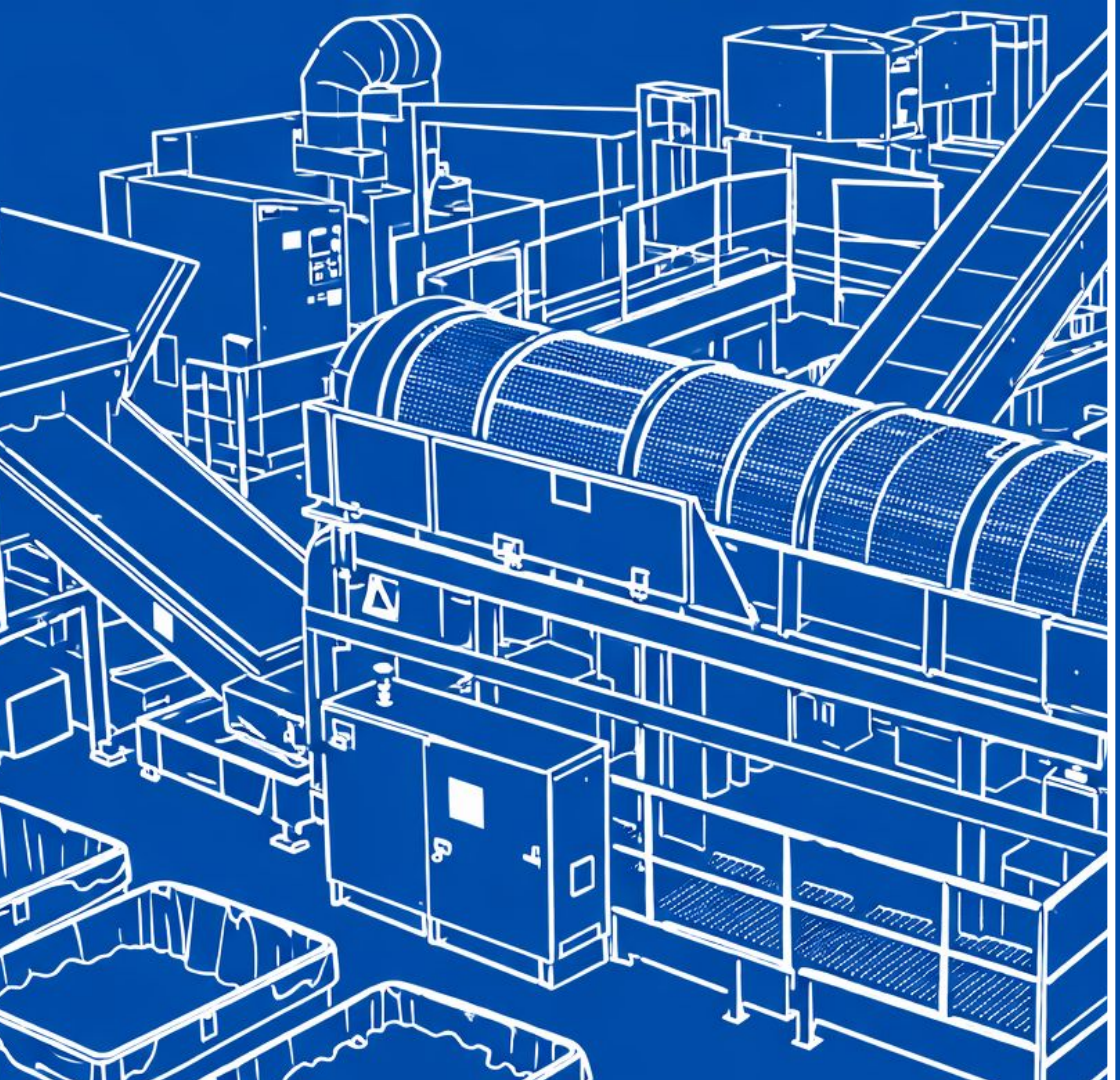


CLIMAKE

Asset Finance Opportunities Across India's Waste & Circularity Sector

Landscape Report

May 2026

Executive Summary

India's waste sector is shifting toward value recovery and circularity

India's waste and circularity sector is undergoing a structural transformation as rapid urbanisation, economic growth, and rising consumption drive increasing volumes of waste across the economy.

In addition to these factors, regulatory frameworks such as Extended Producer Responsibility (EPR) and recycling mandates are also being strengthened. This has led to a shift from a traditional focus on waste management and disposal towards high-quality recycling and resource recovery.

Increasing emphasis on extracting valuable materials from waste streams is accelerating the adoption of more advanced recycling technologies and processing systems. Scaling these solutions requires the development of industrial recycling infrastructure and specialised processing facilities, increasing the need for capital investment in equipment, plants, and supporting infrastructure.

The circularity capital stack needs to broaden as the sector grows

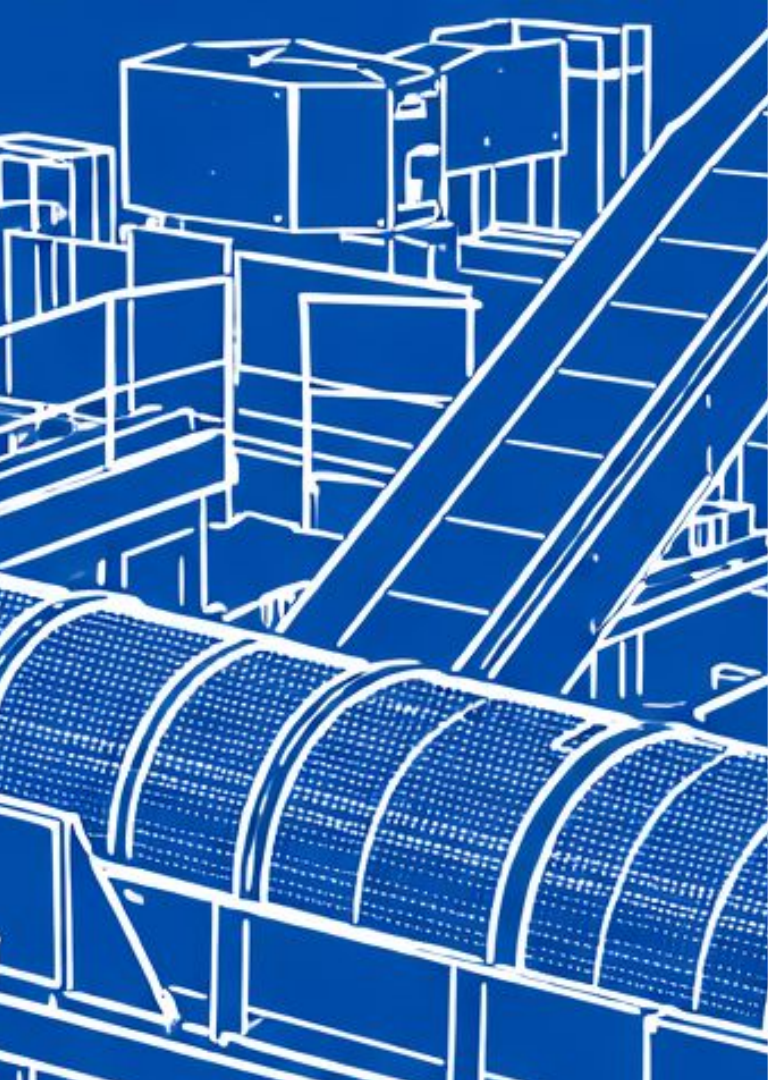
However, scaling circular solutions will require significantly greater capital deployment. Between 2020 and 2024, equity investment in India's waste and circularity sector totalled approximately $357 million, with most capital concentrated in early-stage ventures and relatively mature segments such as plastics and battery recycling. As the sector evolves, key financing gaps remain across early commercialisation capital, infrastructure and project finance, equipment and asset finance, working capital for waste supply chains, and growth capital for asset-heavy businesses.

