RELAX THE TAX

Facilitating Waste Circularity Ecosystem through GST Rationalization

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1. Introduction

Economic activity, infrastructure and material living standards all rely on the supply of materials to fuel the economy and support social well-being. Materials are extracted, traded and transformed into goods, or used to provide services, and are eventually disposed of as waste or emissions. Environmental impacts occur at all stages of this supply chain, and they have been intensifying in proportion to the growing global demand for materials. The global demand for material use has seen prolonged growth over the past five decades. The annual global extraction of materials has grown from 30.9 billion tonnes in 1970 to 95.1 billion tonnes in 2020, and is expected to reach 106.6 billion tonnes in 2024 following an annual average growth rate of 2.3 per cent.[1]

India's development trajectory has also been characterized by a resource-intensive growth pattern that significantly exceeds global averages. The Economic Advisory Council to the Prime Minister Working Paper Series, *India's Tryst with a Circular Economy*, states that India's resource extraction is 1,580 tonnes per acre, which is 251 per cent higher than the world average of 450 tonnes per acre.[2] This extraction intensity places immense pressure on India's natural resource base and environmental systems, with projections indicating that if India continues its current development trajectory, its 'resource demand will more than triple'"by 2030—equaling the current consumption of all the OECD (Organization for Economic Co-operation and Development) countries combined.[3]

Although the concept of circularity has been around in India since the mid-1960s, it has gained steadier traction in recent years. In 2015, the Government of India constituted the Indian Resources Panel (IRP) as a step to address India's resource security in a strategic perspective. IRP is an advisory body under the Ministry of Environment, Forest and Climate Change (MoEFCC)[4]. In September 2022, the Circular Economy Cell (CE Cell) was established within NITI Aayog as a dedicated unit to focus on circular economy initiatives. NITI Aayog has identified 11 focus areas in waste management, to expedite India's transition from a linear to a circular economy. The focus areas include scrap metal (ferrous and non-ferrous), gypsum, toxic and hazardous industrial waste, solar panel, used oil waste etc.[5]

Despite these developments, there is still no comprehensive official record of total waste generation in India, though various government bodies provide partial estimates. According to the Department of Chemicals and Petrochemicals,

hazardous waste is increasing at a rate of two to five per cent annually, and approximately 10–15 per cent of total industrial waste is classified as hazardous.[6] As per the *National Inventory on Generation and Management of Hazardous and Other Wastes*, India generated an estimated 18.51 million metric tonnes (MMT) of hazardous waste during the financial year 2023–24.[7] Based on this, the total industrial waste generated during that year can be estimated to range between 123.4 MMT (if hazardous waste accounts for 15 per cent) and 185.1 MMT (if it accounts for 10 per cent). Assuming a continued annual increase of two to five per cent, projecting over two years, hazardous waste in 2025–26 could increase to approximately 19.2–20.4 MMT, and its share in total industrial waste could rise to 11–17 per cent, pushing total industrial waste estimates to between 113.8 MMT and 185.4 MMT (low-growth scenario) or 117.9 MMT and 185.9 MMT (high-growth scenario), depending on how sharply both figures rise.

However, a report by Centre for Science and Environment (CSE), *Good Practices in Industrial Waste Circularity*, estimates the potential for circular use of various industrial wastes by 2030, along with the associated benefits in terms of natural resource conservation, carbon emission reduction, and cost economics. According to the report, there is a potential for utilizing about 750 million tonne (MT) of various types of wastes in industries (steel slag, RDF, fly ash, red mud, biomass, hazardous waste etc). Circularity can also help conserve more than 450 MT of natural resources like coal and gypsum, while the potential of reduction in carbon dioxide equivalent (CO_2e) lies in the range of 50–90 MT.

