments	Corporate/ Strategic Investments	Private Equity	Public Investment/ IPOs	Venture Capital



A steady state for M&As while IPO activity remains muted

Corporate/strategic investing in plastics circularity solutions in emerging markets has remained fairly steady during 2018-9M 2022. Five to ten mergers and acquisitions (M&A) were recorded each year during the review period, with M&A (when compared to joint ventures) the go-to approach for corporate investment activity. M&A deal values ranged from just under a million dollars to the more than US\$200 million acquisition of Alam Flora in Malaysia by Malakoff.

IPO activity in plastics circularity in emerging markets was rare. A total of 16 IPOs were recorded during 2018-9M 2022, with most of these IPOs undertaken by firms functioning in the more established and mature waste management sectors.

Several early-stage investments but deal value remains disproportionately low

The majority of deals (62%) involved firms that were in the early stages of development (i.e. seed and early-stage investments), while 38% of companies were in more mature financing stages (i.e. later-stage investments and exits) (see Appendix D for the categorization of investments). However, seed and early-stage investments added up to only US\$256 million, or 5.1% of the cumulative deal value recorded between 2018 and 9M 2022. Larger investors appear to be more interested in investing in or buying out companies with mature technologies and stable business models, while impact funds, venture capitalists, and accelerators/incubators tend to make smaller investments in earlier-stage companies.

Table 2: Plastics Circularity Investments 2018-9M 2022 by Investment Stage

Investment Stage	No. of Deals	Deal Value (US\$ million)	Minimum Recorded Deal Value (US\$)	Maximum Recorded Deal Value (US\$)	Median Deal Value (US\$)
Seed	207	56	1,800	14,590,000	53,000
Early-stage	49	151	280,000	20,000,000	2,000,000
Later-stage	74	1,934	42,500	302,700,000	4,900,000
Exits	82	1,917	829,000	510,000,000	15,400,000

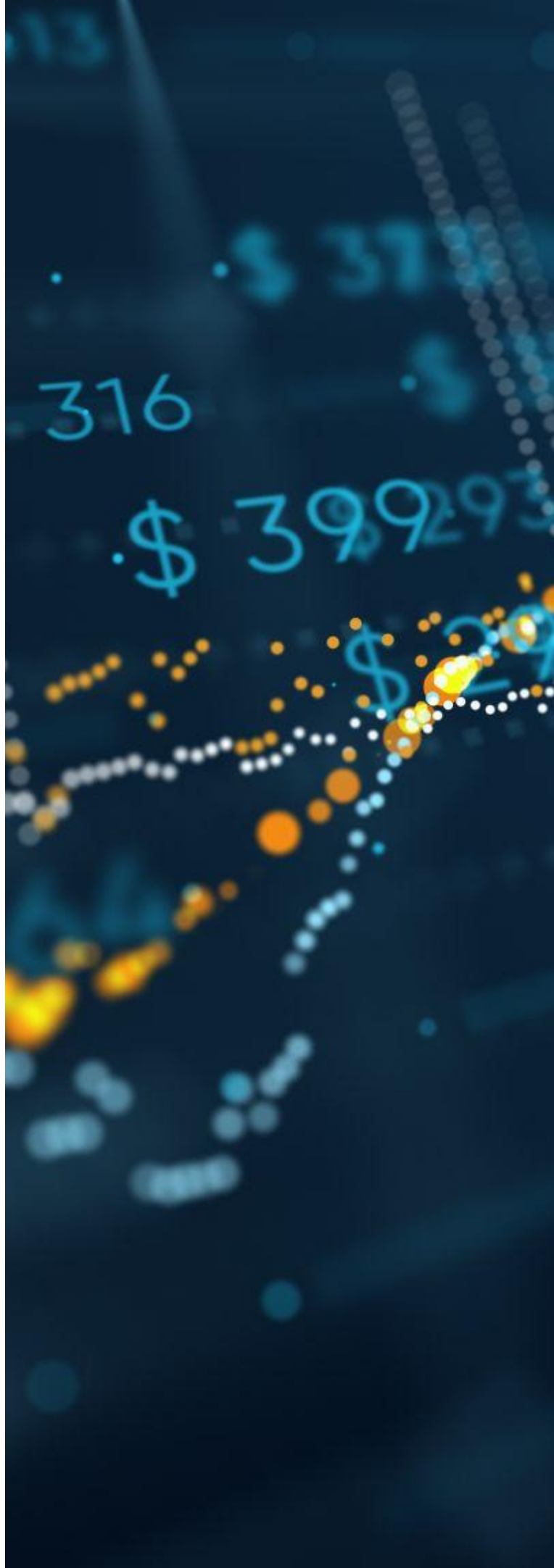
Note: The investment categories of two deals were undisclosed, and are excluded from the table above. Median deal values have been rounded off.