A central challenge emerging across waste streams is the growing need to finance asset-intensive infrastructure and specialised equipment required to enable advanced recycling and material recovery. In this context, asset finance is emerging as a critical enabler for scaling circular infrastructure.

Asset finance is becoming a critical need

This report examines these opportunities across ten major waste streams that together represent the largest sources of waste generation in India: *plastics, lithium-ion batteries waste* ***(LiB waste)*** *and electronic waste* ***(e-waste)****, agricultural and biomass waste, municipal solid waste, wastewater, textiles, tyres, lead-acid batteries, construction and demolition waste, and end-of-life vehicles.*

Expanding access to asset and equipment finance – through leasing, asset-backed lending, and infrastructure financing – presents a significant opportunity to unlock capital deployment and accelerate the development of India's circular economy infrastructure.



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Waste & Circularity Context in India

India’s waste sector is creating opportunities for circular resource recovery

India became the world’s most populous country in 2023, with a population of 1.4 billion. Rapid urbanisation, rising incomes, and expanding consumption have driven a sharp increase in waste generation across all categories.

Urban India currently generates 130,000–150,000 metric tonnes of municipal solid waste (MSW) daily, equivalent to about 55 million tonnes annually. This is projected to rise significantly to 165 million tonnes by 2030, and 436 million tonnes by 2050.

Waste management in India is evolving beyond disposal and pollution control toward a more output-oriented sector focused on recycling, resource recovery, and circularity.

This landscape analysis focuses on 10 key waste streams that together capture the major sources of waste generated in India today. These streams also offer potential for material recovery and circular value creation.

Figure 1: *Waste and recycled output profile across the ten most prominent waste streams in India*

Waste Stream	Main Waste Types	Recycled and Circular Outputs
Plastic Waste	**Packaging plastics, bottles, containers, films, multi-layer packaging**	PET bottles, HDPE and other rigid plastics
LiB Waste & E-waste	**Mobile phones, consumer electronics, batteries, circuit boards**	Lithium, cobalt, nickel, copper, precious metals
Agricultural, Food & Biomass Waste	**Crop residues, food waste, forestry residues, organic biomass**	Compost, biogas, electricity, biofuels
Municipal & Industrial Solid Waste	**Mixed household waste, packaging, industrial scrap**	Plastics, metals, paper, organic waste
Wastewater & Industrial Effluents	**Sewage, industrial discharge, contaminated water streams**	Treated water, sludge, nutrients
Textile Waste	**Discarded garments, factory offcuts, synthetic fabrics**	Fibres for rags, insulation, recycled yarn
Waste Tyres	**Discarded vehicle tyres**	Retreaded tyres, crumb rubber, pyrolysis outputs
Lead-acid Battery Waste	**Automotive and industrial lead-acid batteries**	Lead metal and battery components
Construction & Demolition Waste	**Concrete, bricks, asphalt, metals, wood**	Recycled aggregates, metals
End-of-Life Vehicles	**Scrapped cars, trucks, and two-wheelers**	Steel, aluminium, plastics, components

10 waste streams drive India's circular economy opportunity

Figure 2: *Waste generation and recycling insights across the 10 key waste streams*

Waste Stream	Annual Waste Generation	Waste Management and Recycling Insights
Plastic Waste	**4 MT (2021)**	**Between 30–50% recycled.** PET and rigid plastics recycle well; flexible and multi-layer plastics remain a major challenge
LiB Waste & E-waste	**4.1 MT e-waste (2022)** **43,000 T LiB**	**33% processed.** Current LiB waste mainly from phones, while EV batteries will grow. High-value metal recovery is still emerging.
Agricultural, Food & Biomass Waste	**350 MT (2022)**	Recycling is poorly tracked due to fragmented generation. Waste-to-energy and biofuels are leading recycling methods
Municipal & Industrial Solid Waste	**60 MT (2021)**	**50% processed.** Collection is improving, but conversion to recycling remains limited.
Wastewater & Industrial Effluents	**111,000 MLD (2021)**	**28% of wastewater treated.** Cities generate 65% of wastewater and hold most treatment capacity, while rural infra is weak.
Textile Waste	**7.9 MT (2022)**	**35% recycled / upcycled.** Recycling dominated by informal downcycling; advanced recycling technologies are nascent.
Waste Tyres	**2.8 MT (2021)**	Tyre traceability is poor and recycling largely informal, but manufacturers are increasing recycling value chain footprint
Lead-acid Battery Waste	**3 MT (2023)**	**98% recycled.** Recycling rates are high but heavily reliant on informal and hazardous operations.
Construction & Demolition Waste	**150 MT (2020)**	**5% recycling capacity.** Poorly tracked but potentially **~25% of MSW** with significant material recovery potential.
End-of-Life Vehicles	**19 M vehicles cumulative (2024)**	Exact recycling rates are hard; informal dismantling dominates; **EPR regulation should start to formalise the sector.**

India's waste sector is transitioning from a system largely dominated by informal actors to one where formal enterprises are increasingly participating. This shift has been driven primarily by policy measures requiring producers and brands to manage waste generated from their products.

As the focus moves from basic waste management toward recycling and circular resource recovery, opportunities for private sector participation and investment are expanding — waste management priorities are not just on mitigating the adverse impact of waste but on extracting materials from wastes.