India's transition from a linear consumption pattern to a circular economy necessitates a fundamental overhaul of its existing taxation framework, particularly the Goods and Services Tax (GST). Designed for a 'take-make-dispose,' model, the current GST structure fails to accommodate circular material flows where waste is reimagined as a resource. As industrial processes increasingly adopt circularity, linear taxation policies pose economic barriers instead of enabling this shift. One of the most critical challenges is the lack of differentiation between virgin and recycled materials within the GST regime, which places recycled products at a cost disadvantage despite their lower environmental impact. Rationalizing GST for industrial waste materials is therefore a crucial policy intervention—one that can dismantle systemic barriers and align fiscal policy with the principles of a circular economy, thereby encouraging recovery, reuse, and recycling across sectors.

Multiple stakeholders—including industry associations, recycling federations, and policy think tanks—have consistently highlighted GST rationalization as a foundational enabler for material circularity. Industry associations and

stakeholders from the recycling industry have voiced concerns that without addressing existing tax disparities, recycled materials will continue to face artificial price barriers, inhibiting both demand and investment in waste processing infrastructure. Similarly, national-level industry associations have formed task forces on the circular economy, repeatedly underlining the need for fiscal incentives to steer industrial production and consumption patterns toward more sustainable practices.

The Ministry of Housing and Urban Affairs (MoHUA), in its national report, *Circular Economy in Municipal Solid and Liquid Waste,* further validates these concerns. The report recommends a comprehensive suite of fiscal interventions to incentivize circularity in waste management, including a reduction of GST on recycled products (especially from dry and construction and demolition waste) to a nominal five per cent, tax rebates for the use of secondary construction materials, tax holidays for waste processing facilities, and exemptions for waste treatment equipment. These initiatives aim to narrows the competitiveness gap between recycled and virgin materials, while also catalyzing investments across waste-to-resource value chains.

Apart from these issues, the industrial waste sector in India faces significant challenges related to false billing and GST evasion. The informal character of segments within the waste collection and processing chain allows ample scope for tax avoidance and fraudulent practices, such as invoice manipulation, material misclassification, and unrecorded transactions. These malpractices lead to substantial revenue losses for the government. The informal sector remains largely unregulated, making it difficult to quantify the exact scale of tax evasion. However, estimates suggest that the loss of Goods and Services Tax (GST) revenue could be as high as INR 80,000 crore annually, particularly from sectors such as e-waste (including batteries), end-of-life vehicles (ELVs), and plastics.[8] These practices not only reduce public revenue but also create unfair competition for legitimate recycling businesses that comply with tax laws. Addressing these issues will require more than just stricter enforcement; it calls for a fundamental rethink of how taxation is applied to waste materials within a circular economy framework.

This report examines the intersections between India's waste, specifically industrial waste management challenges and the current GST framework, to identify practical pathways for tax rationalization that can accelerate waste circularity. By analyzing sector-specific waste market size, waste generation patterns, and utilization rates across industries, the study aims to highlight how the prevailing linear taxation system is not very effective. The findings of the study also offer

insights into measures for improving the way forward. However, the challenge lies not only in taxation, but in aligning environmental goals with economic policy. Without reforming GST and related fiscal measures, India risks falling short of its waste management objectives, climate commitments, and aspirations for resource efficiency.

Through engagement with diverse stakeholders, the report seeks to initiate dialogue on designing taxation policies that actively support circular material flows, rather than endorse the application of traditional tax structures that are ill-suited to the dynamics of circular business models. The ultimate objective is to propose differentiated GST approaches that reflect the varying nature and value of waste streams across industrial sectors. A reformed tax regime that recognizes the environmental benefits of recycled materials is not just desirable—it is essential. It would help level the playing field for circular enterprises, unlock green jobs, and catalyze India's transition toward a sustainable, resilient industrial economy.

2. Methodology

This study employed a multi-dimensional research framework integrating quantitative economic analysis with qualitative policy assessment to examine the intersection of India's Goods and Services Tax structure and industrial waste management systems. The research design was structured around stakeholder engagement for ground-level insights, economic impact quantification through market analysis, and comparative policy assessment for understanding global practices in circular economy taxation.