Several seed funding transactions, but growth and patient capital required

Seed funding of US\$17.9 million was recorded in 2018, but has declined over the review period. The high number of seed and accelerator/incubator funding deals indicate more capital that is supporting entrepreneurial support organizations, and interest in growing the ecosystem of startups contributing to the plastics circular economy. However, the vast majority of these transactions were typically in the thousands or tens of thousands – reflecting an insufficient amount of capital required to continuously grow the business. Many newly formed companies struggle to find the capital required to grow after a small initial investment, making it difficult for them to reach maturity and attract larger investment. Continued support through more patient capital and businesses' development can help these startups to develop the technologies and capabilities needed.

Debt financing not common for early-stage plastics circularity solutions

Debt financing was not common for early stage ventures. Most commercial banks in emerging markets have avoided providing loans to firms involved in plastics circularity solutions due to both risk concerns and a lack of understanding of the sector. It should also be noted that information on debt transactions tend to be private and confidential and that the databases consulted for the purposes of this Investment Tracker had less comprehensive coverage of debt financing compared to other types of deals.



Plastics Circularity Investments by Circularity Solutions

Eight archetypes or solutions were identified as driving a circular economy for plastics. These include:

-  **Materials**
-  **Redesign**
-  **Refill/Reuse**
-  **Services** (driving plastics circularity or plastic waste management)
-  **Operational Platforms** (enabling plastics circularity)
-  **Digital Mapping**
-  **Recycling**
-  **Recovery**

See Appendix B for a detailed description of each archetype. Investment into each firm has been categorized into one of the eight archetypes based on their primary business focus.

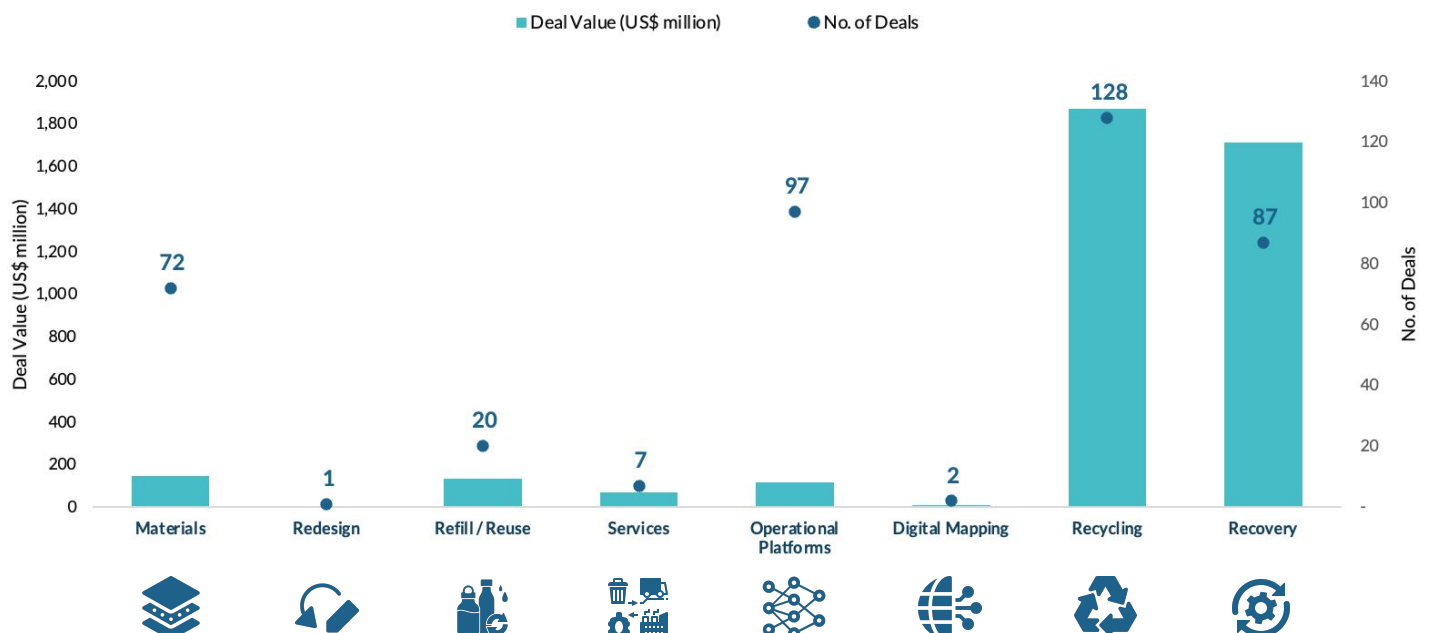
Recovery and recycling account for a majority of investments