However, recycling rates remain uneven across waste streams, highlighting the need for significant expansion of recycling capacity and infrastructure across most segments of the sector.

Policy and regulations are catalysing circular economy development

India's regulatory ecosystem is the primary catalyst for private-sector participation in waste management. Five types of enabling policy exist across the ten streams:

- **Waste Management Regulations:** Minimum standards on safe disposal and waste handling.
- **Policies Encouraging Circular Products:** Non-mandatory policies promoting adoption of circular products through incentives and standards.
- **Material Recovery Mandates:** Extended Producer Responsibility (EPR) requirements to recover materials from waste streams, necessitating effective recycling systems.
- **Recycled Content Mandates:** Policies requiring minimum recycled content in products, driving demand for high-quality recycled materials.
- **Subsidies for High-Quality Recycling:** State-level financial incentives supporting the development of advanced recycling facilities.

Figure 3: *Policy and regulatory approaches supporting circularity across the 10 waste streams*

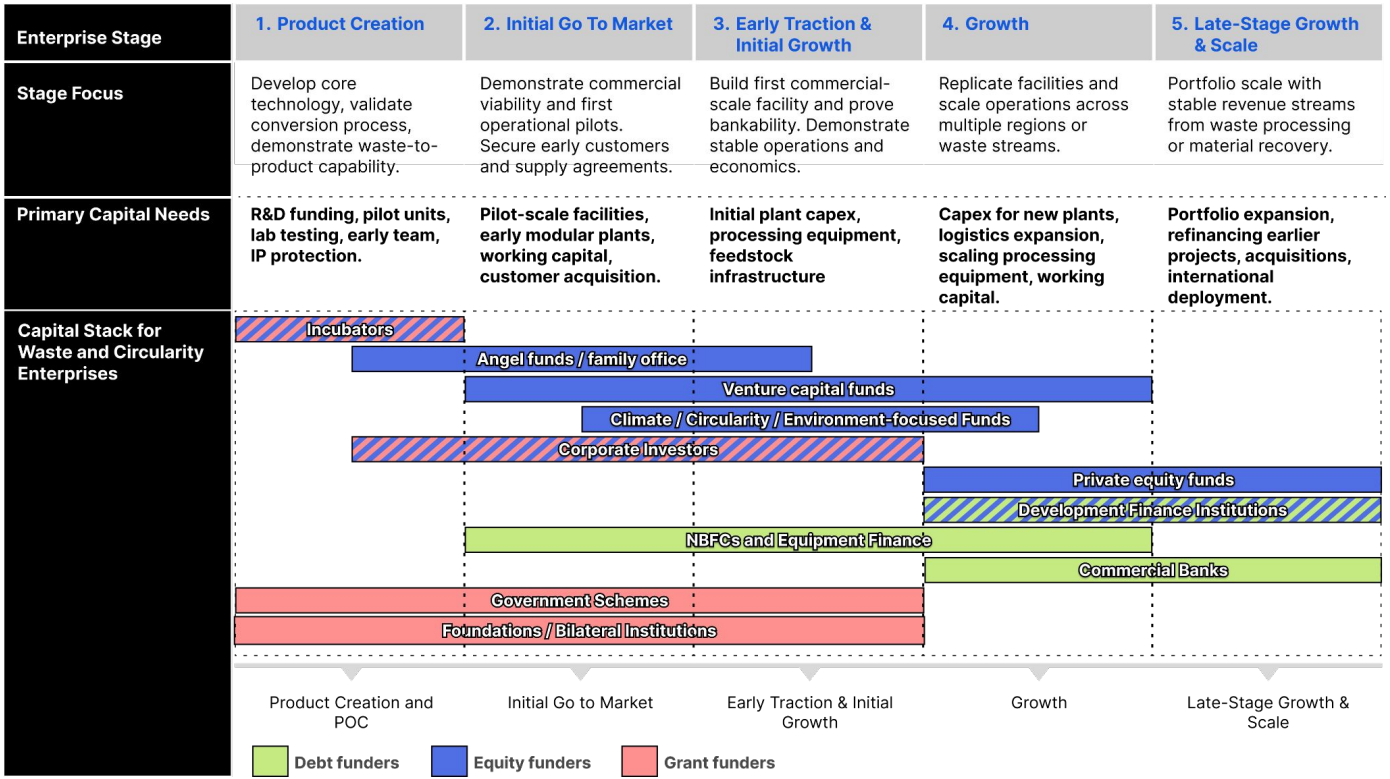
Waste Streams	Waste Management Regulations	Policies Encouraging Circular Products	Material Recovery Mandates	Recycled Content Mandates	Subsidies For High-Quality Recycling
Plastic Waste	●	●	●	●	●
LiB Waste & E-waste	●		●	●	●
Municipal and Industrial Solid Waste	●		●		●
Agricultural, Food and Biomass Waste	●	●			●
Wastewater and Industrial Effluents	●				●
Textile Waste	●				
Construction and Demolition (C&D) Waste	●		●	●	
End-Of-Life Vehicles	●	●	●	●	
Tyre Wastes	●		●	●	
Lead-Acid Battery Waste	●		●	●	

The capital stack for waste and circularity is diverse to meet enterprise needs

The capital stack for waste and circularity enterprises reflects the diverse financing needs of an emerging sector, as companies progress from early technology development to commercial operations and infrastructure scale. Early stages rely on grants, incubators, and early equity to support pilots and validation.

As enterprises grow, capital increasingly supports equipment deployment, processing infrastructure, and waste supply chains. In later stages, asset finance, private equity, development finance institutions, and banks play a larger role in enabling large-scale facility deployment, infrastructure expansion, and the scaling of circular processing capacity.

