



Working Paper

Input Supply Impact Analysis in a Recycling Manufacturing Business Model

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RECOMMENDED CITATION

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DISCLAIMER

This document is a concise paper offering relevant facts and figures, and arguments outlining key challenges and strategic imperatives for the recycling manufacturing sector. It is a knowledge product developed to support strategic planning and advocacy for transitioning towards a circular economy in Kenya. It does not, nor is it intended to, create any binding, legal or financial obligations under international or domestic law.

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Acronyms and Definitions

Circular Economy – A ‘closed-loop’ system whereby any waste is recovered and processed for re-use in the creation or manufacturing of new products which re-enter the market economy

COGS - Cost of Goods Sold – The total cost of producing a specific *per unit* product or ‘good’. Every cost. This includes labour, machinery and equipment, tools, water, power, transport, input supplies, production, marketing, etc.

MRF - Material Recovery Facility – a facility where collected waste materials are sorted and processed in readiness for re-use and recycling

PPPs – Public, Private Partnerships – A partnership or collaboration agreement entered into by a public entity (government or official) and a private entity (business, enterprise or non-governmental group or organisation)

Recyclable material – recovered waste material which is recyclable, i.e.: plastic, paper, metal, glass, textile, rubber, etc. These are inorganic materials. Compostable waste materials are organic.

Recyclates - sorted and processed (shredded flakes or pellets) recyclable material

1. INTRODUCTION

Recycling is a cornerstone of Kenya's transition towards the circular economy for post-consumer solid waste management to bring potential benefits to people and our environment. By recycling waste, we recover valuable materials, unlock socio-economic value-adding opportunities, and create a healthier planet for ourselves and future generations while also conserving natural resources. Recycling reduces the need to extract more natural resources—such as fossil fuels, timber, water, and minerals—for new products.

As Kenya transitions toward a Circular Economy its emerging recycling industry is facing formidable challenges. Yet, there is a bright future ahead if adequate funding, investment, policy enforcement plus commitment and determination are secured. This working paper provides a focused analysis of the myriad issues associated with the input supply of raw material, or feedstock, essential for the manufacturing of recycled building products, and proposes strategic imperatives for sustained business viability.

2. CONTEXT: THE RECYCLING LANDSCAPE IN KENYA

Background

Kenya faces mounting and ever-increasing waste management challenges. It is currently estimated the country's population of >54 million generates between **3,000 and 4,000 tonnes of waste daily**, amounting to about **42,000 tonnes annually**. Of this, estimates are **20–30%** comprise plastic, metal, and paper. Yet only **5–10% of plastic waste is recycled**. This is largely due to underdeveloped or non-existent disposal infrastructure and public awareness. Likewise, there currently are very few **Material Recovery Facilities (MRFs)**, leading to limited sorting and recycling, and inadequate waste collection services both within and outside urban areas.

One key area that Kenya needs to focus on is waste segregation at the source. A system of household and community-level waste separation could be implemented to ensure that recyclable materials, organic waste, and non-recyclables are segregated properly. Kenya could also benefit from creating more public recycling bins and establishing a formal collection system that encourages people to separate their waste before it is collected.

Another important step is the establishment of robust MRFs for processing and recycling as well as composting near urban centres. These facilities would allow for the large-scale processing of materials such as plastics, metals, and organic waste, which could be recycled or composted.¹

The current waste management challenges of underdeveloped infrastructure and low public awareness of segregated waste disposal practices are forcing emerging plastic waste recycling enterprises in Kenya to carefully weigh their raw material input requirements against accessible and affordable supply. Securing adequate input supply and minimizing the cost of the feedstock are essential. For example: Mixed waste, collected at landfills or from non-segregated disposal bins, require

additional and costly steps during sorting and processing—impacting the ultimate price point of the manufactured recycled product.

While only a small fraction of waste is currently collected and processed, this presents both a massive environmental challenge, and a substantial economic opportunity. As interest in recycling and manufacturing grows, it is creating opportunities for new actors to establish enterprises capable of transforming post-consumer waste into valuable recyclable materials. Understanding the dynamics of feedstock supply is paramount to unlocking this potential.

For Kenya's emerging plastic waste recycling and manufacturing enterprises, calculating the volume of recyclates input required per month to produce a specified output volume of products, and identifying verifiable input/feedstock supply sources to meet this level is critical. Mitigation includes always maintaining contingency back-up supply of inputs, as well as machinery and equipment spare parts and final product inventory. This would guard against or avoid and reduce the duration of costly production flow stoppages—plus better meet and maintain market demand.

3. ANALYSIS OF CRITICAL INPUT SUPPLY CHALLENGES

The success and ultimate survival of a recycling manufacturing enterprise hinges on securing **robust and reliable access to raw materials and recyclates**. Building loyal commitments among dedicated supply chain partners is therefore an imperative.