Among various firms offering plastics circularity solutions, recovery and recycling companies received the most investment. These companies received nearly US\$3.6 billion in funding, or 88% of the total investment for the time period (Figure 4).

The recovery and recycling sectors are typically the most established in the system. While public-private partnerships can fund and operate recovery and recycling services, they have been impeded by low financial returns, limited capacity for planning and scaling these services at the city level, and insufficient incentive structures.¹⁴ The privatization of these services is becoming more common due to a combination of a lack of government resources and the potential for profitability as the demand for recycled content escalates, hence driving more investments into the space.

Diving deeper into the sub-archetypes of these solutions, mechanical recycling and waste management received the greatest investments of US\$1.8 billion and US\$1.5 billion respectively, adding up to approximately 82% of the total investments across plastics circularity solutions.

Figure 4: Plastics Circularity Investments by Solution 2018-9M 2022



Upstream solutions receiving fewer investments

Only US\$473 million of investments made their way into upstream solutions such as Materials and Redesign or solutions such as Refill/Reuse, Services, Operational Platforms, and Digital Mapping that have an impact across the plastic value chain. There is a notable gap between investments in these solutions and downstream solutions, which reflects the difference in maturity and the type of firms operating across the solutions. Downstream solutions such as Recovery and Recycling have companies that have been operating for decades with established business models. Some of the firms offering alternate solutions, on the other hand, are relatively new to plastics circularity and have yet to demonstrate a successful business model or to reach a sufficient scale, resulting in hesitation among investors to invest in them. Most of these businesses received smaller-value VC funds, or accelerator or incubator financing.

Risk-averse investors looking at more established companies for investment

All of the top ten deals to drive a circular economy for plastics were investments made in companies with established business models (see Table 3). All ten investments were in firms involved with waste management services or recycling, or those that offered both. Investors were more inclined to finance these mature technologies with tried and tested practices and business models for managing and recycling plastic waste. This result suggests that investors remain somewhat cautious regarding plastics circularity investments and are more hesitant to finance more novel or innovative ideas.



Top investors by deal count and deal value

Of the more than 400 deals captured in the Investment Tracker, the top ten deals constituted approximately 62% of the plastics circularity funding during the review period.

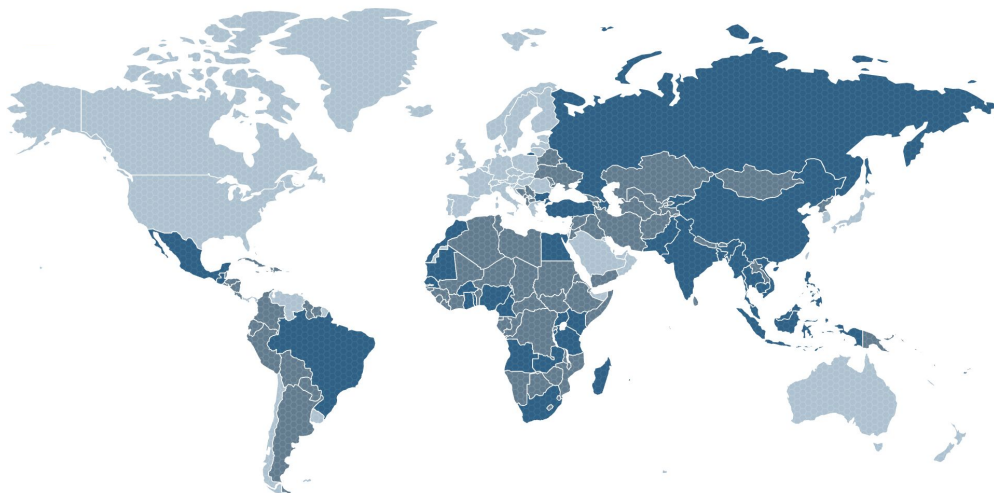
Kohlberg Kravis Roberts & Co. (KKR), a PE firm with its headquarters in the United States, has invested the most in the emerging markets plastics circular economy. The firm invested US\$510 million through its KKR Asian Fund III into Ramky Enviro Engineers Ltd and was part of a US\$11 million joint deal to fund the Chinese waste management business Nantong Guoqi in 2019. The other key players involved in deals valued at or above US\$100 million include the International Finance Corporation (IFC), Asian Development Bank (ADB), and Deutsche Investitions- und Entwicklungsgesellschaft (DEG), Malakoff Corporation Berhad, Zhongzhi Enterprise Group, and ABY Plastik Ambalaj. This list excludes banks and other financial institutions participating in syndicated facilities where their respective financing contributions are unavailable.