***Figure 4**: The capital stack for India's waste and circularity sector*



The waste and circularity sector has to overcome key capital gaps

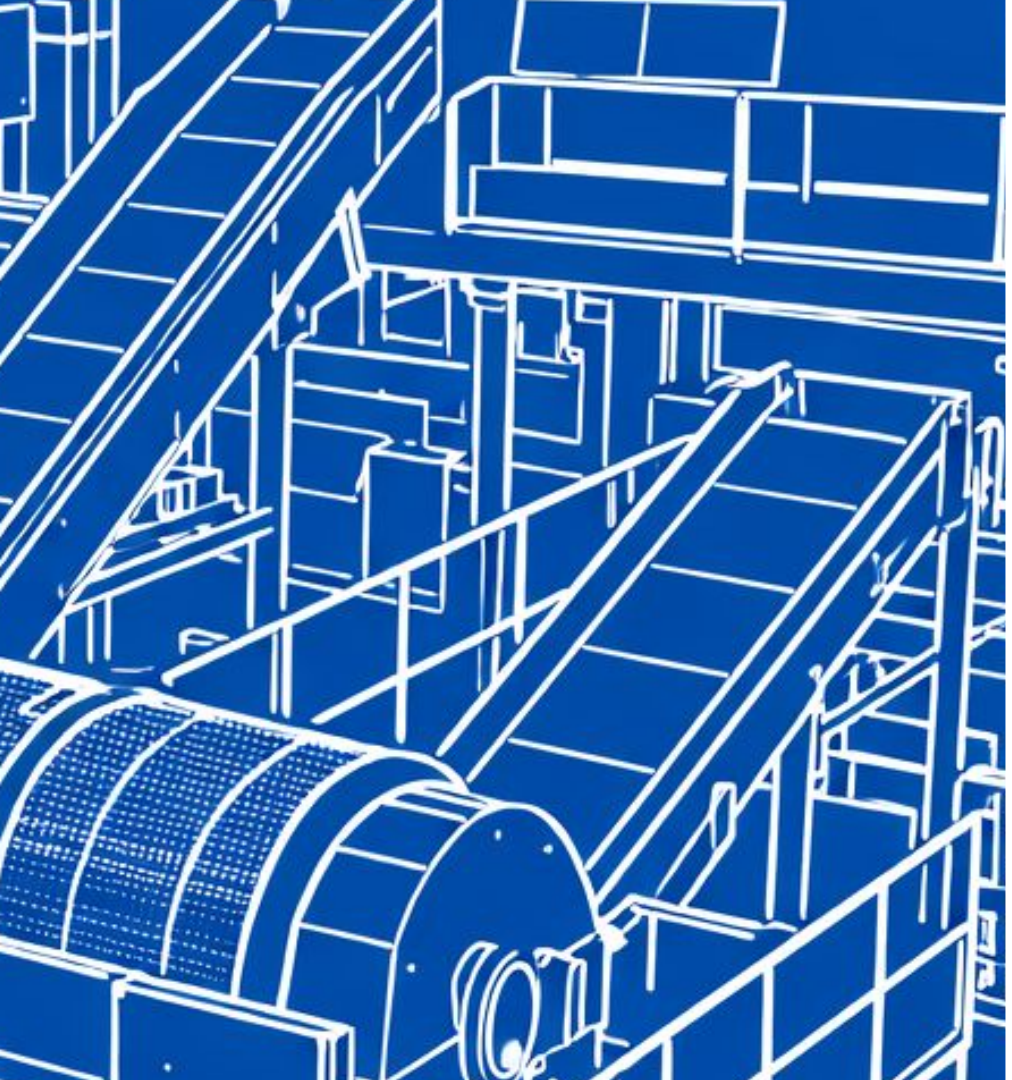
Between 2020 and 2024, investment in India's waste and circular economy sectors remained relatively limited but is beginning to gain momentum. Equity investments totalled **$357 million** between 2020 and 2024, with **44%** of this coming in 2024, signalling growing investor interest in the segment.

Funding has been concentrated in more mature segments such as plastics and battery recycling, while many other waste streams remain underfunded relative to their scale. Most capital has gone towards early-stage venture and commercialisation, primarily initial product development, and early commercialisation.

As the sector matures, capital needs are shifting toward asset-heavy infrastructure, with a major gap emerging in asset and equipment finance required to scale recycling capacity and operations.

Figure 5: *Key capital gaps currently faced by the waste and circularity sector*

Key Capital Gap	Description	Impact on the Sector	Why This Gap Exists
Early Commercialisation / First-of-a-Kind (FOAK)	Limited funding to scale technologies from pilot to first commercial plant.	Many recycling and waste-to-value technologies remain stuck at demonstration stage.	Venture capital avoids capex-heavy projects while lenders require proven operational track records.
Infrastructure & Project Finance	Limited access to long-term debt for recycling plants and waste processing facilities.	Constrains deployment of large-scale recycling and treatment infrastructure.	Revenue volatility from recycled materials and lack of project track records reduce bankability.
Equipment & Asset Finance	Limited leasing or asset-backed loans for recycling and waste processing machinery.	Restricts expansion of processing capacity for recycling and waste treatment businesses.	Lenders have limited familiarity with recycling equipment and asset resale values.
Working Capital for Waste Supply Chains	Limited financing for waste aggregation, feedstock procurement, and logistics.	Supply chain fragmentation reduces feedstock reliability and plant utilisation rates.	Waste supply chains are informal and difficult for lenders to underwrite.
Growth Capital for Asset-Heavy Businesses	Limited growth-stage equity for companies scaling infrastructure-heavy circular models.	Circular businesses struggle to expand beyond early-stage operations.	Venture investors favour asset-light technology models with faster growth profiles.



Sector Outlook

Circularity and waste require investment across the entire waste value chain

This section provides an overview of ten key waste streams, highlighting the capital needs and asset intensity of the core business models within each.

Circular waste systems rely on strong value chains — high-quality recycling depends on robust collection and pre-processing. As a result, investment opportunities exist across the full waste value chain.

The value chain can broadly be defined across three stages: **collection, pre-processing, and end recycling**, although individual waste streams may have more specialised structures. The main business models enabling recycling and circularity are outlined in the tables on the right and on the following page.

Figure 6a: *Business models within each waste stream across the waste value chain*

Waste Stream	Collection and Aggregation	Sorting & Initial Recycling	High-Quality Recycling and Circularity Outputs
E-waste and Lithium-Ion Battery Waste	• Collection centre	• Interim Recycling	• Refurbisher • Pyrometallurgy recycling • Hydrometallurgy recycling
Plastic Waste	• Collection centre	• Waste sorting technologies	• Chemical recycling • High-quality mechanical recycling • Bio-based plastic alternatives
Agriculture, Biomass, Food Waste	• On-farm waste extraction and collection		• Biochar • BioCNG / biofuels producers • Biogas solution providers • Biomaterials manufacturers
Municipal and Industrial Solid Waste	• Collection and waste pickup solutions	• Material recovery facilities (MRFs) • Waste sorting technologies	• Waste treatment facilities • Stream-specific material recycling • Biomining
Wastewater and Industrial effluents			• Decentralised wastewater treatment facilities • Large-scale wastewater treatment facilities • Industrial effluent treatment facilities

Asset finance will intensify as the sector shifts toward advanced recycling

Collection and aggregation are relatively mature and advancing beyond the informal sector focus through logistics networks, aggregation centres, and basic sorting infrastructure that are comparatively low-capex and operationally driven.