3.1. Feedstock Security and Cost Reduction

Securing consistent high-quality is the single greatest determinant of manufacturing viability. Two critical challenges dominate this process:

- **Minimizing Intermediation:** Involving the fewest possible middlemen for recyclable material supply and processing is vital. Each intermediary layer adds transaction costs, directly impacting the final **Cost of Goods Sold (COGS)**. These layers often prevent the company from achieving its lowest possible price point for its products.
- **Supply Chain Loyalty:** Building relationships that guarantee a constant flow of quality feedstock is essential to avoid operational downtime and maintain production capacity. Playing 'catch-up' in securing materials is a defeating approach that destabilizes long-term planning.

3.2. Quality, Contamination, and Pre-Processing Costs

Unlike virgin resource streams, feedstock sourced from the informal waste economy exhibits high variability in quality, often due to high levels of contamination (e.g., organic residue, mixed materials) or degradation (e.g., UV exposure). This variability poses a critical threat to manufacturing efficiency and product integrity:

- **Increased Processing Costs:** To achieve the purity levels necessary for recycled building products, significant investment in sorting, washing, and processing technology is mandatory. These steps increase operational

expenditure and impact the COGS, often requiring specialized chemical or mechanical treatments.

- **Non-Conformance Risk:** Inconsistent feedstock quality introduces the risk of non-conformance in the final product. A single contaminated batch can lead to product failure, undermining market confidence and requiring costly batch recall or disposal, thereby generating secondary waste and negating sustainability goals.

3.3. Policy Gaps and Regulatory Uncertainty

The broader regulatory landscape creates systemic uncertainty for long-term feedstock procurement:

- **Absence of Mandatory Extended Producer Responsibility (EPR):** Where EPR schemes are absent or weakly enforced, manufacturers bear the full cost of material collection and aggregation. Effective EPR shifts the financial and operational burden back to product producers, which can stabilize collection volumes and establish standardized sorting procedures, reducing manufacturer uncertainty.
- **Informal Sector Integration:** The majority of feedstock collection relies on the informal waste collector sector. Policies must be developed to formally recognize, integrate, and finance this sector. Without such integration, supply is unreliable, lacking the scale and consistency needed to support industrial manufacturing volumes.

3.4. Infrastructure Gaps and the Public-Private Partnership Opportunity

The establishment of robust MRFs for processing, as well as composting facilities near urban centres, is an essential requirement for large-scale processing of waste materials such as plastics, metals, paper and glass, plus organic waste. If such waste is available or easily accessible in abundant quantities (>40 tonnes/month), the infrastructure and machinery investment for processing and recycling or composting becomes tenable.

This mandate is formally set out in Kenya's Sustainable Waste Management Act (SWMA 2022). However, counties often lack the financial resources and technical capacity to develop these MRFs to promote effective waste recovery. This funding gap creates a strong opportunity for Public-Private Partnership (PPP) agreements. These agreements allow investors, stakeholders, and social enterprises (like KRC) to work with local governments to set up systems for waste recovery that support recycling and promote dignified, fulfilling jobs for waste workers. Local and National governments are thus required to create an enabling business environment—including incentives, subsidies, and special economic zone status—to allow aggregators across the counties to scale into full-fledged MRFs, working in tandem with the municipalities to manage waste streams and ensure recovered waste is directed to collectors.



4. STRATEGIC IMPERATIVES FOR BUSINESS VIABILITY

Based on the challenges identified, the following eight strategic imperatives are critical for any start-up enterprise within the recycling manufacturing sector to achieve market penetration and financial sustainability.

4.1 Continuous Cost-Benefit Analysis: Continuously conduct a thorough cost and benefits analysis of all competitors across the non-recycled and recycled local and imported construction product markets.

4.2 COGS Optimization: Constantly, continuously, and consistently compute COGS analysis to identify efficiencies and maintain competitive pricing.

4.3 Market-Building Cost Calculation: Specifically calculate 'market-building' costs, particularly for the emerging recycled construction product market, to budget adequately for necessary market education and adoption.

4.4 Financial Package Analysis: Continuously analyze the various financial packages that are available and accessible for the specifically targeted market segments to tailor offerings appropriately.

4.5 Primary Target Market Focus: Analyze and select a primary target market and maintain this focus to avoid the diffusion of resources and effort across too many segments.

4.6 Avoid Premature Launch: Avoid the rush to market before the necessary financial, operational, and supply chain points (1 to 5) are clarified and firm.

4.7 Segmented Service Caution: Avoid the temptation of servicing all market segments, particularly during start-up years, to ensure resources are maximized for the most profitable and accessible markets.

4.8 Verifiable Product Promises: Product claims must be auditable, data-backed, and supported by independent testing.

5. CONCLUSION

Control and loyalty within a robust and reliable input supply chain are critical to any start-up enterprise in the Recycling Industry. Deeply understanding your focal customer is equally vital, not only to discern their ability-to-pay and access to capital but also to determine where to focus the start-up's primary efforts and energy. The time and cost spent on solid market research—including competitor analysis, pricing, demand gauging, market-building strategies, and ensuring data-backed product promises—are all well-utilized uses of funds and effort that safeguard the long-term viability of the enterprise.

References

¹ [ENVACO Newsletter, \(November 2024\)](#)