Circulate Capital, an investment management firm headquartered in Singapore, which is dedicated to advancing the circular economy for plastics in high growth markets, concluded the most deals.[†] As of September 2022, Circulate Capital has invested approximately US\$80 million in 14 transactions, with a focus on South and Southeast Asia.

Significant diversity in the country of origin of investors in plastics circularity

The leading investor list indicates the geographical diversity of investors financing plastics circularity solutions in emerging markets. Although the majority of the top investors are headquartered in developed economies such as the US, Germany, Hong Kong, and Singapore, they are investing in emerging markets. Regional sources of financing, particularly for Asia, are also present through VC firms, impact investors, and accelerators and incubators based in the region.

A combination of local and international sources of funding is necessary to fully build out the plastics circular economy in various emerging markets. In Asia, infrastructure is still primarily funded by the public sector, which pays for over 90% of the region's total investments.¹⁵ While local companies have a better grasp of the needs of the market, local banks are unlikely to see the waste management space as creditworthy. Therefore, emerging markets are expected to continue to rely, at least in part, on foreign investment to finance the transition to circularity.



[†] The Circulate Initiative was established with the support of Circulate Capital to bridge market gaps in waste management and plastic recycling across emerging economies. The two organizations work closely to improve the quality and quantity of investable opportunities and foster the conditions entrepreneurs in the circular ecosystem need to succeed.

Table 3: Top ten transactions (by deal value) 2018-9M 2022

Company	Solution	Investor(s)	Investment Category	Deal Value (US\$ million)	Year	Country
Ramky Enviro Engineers Ltd	Recovery 	Kohlberg Kravis Roberts	Private Equity - Buyout / Leveraged Buyout (LBO)	510	2019	India
Indorama Ventures Public Company Ltd	Recycling 	-	Debt financing - Sustainability-linked bond	303	2021	Thailand
Indorama Ventures Public Company Ltd	Recycling 	IFC, ADB, DEG	Development Bank Financing	300	2021	Thailand
Indorama Ventures Public Company Ltd	Recycling 	-	Debt financing - Sustainability-linked Ninja Loan	255	2020	Thailand
Indorama Ventures Public Company Ltd	Recycling 	-	Debt financing - Green Loan	212	2019	Thailand
Beijing China Sciences Runyu Environmental Technology Co Ltd	Recovery 	-	IPO	209	2022	China
Alam Flora Sdn Bhd	Recovery 	Malakoff	Corporate/ Strategic Investment - Merger / Acquisition	209	2019	Malaysia
Ambipar Group	Recovery 	-	IPO	186	2020	Brazil
Coca-Cola FEMSA	Recycling 	-	Debt financing	176	2020	Mexico
Xiaohuanggou Environmental Protection Technology Co Ltd	Recovery 	Zhongzhi Enterprise Group	Private Equity - Growth/ Expansion	164	2018	China

* Green bond; deal value estimated

Case Study: Recycling startup expands into international markets due to blended finance investment¹⁶

Tridi Oasis, a promising Indonesian recycling startup, benefitted from the support of a circular plastics-focused blended finance vehicle. Blended finance uses catalytic capital from public or philanthropic sources to mobilize private sector investments in sustainable development projects. The company was able to attract an experienced strategic partner, and the investment ultimately allowed the organization to pursue international expansion and help supply the burgeoning global demand for recycled plastics. This case demonstrates that small and medium enterprises (SMEs) – which require a combination of de-risked financing and technical assistance to scale – often offer the greatest opportunity for significant impact through strategic investment interventions.