However, the sector is increasingly shifting toward advanced high-quality recycling and material recovery, where innovation need, scale, and capital is greatest. Technologies at this stage require complex industrial systems and large-scale processing facilities. This transition from logistics-focused waste management toward technology-driven resource recovery, is changing the sector's capital profile, as the need focuses on setting up capital-intensive infrastructure and equipment that enables high-quality recycling.

Figure 6b: *Business models within each waste stream across the waste value chain*

Waste Stream	Collection and Aggregation	Sorting & Initial Recycling	High-Quality Recycling and Circularity Outputs
Textile Waste		• Downcyclers • Secondhand clothing • Mechanical recyclers	• Advanced chemical and mechanical recycling • Circular apparel brands
Tyre Waste	• Tyre yards	• Retreading facilities • Incineration Facilities	• Tyre recyclers
Lead Acid Battery Waste	• Collection centres		• Lead and base metal recyclers • Plastic mechanical recyclers
Construction & Demolition Waste	• C&D disposal yards	• C&D waste processing companies	• C&D recycled products producers
End-of-life Vehicles	• Salvage yards		• Base metal recyclers • Plastic mechanical recyclers

Lithium-ion and e-waste recycling

Overview

India generated **4.1M** tonnes of e-waste in 2022 (one of the largest globally), expected to exceed **9M** tonnes/yr by 2030. Lithium-ion battery waste will reach **400,000** tonnes between 2021–2030, driven by consumer electronics and, increasingly, electric vehicles.

Waste Generation Drivers

- Rapid growth of consumer electronics and digital devices
- Expanding EV adoption and battery replacement cycles
- Shorter device lifespans and rising e-commerce electronics sales
- Increasing domestic electronics manufacturing

Circularity Drivers

- E-waste contains high-value metals such as gold, cobalt and nickel
- Growing EV battery market and domestic battery manufacturing
- Government PLI schemes for battery manufacturing
- Expansion of second-hand electronics markets

Business Model	Description	Asset Intensity	Key Technologies / Assets	Primary Finance Instruments
Collection centres	Aggregate and dismantle e-waste and supply feedstock to refurbishers and recyclers.	**Low**	Waste aggregation platforms; battery collection networks	Working capital lines; venture debt; VC equity
Interim recyclers	Recover base metals such as copper and aluminium through smelting processes.	**Medium**	Copper and aluminium smelting units	Equipment loans; hire purchase; NBFC asset finance
Refurbishers	Repair and resell used electronic devices to extend product lifecycles.	**Medium**	Device refurbishment facilities	Equipment leasing; venture debt
Pyrometallurgy smelters	Use high-temperature furnaces to extract precious metals from e-waste.	**Very High**	Precious metal recovery furnaces	Project finance; asset-backed debt; blended finance
Hydrometallurgy recyclers	Extract lithium, cobalt and nickel from battery materials using chemical processes.	**Very High**	Lithium, cobalt, nickel extraction plants	Project finance; strategic equity; blended climate finance

Plastic waste recycling

Overview

India generates **26,000** tonnes of plastic waste per day (**4M** tonnes annually), projected to reach **45M** tonnes/yr by 2035. The plastic recycling industry is expected to grow from **$2.3B** in 2023 to **$10B** by 2030.

Waste Generation Drivers

- Rising plastic packaging consumption
- Growth in consumer goods and e-commerce
- Increased use of plastics in automotive and manufacturing
- Continued reliance on virgin polymers

Circularity Drivers

- Extended Producer Responsibility (EPR) regulations
- Corporate demand for recycled plastic content
- Increasing interest in chemical recycling solutions
- Pressure to reduce landfill and ocean plastic pollution

Business Model	Description	Asset Intensity	Key Technologies / Assets	Primary Finance Instruments
Collection centres	Aggregate plastic waste from households and businesses for recycling supply chains.	**Low**	Waste aggregation systems	Working capital finance; VC equity
Waste sorting technologies	Automated systems that separate plastics using optical, robotic or AI sorting.	**Medium**	Optical sorting machines; AI sorting robots	Equipment leasing; venture debt
Mechanical recycling facilities	Convert sorted plastics into recycled pellets through shredding, washing and melting.	**High**	PET/HDPE recycling plants	Equipment leasing; hire purchase; NBFC asset finance
Chemical recycling facilities	Break plastics into molecular feedstocks using processes such as pyrolysis.	**Very High**	Pyrolysis and depolymerisation plants	Project finance; asset-backed debt; blended finance
Bio-based plastic producers	Produce biodegradable plastic alternatives using renewable biomass feedstocks.	**Medium**	Biomaterial processing units	Venture equity; venture debt; equipment loans

Agriculture, biomass, and food waste circularity

Overview

India produces **350M** tonnes of agricultural waste annually with a total biomass potential of **750M** tonnes. Much of this waste remains underutilised or burned, despite its significant energy and material potential.

Waste Generation Drivers

- Large volumes of crop residues and agri waste
- Limited logistics and markets for agricultural by-products
- Fragmented farming with smallholder farms dominating
- Increasing urban and industrial biomass waste streams

Circularity Drivers

- Government biofuel blending targets (20% ethanol, 5% biodiesel)
- Demand for bioCNG and renewable fuels
- Biomass co-firing mandates in thermal power plants
- Rising interest in biochar and biomaterials

Business Model	Description	Asset Intensity	Key Technologies / Assets	Primary Finance Instruments
Logistics & traceability platforms	Aggregate biomass supply and track feedstock across distributed agricultural sources.	**Low**	Biomass logistics platforms	VC equity; venture debt
On-farm waste extractors	Machines that collect crop residues to prevent burning and enable biomass use.	**Medium**	Crop residue extraction machines	Equipment leasing; agricultural asset loans
Biogas solution providers	Deploy biodigesters converting organic waste into methane and fertiliser.	**High**	Biodigesters; farm biogas systems	Equipment finance; carbon-backed loans
Biochar production	Produce carbon-rich soil amendments through pyrolysis of biomass waste.	**High**	Pyrolysis reactors	Equipment loans; blended finance
BioCNG / biofuel producers	Convert biomass into renewable fuels such as biomethane or bioethanol.	**Very High**	Biomethane plants; biofuel refineries	Project finance; infrastructure debt
Biomaterial manufacturers	Convert agricultural residues into fibres and industrial biomaterials.	**Medium**	Fibre processing plants	Equipment leasing; venture debt

Municipal solid waste management and treatment

Overview

India generates **60M** tonnes of municipal solid waste annually, expected to rise to **165M** tonnes by 2031. Despite **90%** collection rates, only **50%** of waste is processed — often for low-value outputs — leading to significant landfill accumulation.