The methodological approach recognized the complex nature of waste management ecosystems where formal and informal sectors operate simultaneously, creating unique challenges for tax policy implementation. Given the fragmented nature of available data on industrial waste generation and evolving regulatory landscape, the study adopted a triangulation strategy that cross-validates findings from multiple data sources and analytical methods.

Extensive consultations were conducted with key industry associations such as Material Recycling Association of India (MRAI), Associated Chambers of Commerce and Industry of India (ASSOCHAM), Federation of Indian Chambers of Commerce and Industry (FICCI) representing various sectors of the waste management and recycling ecosystem. Primary engagement involved structured discussions with industry associations representing waste paper, metal scrap, plastic waste, e-waste, battery waste, and glass waste sectors. These consultations captured sector-specific challenges related to GST compliance, market dynamics, and operational constraints affecting circular economy adoption. Each consultation session explored current GST-related challenges, operational impact of existing tax structures on formal and informal sector operations, competitive dynamics between registered and unregistered businesses, and stakeholder perspectives on potential policy reforms.

Direct engagement with recycling companies operating across multiple waste streams provided critical insights into operational realities of waste processing businesses. These interactions focused on understanding supply chain complexities, particularly challenges related to invoice verification, input tax credit claims, and compliance burdens arising from fragmented supplier networks with significant informal sector participation. The assessment revealed systemic issues related to

traceability and transparency affecting legitimate businesses while creating unfair competitive advantages for informal operators.

The study incorporated perspectives from regulatory bodies including the Director General of Taxpayer Services and Central Board of Indirect Taxes and Customs through analysis of their official communications, policy documents, and enforcement actions. This provided regulatory viewpoint on compliance challenges and revenue implications of potential GST reforms, particularly regarding tax evasion and revenue losses currently experienced.

The economic analysis began with comprehensive market size estimation across 14 major industrial waste categories including paper waste, plastic waste, metal scrap covering ferrous and non-ferrous materials, e-waste, agricultural waste, sugarcane bagasse, battery waste, tyre recycling, end-of-life vehicles waste, glass waste, fly ash, and solar panel waste. Market valuations were estimated through compilation and analysis of market research reports, supplemented by industry association data and government statistics.

The formal-informal sector distribution analysis drew on industry estimates to assess the extent of unorganized sector involvement across various waste streams. It found that participation by the informal sector varies considerably—ranging from as low as 15 per cent in agricultural waste to as high as 95 per cent in the paper and glass waste sectors. This analysis was essential for calculating current GST revenue losses and projecting potential gains from formalization efforts.

Revenue impact calculations were performed using current market values, applicable GST rates, and formal-informal sector distribution ratios. The analysis quantified both the current GST revenues generated by formal sector operations and losses incurred due to informal sector activities operating outside the tax framework. Projections for 2035 were developed using growth rate assumptions based on historical trends and economic projections for India's industrial development.

Scenario modelling developed four distinct reform scenarios to evaluate potential policy interventions, considering varying degrees of formalization combined with different GST rate structures. These scenarios ranged from partial formalization with moderate rate reductions to complete formalization with flat rate structures, providing policymakers with a spectrum of intervention options and their revenue implications.

The methodology employed multiple validation techniques to ensure reliability of findings despite data limitations associated with sectors characterized by high informal participation. Cross-referencing market size estimates from different sources, validating sector participation ratios through multiple stakeholder inputs, and triangulating revenue impact calculations using different analytical approaches enhanced the robustness of quantitative findings.

The research acknowledged several important limitations affecting the precision of quantitative estimates. Due to the absence of comprehensive official records on total industrial waste generation in India, the study relied on partial estimates drawn from various government bodies and industry sources. Price volatility in recycling markets introduced uncertainty in economic projections, while the informal nature of significant portions of the waste management sector limited availability of reliable transaction data. This necessitated reliance on available indicators and industry estimates to inform the analysis. Despite these limitations, the methodology's multi-source approach and stakeholder validation processes provide sufficient confidence in the study's findings to support policy recommendations.