Tridi Oasis was founded in 2016 by two female entrepreneurs as a processor of post-consumer polyethylene terephthalate (PET) bottles into flakes for the domestic recycling market in Indonesia. From a manufacturing facility located on the outskirts of Jakarta, the company sourced the bulk of its feedstock from waste pickers and collectors in and around Indonesia's capital, with whom it developed strong links.

By 2019, Tridi Oasis successfully expanded its capacity to 1,000 metric tons per year and was beginning to sell its flakes internationally. However, it needed additional capital to improve the flake quality and access the higher-priced European export market, where the EU directive on single-use plastics – which requires the incorporation of 25% recycled material in PET beverage bottles from 2025 (and 30% by 2030) – underpinned increasing demand.

As a blended finance vehicle able to offer early-stage venture debt and equity, Circulate Capital's Ocean Fund extended its first loan to Tridi Oasis in early 2020 to expand and upgrade its flake production capacity. The impact fund invests in entities that remediate plastic pollution leakage and promote plastics circularity. The loan included a 50% credit guarantee backed by the US International Development Finance Corporation (DFC), which partially de-risked the fund's investment while allowing the founders to maintain their existing equity. Circulate Capital extended additional loan capital in early 2021.

The loans funded the company's purchase of automated sorting and processing equipment that reduced contamination by non-PET plastics. The additional working capital enabled the company to manage unanticipated delays in export shipments, resulting from a shortage of shipping containers caused by the Covid-19 pandemic. By the close of 2021, Tridi Oasis improved its cash flows and increased productivity, targeting an increase in capacity of 11,000 metric tons per year by 2022. It also sought to further improve its product marketing by qualifying its material under an ocean-bound plastics certification. Additionally, it began dialogues with potential partners in the Greater Jakarta area, where an estimated >90% of PET bottles are collected for recycling.¹⁷

In July 2022, those discussions culminated in the announcement of a joint venture between Tridi Oasis and ALBA Asia Plastics Recycling, a leading global recycling specialist and environmental services provider. The resulting entity will establish a new food-grade recycled polyethylene terephthalate (rPET) plant, seeking to supply the increasing global demand for recycled plastics from food and beverage companies. This growth followed the minimum recycled content policies for the European and other more stringent international markets.

Tridi Oasis' ambitious growth plans were fueled by a well-timed strategic impact investment. The company was able to scale while improving recycling quality, allowing it to meet the qualifications to begin exporting to the European market and pay out all outstanding debts. In addition to plastics recycling, strategic investment interventions in SMEs can be successfully made across all sectors of the plastics circular economy with the proper forethought and business plan.

Paving the path for new investments in plastics circularity

The Circulate Initiative's Plastics Circularity Investment Tracker is the first of its kind to offer comprehensive insights into the plastics circularity investment landscape. These insights can help facilitate more effective investments into plastics circularity in emerging markets and assist in the urgently needed transition to a circular economy for plastics. The development of an international legally binding instrument on plastic pollution, which is to be negotiated by 2024, will reduce the uncertainty and the risk, and provide an opportunity for investors to act.¹⁸ Investments in plastics circularity are needed to ensure that we meet the sustainable development goals set out by the United Nations.

The goals related to plastics circularity include:

- SDG 3: Good health and well-being
- SDG 6: Clean water and sanitation
- SDG 11: Sustainable cities and communities
- SDG 12: Responsible consumption and production
- SDG 13: Climate action
- SDG 14: Life below water
- SDG 15: Life on land¹⁹

Investments in plastics circularity is expected to continue with increased commitments by governments and businesses towards a sustainable agenda, and with the legally binding instrument potentially providing further impetus. A significant portion of the total deal value is highly concentrated among a handful of high-value deals that lie downstream in the plastics circularity value chain, indicating additional opportunities for diversification and investments in SMEs and across solutions.