Waste Generation Drivers

- Rapid urbanisation and population growth
- Rising consumerism and packaging waste
- Limited waste infrastructure in smaller cities
- Industrial growth producing hazardous and mixed waste

Circularity Drivers

- Government compliance mandates, Solid Waste Management Rules, Government Swachh Bharat Mission programmes, etc.
- Expansion of material recovery facilities (MRFs)
- Increasing focus on landfill remediation
- Opportunities to recover materials through biomining

Business Model	Description	Asset Intensity	Key Technologies / Assets	Primary Finance Instruments
Collection & pickup services	Tech-enabled municipal waste collection and logistics systems.	**Medium**	Smart bins; GPS waste fleets	Equipment leasing; PPP financing
Waste sorting technologies	Automated systems separating recyclables from mixed municipal waste.	**High**	Conveyor sorting systems	Equipment leasing; asset finance
Material recovery facilities	Centralised plants sorting and baling recyclables from municipal waste streams.	**High**	Large waste sorting plants	Infrastructure debt; equipment loans
Waste treatment facilities	Facilities that safely treat hazardous or non-recyclable waste streams.	**High**	Hazardous waste treatment plants	Project finance; municipal bonds
Biomining	Extract materials from legacy landfills while reclaiming land.	**Very High**	Landfill remediation plants	Project finance; blended finance

Wastewater & industrial effluent management

Overview

Indian cities produce over **72,000** million litres of wastewater daily; only **28%** is treated. India's AMRUT programme commits **$35B** over five years to improve water security and wastewater recycling across **500** cities, which can be a basis for increasing market opportunity for the segment.

Waste Generation Drivers

- Rising urban water demand and rapid population growth
- Industrial wastewater from chemicals, textiles and manufacturing
- Increasing pressure on natural water resources
- Outdated sewage treatment infrastructure (~65% efficiency)

Circularity Drivers

- Government AMRUT water infrastructure investments, and drive towards zero-liquid discharge (ZLD) norms
- Growing water scarcity increasing demand for recycled water
- Growing opportunities to recover energy and water from wastewater

Business Model	Description	Asset Intensity	Key Technologies / Assets	Primary Finance Instruments
Decentralised wastewater treatment	Localised systems that treat sewage near the source of generation.	**High**	Modular sewage treatment plants	Equipment leasing; infrastructure debt
Industrial effluent treatment plants	Treat industrial wastewater to meet regulatory discharge standards.	**High**	ZLD treatment plants	Project finance; asset-backed loans
Filtration technologies	Membrane and filtration systems that purify wastewater streams.	**Medium**	Nanofiltration; membrane filtration	Equipment loans; venture debt
Large municipal wastewater plants	Large infrastructure facilities treating sewage from urban areas.	**Very High**	Sewage treatment plants	Infrastructure project finance; PPP financing

Textile waste recycling

Overview

India generates **7.8M** tonnes of textile waste annually, with most waste originating from domestic consumers and manufacturing processes. The textile waste industry is forecast to reach **$375M** by 2028, reflecting its nascent stage, with low value capture presently in place.

Waste Generation Drivers

- Rapid growth in textile and apparel market (10% CAGR)
- High volumes of pre-consumer manufacturing waste
- Limited collection infrastructure for textile recycling
- Absence of formal EPR policies for textiles

Circularity Drivers

- Demand for recycled textile fibres globally
- Government PLI initiatives for textile manufacturing innovation
- Growing global market for sustainable materials
- Emerging digital platforms for textile waste tracking

Business Model	Description	Asset Intensity	Key Technologies / Assets	Primary Finance Instruments
Downcyclers	Convert low-grade textile waste into filler fibres and industrial materials.	**Low**	Textile shredding facilities	Working capital finance
Second-hand clothing platforms	Extend clothing lifecycles through resale of used garments.	**Low**	Resale marketplaces	VC equity
Mechanical recyclers	Recycle textiles into yarn through shredding and spinning processes.	**Medium**	Fibre shredding and spinning systems	Equipment leasing; NBFC asset finance
Chemical recyclers	Recover fibres from blended textiles using chemical recycling processes.	**High**	Polyester depolymerisation plants	Project finance; venture equity
Circular apparel brands	Produce garments using recycled materials and circular production models.	**Low**	Sustainable apparel production	VC equity; venture debt

Construction & demolition waste management

Overview

India produces **150–750M** tonnes of C&D waste annually, potentially accounting for up to one-third of global C&D waste. India has infrastructure suitable to manage less than **5%** of the C&D waste generated.

Waste Generation Drivers

- Rapid urbanisation and infrastructure expansion
- Large-scale construction projects across the country
- Inefficient material use and construction practices
- India needs to add **700–900M** m^2 of built space annually by 2030

Circularity Drivers

- Environmental restrictions on river sand mining (boosting M-Sand demand)
- Growing demand for recycled aggregates and construction materials
- Government guidelines for C&D waste disposal
- Growing focus on green building practices

Business Model	Description	Asset Intensity	Key Technologies / Assets	Primary Finance Instruments
C&D Disposal Yards	Storage locations to deposit C&D waste	**Low**	Trucks and vehicles	*Limited scope*
C&D waste processing companies	Process construction debris into recyclable aggregates and materials.	**Medium**	Mobile crushing plants	Equipment leasing; NBFC asset loans
Recycled construction product manufacturers	Manufacture construction materials from recycled debris.	**High**	Aggregate production plants	Equipment leasing; infrastructure finance

Tyre waste recycling

Overview

India discards over **100 million** tyres annually (~1% of total MSW), driven by rapid expansion of the automobile sector. The tyre recycling market is estimated at **$400M**, with EPR norms recently introduced to drive formalisation, likely to increase this opportunity.

Waste Generation Drivers

- Rapid growth in vehicle ownership and tyre production (**21%** rise in 2022)
- Increasing tyre production volumes (**217M** units/yr)
- Limited tracking and monitoring of discarded tyres

Circularity Drivers

- Introduction of EPR norms for tyre manufacturers
- Valuable outputs: crumb rubber, carbon black and pyrolysis oil
- Growing use of recycled rubber in road construction

Business Model	Description	Asset Intensity	Key Technologies / Assets	Primary Finance Instruments
Tyre yards	Aggregate scrap tyres for recycling or retreading.	**Low**	Scrap tyre aggregation	Working capital finance
Retreading facilities	Extend tyre life by refurbishing worn tyres.	**Medium**	Retreading machinery	Equipment leasing; SME loans
Tyre recycling plants	Process tyres into crumb rubber and reclaimed rubber products.	**Medium**	Rubber shredding plants	Equipment leasing; NBFC loans
Pyrolysis facilities	Convert tyre waste into oil, carbon black and steel through thermochemical processes.	**High**	Tyre pyrolysis plants	Project finance; blended finance

Lead acid battery waste recycling

Overview

Lead-acid batteries (LAB) is a widely used battery technologies in India for automotive, backup power and telecom applications. LAB recycling is already a well-established industrial sector with **>90%** recovery rates — one of the most mature circular economy segments.

