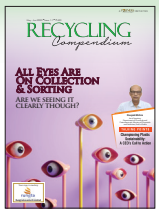
Using AI to Enable Smart Sorting
For the Recycling Sector

Originally published in
RECYCLING Compendium
May - Jun 2025



India generates a huge amount of plastic waste, much of which remains unrecycled due to inefficient material recovery infrastructure. Artificial intelligence-powered material recovery solutions are transforming this space by enabling accurate, high-speed segregation and improving material purity. With scalable and locally adaptable solutions, recyclers are boosting efficiency, ensuring regulatory compliance and contributing to a cleaner, more circular economy.

India generates over 26,000 tonnes of plastic waste every single day. That adds up to nearly 9.5 million tonnes a year - a volume that's both, staggering and growing. Yet, despite the scale of this challenge, a significant portion of this waste never sees a second life. The vast majority ends up in landfills, water bodies or informal collection channels where the true value of the recyclable material is often lost. The reason? A lack of suitable material recovery infrastructure, which makes us rely entirely on human judgement, manual labour and outdated technologies.

Role of AI in Recycling

Having worked closely with over 50 recyclers, we have seen a common challenge time and again - contamination in the output stream, often caused by poor segregation of plastic waste even before it enters the recycling process. Today, artificial intelligence, machine vision and data-driven automation are not just buzzwords - they're quietly, but powerfully reshaping how material recovery works. No longer a futuristic concept, AI is actively transforming recycling operations across India and beyond, helping deliver cleaner outputs, reducing reliance on manual labour and unlocking real, measurable value for recyclers.

For years, recyclers have operated under severe constraints: inconsistent feedstock quality, contaminated input streams, unpredictable labour availability and increasing pressure to meet regulatory requirements such as extended producer responsibility (EPR). These challenges are magnified in a market like ours - fragmented, informal and highly diverse. But it's precisely within these constraints that technology finds its purpose.

Today, AI-powered sorting systems are being deployed in forward-looking facilities across the country. These systems are trained on billions of material images - tailored specifically to the recycler's waste streams - to detect,

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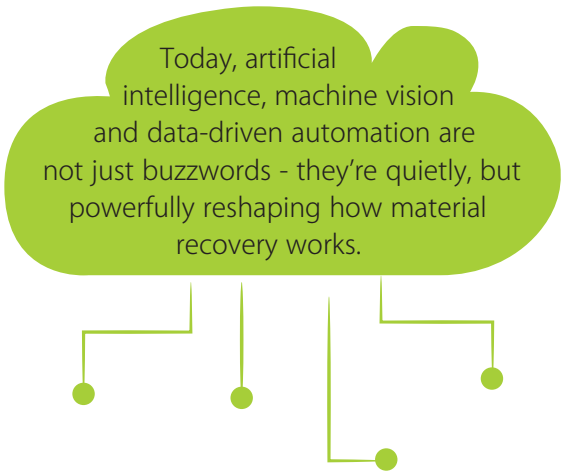

classify and separate plastics based on polymer type, colour, shape and even label contamination. Whether it is distinguishing between PET, PP, HDPE, PVC or automatically identifying foreign polymer or moulding grade contaminants, AI models can make split-second decisions with upto 99% accuracy - at a speed impossible for the human eye.

Case Study

Considering the case of a regional PET aggregator we recently worked with. Prior to adopting automation, their operations were entirely manual, limiting daily throughput to 2 - 3 tonnes per day. Contamination rates were high and valuable contracts were slipping through their fingers. By integrating an AI-driven sorting solution into their sorting centre, they scaled up to over 18 tonnes per day, without any increase in manpower and - most importantly - achieved a level of purity that opened doors to recycling centres with stringent requirements such as food-grade and bottle-to-bottle conversions. This isn't an isolated story; it is becoming the new benchmark.

Recyclers today are not just looking for efficiency - they're looking for trust. Trust in their output, in their reporting and in their ability to meet the rising demands of both, regulations and the global marketplace. That is where technology adds another layer of value: traceability. With proprietary analyser systems, every batch is analysed with digital documentation - showing polymer composition, percentage purity and even PPM-level contamination. These data-rich reports serve not only as internal QC benchmarks, but also as compliance documentation for EPR and food-safety standards.

To be truly effective, recycling technologies today go beyond being cutting-edge - they are also context-aware. Systems designed and trained locally are better suited to handle the specific challenges of local waste streams, site conditions and budget limitations. Also, modular and scalable solutions that integrate with existing infrastructure offer recyclers the flexibility to upgrade without starting from scratch. Equally important are intuitive interfaces and dashboards that make automation easy to adopt and operate - empowering recyclers to make the most of automated solutions.

The Impact is Real

Across the recycling sector, the adoption of AI-powered automation is leading to up to fivefold increases in throughput, substantial reductions in downtime and a significantly lower carbon footprint per kilogram of output. But perhaps the most exciting shift is this: recyclers are starting to see themselves not just as waste managers, but as tech enabled manufacturers - producing high-purity, high-value raw materials for the circular economy.

Of course, the road ahead requires more than just innovation. It calls for alignment - between policy, private players and public awareness. The EPR framework must continue to evolve to incentivise digital compliance and high-purity outputs. Financing models should support recyclers in adopting automation. And most importantly, we must bridge the knowledge gap - so that small- and mid-sized recyclers can see AI not as a luxury, but as a competitive necessity.

Conclusion

India stands at a pivotal moment. With a unique combination of scale, urgency and entrepreneurial energy, we can leapfrog the limitations of traditional recycling models and set global standards in tech-enabled material recovery - but only if we act boldly and build smart.

My belief is simple: waste is not a problem to bury. It's an opportunity to decode. With the right technology, the right intent and the right partnerships, we can turn every piece of discarded plastic into a building block for a cleaner, circular India.