Investors are currently injecting capital into recovery and recycling programs in particular, which are a proven and necessary part of closing the loop at the end-of-life stage of the circular economy. However, there are various unexplored or underinvested areas of opportunity for investors that can ensure that future financing of plastics circularity is leveraged effectively. More diverse investments into different sectors of the plastics circularity market (i.e., upstream solutions) can help uplift and fully develop the entire system. For example, there are opportunities for additional investments into alternative materials and technologies to support the functioning of the circular economy, and redesign sectors to improve the upstream and midstream sectors of the plastics circularity market. The ability to reap the benefits of investments in upstream solutions is also contingent on the infrastructure strength of existing waste segregation systems. The circular economy is only as strong as its weakest link, and well-rounded investing provides for a systems approach to tackling the plastic pollution challenge.

Investments, especially patient capital in early-stage companies to help them scale (by expanding into international markets, improving quality of their products or technology, etc.), are necessary to ensure that there is a wide variety and number of actors working towards a common goal of tackling the plastic waste crisis.

In summary, an increase in strategic investment activity in a diverse range of solutions, across actors and regions, is crucial to solving the ocean plastic pollution challenge and fostering sustainable development.



References

1. The Pew Charitable Trusts and SYSTEMIQ. (2020). *Breaking the Plastic Wave* [online]. Available from: https://www.systemiq.earth/wp-content/uploads/2020/07/BreakingThePlasticWave_MainReport.pdf
2. World Bank. (2021). *World Bank Country and Lending Groups* [online]. Available from: <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>
3. Demeneix, B.A. (2020). How fossil fuel-derived pesticides and plastics harm health, biodiversity, and the climate. *The Lancet Diabetes & Endocrinology* [online], 8(6). Available from: <https://www.sciencedirect.com/science/article/pii/S2213858720301169>
4. The Pew Charitable Trusts and SYSTEMIQ. (2020). *Breaking the Plastic Wave* [online]. Available from: https://www.systemiq.earth/wp-content/uploads/2020/07/BreakingThePlasticWave_MainReport.pdf
5. Organisation for Economic Co-operation and Development. (2022). *Global plastic waste set to almost triple by 2060, says OECD* [online]. Available from: <https://www.oecd.org/environment/global-plastic-waste-set-to-almost-triple-by-2060.htm#:~:text=The%20share%20of%20plastic%20waste,50%25%20of%20plastic%20waste%20respectively>
6. Google, AFARA. (2022). *Closing the Plastics Circularity Gap Full Report*. Available from: <https://www.gstatic.com/gumdrop/sustainability/closing-plastics-gap-full-report.pdf>
7. Ellen MacArthur Foundation. (2021). *The Plastics Pact Network* [online]. Available from: <https://ellenmacarthurfoundation.org/the-plastics-pact-network>
8. U.S. Plastics Pact. (2022). *U.S. Plastics Pact Activators* [online]. Available from: <https://usplasticspact.org/about/activators-of-the-u-s-plastics-pact/>
9. Ellen MacArthur Foundation. (2020). *The U.S. Plastics Pact* [online]. Available from: <https://ellenmacarthurfoundation.org/us-plastics-pact>
10. European Commission. (2014). *Development of guidance on Extended Producer Responsibility (EPR)* [online]. Available from: https://ec.europa.eu/environment/archives/waste/eu_guidance/introduction.html
11. Añonuevo, C. and Laureto, B. (2022). The EPR Law takes on the Philippines' plastic problem. *The Manila Times* [online], 25 July 2022. Available from: <https://www.manilatimes.net/2022/07/25/business/to-p-business/the-epr-law-takes-on-the-philippines-plastic-problem/1852083>
12. Meijer, L. J. J. et al. (2021). More than 1000 rivers account for 80% of global riverine plastic emissions into the ocean. *Science Advances* [online], 7(18). Available from: <https://www.science.org/doi/10.1126/sciadv.aaz5803>
13. Our World in Data. (2021). *Mismanaged plastic waste, 2019* [online]. Available from: <https://ourworldindata.org/grapher/plastic-waste-mismanaged?tab=table&country=CMR~PHL~MYS~CHN~IND~BRA~GHA~ARG~LKA>
14. Hanway, C. E. and Blas, H. (2021). *Private sector financing can accelerate a green recovery for cities* [online]. Available from: <https://www.gihub.org/articles/private-sector-financing-can-accelerate-a-green-recovery-for-cities/>
15. Asian Development Bank. (2017). *How Much Should Asia Spend on Infrastructure?* [online]. Available from: <https://www.adb.org/news/features/how-much-should-asia-spend-infrastructure-0>
16. Global Plastic Action Partnership. (2022). *Unlocking the Plastics Circular Economy: Case Studies on Investment* [online]. Available from: <https://weforum.ent.box.com/s/o984n3gtao1aul5v736z4umbqisr28io>
17. Ibid.
18. Martin, E. (2022). *The plastics treaty is coming. Investors who act fast will reap the biggest rewards* [online]. Available from: <https://www.thecirculateinitiative.org/post/the-plastics-treaty-is-coming-investors-who-act-fast-will-reap-the-biggest-rewards>
19. Plastic Soup Foundation (n.d.). *Individual SDG's* [online]. Available from: <https://www.plasticsoupfoundation.org/en/plastic-problem/sustainable-development/individual-sdgs/>