Waste Generation Drivers

- Rapid growth in automotive vehicle fleets (~**15M** ICE vehicles/yr)
- Extensive use for backup power and telecom infrastructure
- Short replacement cycles (typically 3–5 years)
- Large installed base in cars, inverter, and backup batteries

Circularity Drivers

- Very high recyclability rates (>**90%**)
- Strong economic value of recovered lead (**100%** recovery possible)
- Established recycling infrastructure and supply chains
- Increasing regulatory enforcement on safe battery disposal

Business Model	Description	Asset Intensity	Key Technologies / Assets	Primary Finance Instruments
Collection centres	Aggregate used batteries from consumers and businesses.	**Low**	Battery aggregation hubs	Working capital lines
Lead recyclers	Recover lead from used batteries through smelting and refining.	**High**	Lead smelting plants	Project finance; asset-backed loans
Plastic recyclers	Recycle battery casings into reusable plastic pellets.	**Medium**	ABS recycling plants	Equipment leasing

End-of-life vehicles recycling

Overview

India is expected to have **28M** obsolete vehicles by 2030. The Vehicle Scrappage Policy is expected to reduce auto component costs by **30–40%** for manufacturers. EPR guidelines for ELVs are upcoming and will accelerate formalisation.

Waste Generation Drivers

- Growth in India's automobile ownership
- Aging vehicle fleet reaching end-of-life (**20M** vehicles **>15** years)
- Implementation of vehicle scrappage policies
- Increasing material complexity in modern vehicles

Circularity Drivers

- High recovery value of steel and non-ferrous metals
- Regulatory push for formal scrapping and recycling systems
- Demand for secondary metals in manufacturing
- Potential recovery of EV battery materials in future vehicle fleets

Business Model	Description	Asset Intensity	Key Technologies / Assets	Primary Finance Instruments
Scrap dismantlers	Dismantle vehicles into reusable parts and recyclable materials.	**Medium**	Vehicle dismantling yards	Equipment leasing; SME loans
Base metal recyclers	Melt recovered metals such as steel and aluminium for reuse in manufacturing.	**High**	Metal recycling furnaces	Infrastructure debt; project finance
Plastic recyclers	Recover and recycle automotive plastics from dismantled vehicles.	**Medium**	Automotive plastic recycling plants	Equipment loans
Lithium-ion battery recyclers	Recover critical metals from EV batteries in scrapped vehicles.	**Very High**	EV battery recycling plants	Project finance; blended finance

India’s Waste & Circularity Sector Needs to Attract More Asset Finance

Asset finance stands out as a critical capital solution that needs to scale

While multiple forms of capital are needed, asset finance is a critical layer that remains underdeveloped for the waste and circularity sector.

Asset finance supports the acquisition and deployment of equipment and infrastructure such as processing plants, sorting equipment, processing equipment collection vehicles, and extraction machinery, through non-dilutive approaches, such as loans and leases. Asset finance is particularly important in the circular economy for four reasons:

1. Circular solutions are inherently asset-intensive;
2. The quality of recycled outputs—and therefore revenues—depends on the quality of available equipment and infrastructure;
3. Many enterprises cannot raise equity for capex and are too early for project finance; and
4. The underlying assets can serve as collateral, helping partially address creditworthiness constraints.

Figure 7: *Examples of asset finance instruments and their ideal contexts for deployment*

Instrument	Description	Ideal Contexts for Deployment
Equipment Leasing	Enterprise leases machinery/plant; lessor retains ownership; lease payments expensed	Early–growth firms; movable equipment; minimise upfront capex
Hire Purchase / Finance Lease	Enterprise acquires asset over time with interest; ownership transfers at end	Firms seeking asset ownership; long-use productive equipment
Asset-Backed Lending	Loan secured against specific productive asset	Businesses with collateral; stable revenues
Sale and Leaseback	Enterprise sells asset to financier, then leases it back; unlocks working capital	Mature firms; unlock capital from existing assets
Revenue-Based Financing (RBF)	Repayments as % of revenue; no fixed EMIs	Growth firms; variable revenues; limited collateral
Blended / Concessional Asset Finance	Mainly first-loss guarantee to derisk asset finance lending to enterprises	Early sectors; new technologies; risk-sharing needed
Government Subsidy-Linked Debt	Capex subsidy supplemented by debt for balance capex	Subsidy-backed projects; policy-driven infrastructure
Invoice Discounting	Invoices discounted against receivables from customers, usually established ones	Firms with delayed receivables; working capital needs

Scaling circular solutions is dependent on asset-heavy technologies

As the waste and circularity in India moves towards high-quality recycling, across waste streams. The solutions and technologies needed to meet this are inherently asset-intensive — scaling circular solutions will depend increasingly on a diverse range of capital structures to be deployed.

A consistent need that emerges across the sector is the central role of asset and equipment finance.

Processing lines, shredders, reactors, logistics fleets, and treatment systems represent discrete, financeable assets that underpin operations. The adoption of equipment leasing, asset-backed lending, infrastructure finance, and asset finance in general will need to increase, if the potential of the sector is required to scale.

Figure 8: *The main technologies and equipments, and asset finance approaches for each of the 10 waste streams*

Waste Stream	Main Equipment and Technologies Needs	Main Asset Finance Approaches
Lithium-ion Batteries & E-waste	Battery dismantling systems; black-mass processing; hydrometallurgical & smelting plants	Project finance; infrastructure debt; equipment leasing
Plastic Waste	Sorting automation; mechanical recycling plants; chemical recycling reactors	Equipment leasing; NBFC asset loans; project finance
Agricultural, Food & Biomass Waste	Biomass logistics systems; biodigesters; pyrolysis reactors; bioCNG / biofuel plants	Infrastructure project finance; equipment leasing; carbon finance
Municipal & Industrial Solid Waste	Waste collection fleets; sorting systems; material recovery facilities; biomining equipment	PPP infrastructure finance; fleet finance; equipment leasing
Wastewater & Industrial Effluents	Sewage & effluent treatment plants; filtration systems; water recycling infrastructure	Infrastructure project finance; PPP financing; asset-backed loans
Textile Waste	Textile shredding & fibre recovery lines; chemical textile recycling systems	Equipment leasing; SME asset loans
Construction & Demolition Waste	Crushing & screening plants; recycled aggregate and m-sand production plants	Construction equipment loans; equipment leasing
Waste Tyres	Tyre shredding plants; crumb rubber processing; pyrolysis reactors	Industrial equipment loans; project finance
Lead-acid Battery Waste	Battery dismantling lines; lead smelting & refining plants; plastic recycling lines	Industrial project finance; asset-backed loans
End-of-Life Vehicles	Vehicle dismantling yards; scrap shredders; metal and plastic recycling plants	Equipment leasing; scrap processing loans

Why asset finance is increasingly critical for the waste and circularity sector

India's waste and circularity sector is entering a phase where scaling recycling and resource recovery solutions increasingly depends on the deployment of specialised equipment and processing infrastructure. As circular business models expand, enabling the adoption of asset-heavy solutions across waste streams is becoming increasingly critical.