3. Findings

3.1 Stakeholders' submission on GST rationalization

The following major issues were identified through direct engagement with relevant stakeholders, alongside a detailed compilation and analysis of their publicly available submissions on the subject. For this study, CSE conducted stakeholder consultations with industry associations, think tanks, recyclers specializing in e-waste, battery waste, and glass waste, as well as associations working on waste paper. These stakeholders were consulted to understand the challenges they face in their sectors due to current GST rates, the extent of informal participation in their respective sectors, and potential areas for improvement. This primary research that is direct discussion was supplemented by secondary research on industry representation and government body recommendations.

Table 1: Key points noted during stakeholder discussions on GST rationalization

Sector covered	Type of organization	Source	Stakeholder's inputs on GST rationalization
Waste paper	Industry association working on waste paper	Direct communication	There is a need for GST reduction in the waste paper sector to formalize the informal sector. The current engagement of the informal sector in paper recycling is 95 per cent, which needs to be formalized.
All waste streams	Industry association	Direct communication	GST rationalization is required and should be integrated with Extended Producer Responsibility (EPR) or other environmental regulations.
All waste streams (focus on plastic)	Industry association	Direct communication	Alignment with EPR policies for effective waste management.
Metal scrap	Think tank / industry association	Direct communication	Most scrap is collected by small dealers who avoid the 18 per cent GST, keeping it out of the organized recycling stream. To curb GST evasion through bogus billing, we propose reducing the rate to five per cent.
Metal scrap	Industry association	Secondary sources	GST rationalization for a better tax system promoting circularity.
Ferrous scrap	Steel industry	Secondary sources	GST rationalization for ferrous scrap, aligning with the National Steel Policy (NSP), 2017.
E-waste, battery waste, glass waste	Recycler	Direct communication	Lower GST rates to curb false billing and malpractices by fraudulent registered small- and medium-scale aggregators, recyclers, etc.
Non-ferrous metal scrap	Jawaharlal Nehru Aluminium Research Development & Design Centre Autonomus Body Under Ministry of Mines, Government of India	Secondary sources	As per the National Non-Ferrous Metal Scrap Recycling Framework, 2020, a portal, namely Non-ferrous Metal Recycling Portal (https://nfmrecycling.jnarddc.gov.in) has been developed to formalize this sector.

Source: CSE Analysis

3.1.1 Issues and challenges shared by industry associations

Discussions with various industry associations reveal that the current high GST rates on different types of waste materials pose significant barriers to formalizing the sector, particularly for small players. High tax rates significantly raise operating costs, making it challenging for recyclers to compete with informal operators who do not pay taxes. This creates an unfair advantage for the informal sector. Small players often work with low profit margins and limited cash flow, making it hard for them to afford the additional GST payments and comply with complex documentation and filing requirements. As a result, informal operators can offer better prices to waste suppliers since they avoid taxes, while formal small players struggle to remain competitive. Industry association have consistently emphasized that rationalizing costs would not result in revenue loss for the government; rather, it would boost overall collections by encouraging more formal transactions.[9]