Acknowledgements

This paper was co-authored by:

Umesh Madhavan
Research Director
The Circulate Initiative

Juline Lew
Research Analyst
The Circulate Initiative

The following individuals provided support for this paper through interviews or critical reviews:

Rob Kaplan
Founder & CEO
Circulate Capital

Ellen Martin
Director of Impact & Insights
The Circulate Initiative

Amandine Joly
External Affairs & Investor Relations Director
Circulate Capital

Grant Collins
Principal
Charlotte Square Consulting

Ellie Moss
Founder & Principal
Moss & Mollusk Consulting

Autumn Buford
Associate Consultant
Moss & Mollusk Consulting

Teresa Russell
Sustainability and ESG Consultant



Appendix A: World Bank Country Groups by Income

From the World Bank's classification of countries, emerging economies considered for the purpose of the Investment Tracker include the countries categorized as "Low-income economies", "Lower-middle-income economies", and "Upper-middle-income economies" as described in the table below.

Group	Gross National Income Per Capita	Example Countries
Low-income economies	≤US\$1,085	Afghanistan, Burundi, Yemen
Lower-middle-income economies	US\$1,086-US\$4,255	Algeria, India, Indonesia, Vietnam
Upper-middle-income economies	US\$4,256-US\$13,205	Argentina, Brazil, China, Malaysia, Thailand, South Africa
High-income economies (excluded)	≥US\$13,205	Australia, Chile, Germany, Netherlands, UK, USA

Appendix B: Plastics Circularity Solutions

I. Classification of Solutions along the Plastics Value Chain

The archetypes in the Plastics Circularity Investment Tracker can be classified as upstream, midstream or downstream solutions according to where they lie along the value chain.

Upstream solution: One that may eliminate or reduce the use of plastic, such as the development of a new compostable material for use in foodservice packaging. Example archetypes: Materials, Redesign.

Midstream solution: One that requires the participation of a consumer to realize its plastic reduction strategy. Examples might include zero waste stores that depend on consumers bringing their own packaging or refill systems that require consumers to return a package for refill. If the consumer does not fulfill the action, the innovation is unlikely to reduce use of plastic. Example archetype: Refill/Reuse.

Downstream solution: One that occurs after a package or product becomes waste. Downstream solutions include operational platforms that seek to connect plastic waste generators (i.e., consumers) with informal collectors or mobile apps that track and report waste plastic for the purposes of EPR reporting. Other downstream solutions might also include reverse vending machines that collect recyclable plastics and reimburse the user with awards or points that can be redeemed for other products. Example archetypes: Recycling, Recovery.

Note that some archetypes may be cross-cutting, e.g., they may fall under the downstream and midstream, or midstream and downstream parts of the value chain.

II. Definitions of Solutions

Solution	Description of companies focusing on the solution	Example(s)
Materials	Firms that focus on the production or use of alternative materials for single-use plastics or other applications.	Fiber-based alternatives, such as molded bagasse, or other compostable substitutes for takeout food-service ware.
Redesign	Firms that redesign an existing product and/or packaging system with consideration of its performance and value in the recycling value chain, resulting in products and packaging that are more reusable or recyclable than typical models.	Eliminating polyvinyl chloride (PVC) labels for PET bottles, or shifting from multi-layered packaging to mono-material.
Refill / Reuse	Firms that substitute or eliminate single-use and other plastic products through reuse, refill or product-as-service business models. These firms reflect a diversity of business models intended to eliminate single-use plastics.	Zero waste or bulk stores that offer refill services if consumers bring their own packaging, or reuse and refill systems that might require a deposit to incentivize the return of packaging.
Services (driving plastics circularity or plastic waste management)	Firms that help actors account for plastic usage, audit and offer assurance of plastic waste flows, and/or quantify collected waste plastics in line with EPR regulations or voluntarily. In most cases, these services are offered independently or as an extension of services by organizations that already operate in waste management, plastic clean-up, and/or recycling.	Service providers that enable organizations to calculate their plastic footprint.
Operational Platforms (enabling plastics circularity)	Firms that offer “on-demand” technology platforms or mobile applications that allow individual consumers and/or companies to request at-home or business collection of recyclable plastics.	Operational platforms that indirectly facilitate waste collection and recycling. Some operational platforms offer collection, while others allow for improved business processes.