While a range of financial capital structures will be needed to develop and scale these solutions, asset finance and equipment-backed lending are emerging as key financing mechanisms at this stage, helping to enable the growth and expansion of the waste and circularity sector.

Circularity is entering an asset-intensive phase

India's waste sector is shifting toward industrial-scale resource recovery, increasingly dependent on specialised equipment and processing infrastructure. As recycling and waste-to-resource technologies scale, circular solutions rely on capital-intensive assets such as recycling lines, reactors, and treatment systems, making asset deployment and financing central to sector growth.

Asset finance will be a critical enabler of sector scale

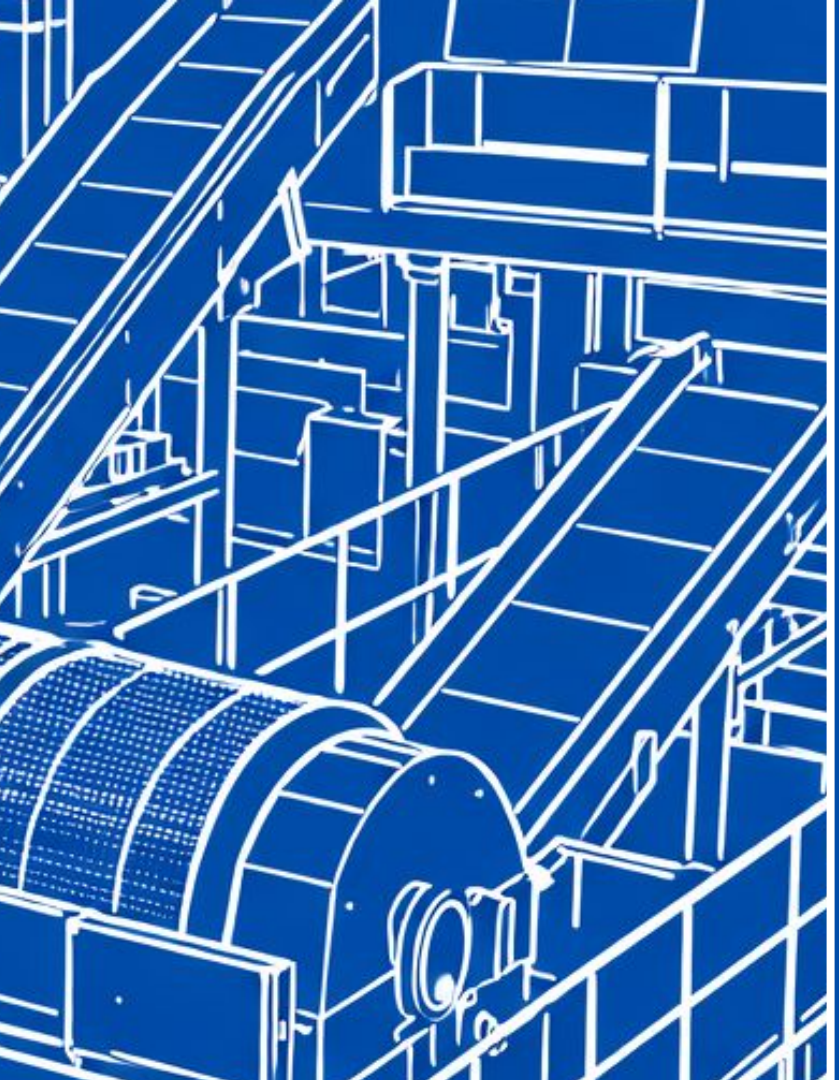
Circular business models rely on equipment-heavy processing systems such as shredders, sorting lines, and recycling plants. Scaling these solutions requires financing for equipment and infrastructure, positioning asset finance, leasing, and asset-backed lending as key mechanisms for expanding circular processing capacity.

Policy momentum is creating scalable opportunities

Policies such as EPR regulations and recycling mandates are formalising waste value chains and creating predictable demand for recycling solutions. Strengthening regulatory frameworks is helping reduce investment risk and enable circular infrastructure to scale.

Demonstrating the applicability of existing finance instruments

Many circular business models already align with existing financing tools such as equipment leasing, SME asset loans, infrastructure debt, and project finance. Applying these instruments to emerging circular segments will help unlock capital and expand lender participation.



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Endnotes

Unlocking India’s circular economy requires financing the equipment and infrastructure that will scale it.

India’s waste and circularity sector is shifting from collection and disposal toward industrial-scale recycling and resource recovery. That transition creates a new financing need: assets. The next phase of growth depends on shredders, sorting lines, reactors, treatment systems, fleets, and processing plants—not equity alone.

Asset finance should therefore become a priority capital solution. Across waste streams – from plastics, batteries, wastewater, biomass, tyres, to emerging areas such as C&D waste – businesses need equipment to expand capacity, improve recovery rates, and strengthen revenues.

While India’s waste and circularity sector attracted around USD 357 million of equity between 2020 and 2024, equity alone cannot fund asset-heavy scale-up. Many companies are too early for project finance, yet too capital-intensive for venture models. Asset finance fills this gap through leasing, equipment loans, asset-backed lending, and blended risk-sharing structures.

The opportunity for asset finance is fast emerging: for lenders to finance a growing segment linked to productive assets; for founders to access non-dilutive growth capital that allows them to scale. Scaling waste management and circularity will depend as much on financed equipment as on innovation.

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Simmi and Shravan started Climake in 2020 to catalyse climate finance in areas where it is most needed. Today, Climake is a leading advisory firm for the Global South, advising funds, DFIs and LPs around the world on maximising the climate impact and returns from the capital they deploy.

Climake also helps founders working on new and emerging areas of climate action connect with the right capital providers.

We are currently present across India and UAE, and are always happy to talk about new ways to solve for and fund climate action. Reach out to us at:
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