Appendix B: Plastics Circularity Solutions

II. Definitions of Solutions (continued)

Solution	Description of companies focusing on the solution	Example(s)
Digital Mapping	Firms that offer digital technology solutions or platforms that are intended to map and/or trace material flows, document the location of waste management infrastructure, or provide insights on waste volumes or composition.	Blockchain ledger technology that maps and traces the flow of waste plastics from the source of collection through reclamation and end products.
Recycling	Firms that offer informal and formal collection, processing or sorting, and reclamation of waste plastic for recycling, as well as firms with technologies to recycle waste plastic into flakes, pellets, or finished products.	Waste management companies and non-profit organizations working with the informal sector to collect waste plastics, reverse vending machines to collect bottles, and companies that recycle and reclaim plastics.
Recovery	Firms that directly recover municipal solid waste or plastic waste for the primary purpose of clean-up and proper disposal. The principal focus is to ensure collection for disposal rather than for recycling. This archetype may include collection of waste, sorting, and disposal steps, or it may be limited to the collection and transport of the plastic waste to treatment facilities. Financing received specifically for waste-to-energy has not been included as it does not contribute to plastic circularity.	Plastic litter and waste collection services and riverine clean-up technologies.

Source: The Circulate Initiative (2022)

Appendix C: Investment Categories and Definitions

Investment Category	Definition
Accelerator/Incubator Financing	A temporary program that provides cash or grant funding as part of the early stage of development. An equity component in lieu of the cash may or may not be involved.
Corporate/Strategic Investments	Includes investment conducted through joint venture, merger, acquisition, secondary transaction involving minority equity purchases from another investor, asset purchases, and/or direct funding.
Debt Financing/Loans	Financing in the form of bank loans or bonds, secured or unsecured.
Development Bank Financing	Financing received directly from development finance institutions.
Impact Investments	Investments made with the intention to generate positive, measurable social and environmental impact alongside a financial return.
Individual /Crowdfunding	Investment received from an individual or a group of individuals typically not requiring an equity component in return for the money provided.
Philanthropy	The work an individual or organization undertakes based on an altruistic desire to improve human welfare. Wealthy individuals sometimes establish private foundations to facilitate their philanthropic efforts.
Private Equity	Private equity (PE) is a form of financing where money or capital is invested into a company. Typically, PE investments are made into mature businesses in traditional industries in exchange for equity or ownership stake. PE is a major subset of a larger, more complex piece of the financial landscape known as the private markets.
Public Investment/IPO	An initial public offering (IPO) refers to the process of offering shares of a private corporation to the public in a new stock issuance for the first time. An IPO allows a company to raise equity capital from public investors.
Venture Capital	Venture capital (VC) is a form of financing where capital is invested into a company, usually a startup or small business, in exchange for equity in the company. It is also a major subset of a much larger, complex part of the financial landscape known as the private markets.

Appendix D: Investment Stages by Deal Types

The deal types that fall under each investment stage are listed in the table below.

Seed	Early-Stage	Later-Stage	Exits
Accelerator/Incubator Financing	Early Stage VC	Conventional Debt	Buyout/LBO
Angel	Series B	Corporate Asset Purchase	IPO
Convertible Note	Series D	Corporate/Strategic Investments	Joint Venture
Equity Crowdfunding		Debt Financing	Merger/Acquisition
Grant		Debt - General	Secondary Transaction
Non-equity Assistance		Debt Repayment	
Pre-seed		Expansion	
Product Crowdfunding		Later Stage VC	
Seed		PE Growth	
Series A		PE Growth/Expansion	