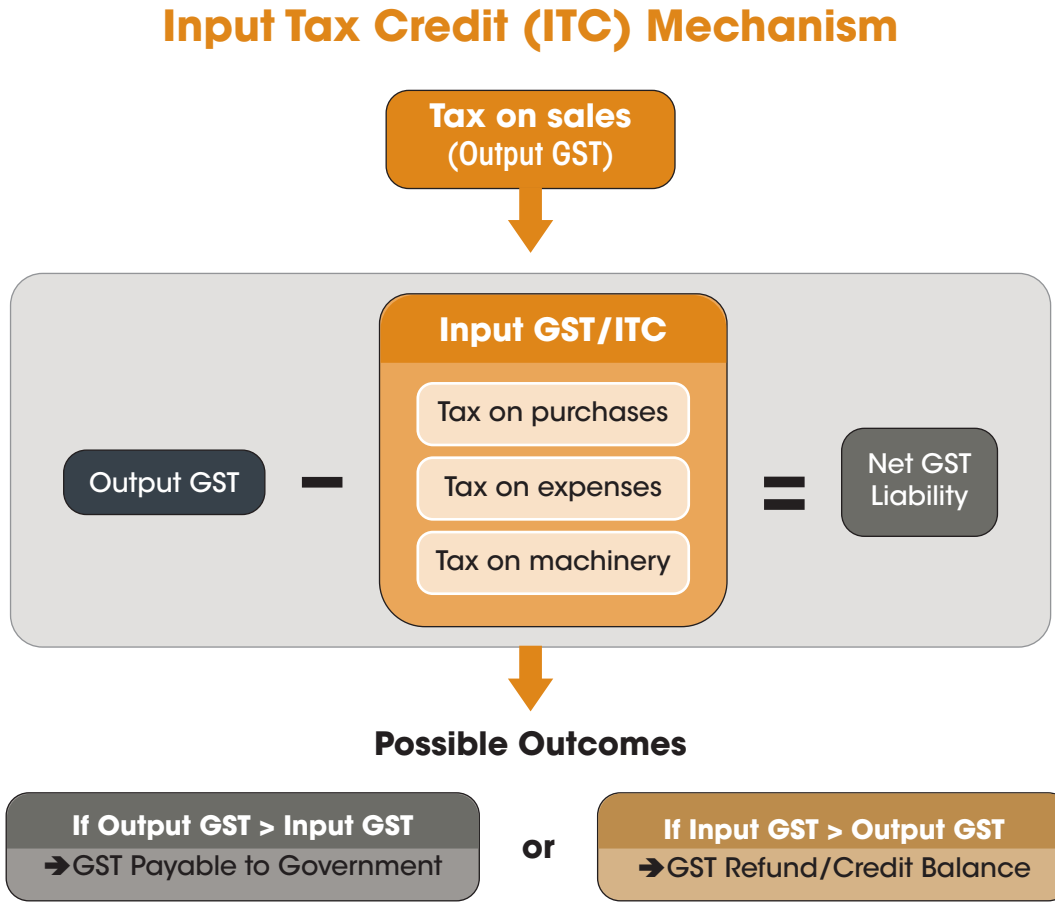
3.1.2 Secondary steel production: GST challenges with metal scrap

The secondary steel sector, which relies heavily on metal scrap as raw material, is projected to contribute 35–40 per cent to India's targeted crude steel capacity by 2030–31. This significant contribution highlights the strategic importance of scrap recycling in achieving national steel policy objectives. However, the current 18 per cent GST rate on metal scrap has created a compliance challenge. Many scrap dealers operate informally and fail to properly pay GST on outward supplies or correctly avail input tax credits. This non-compliance not only results in revenue loss for the government but also creates market distortions where compliant businesses face unfair competition from those evading taxes, potentially hindering the broader objectives outlined in the National Steel Policy.[10]

Metal scrap dumped in the waste dumping site

Metal scrap shorting from domestic waste to be used in recycling

Figure 1: Explanation of input tax credit (ITC) mechanism under GST rule



Further, industry association are advocating **a reduction in GST on metal scrap—from 18 per cent to five per cent—citing similar reasons.** Most scrap is typically collected at the source by small-time scrap dealers. These scrap dealers are unwilling to bear the burden of 18 per cent GST, and hence subsequent sales are made without a GST payment. This situation prevents scrap from entering the organized recycling stream.

REPRESENTATION TO THE GST COUNCIL FOR GST RATIONALIZATION AND SAFEGUARDS AGAINST FAKE INVOICING

The Bombay Metal Exchange Ltd. (BME) has raised serious concerns about the prevalence of fake invoicing and fraudulent Input Tax Credit (ITC) claims within the non-ferrous metal recycling industry under the current GST regime. The issue stems from systemic challenges, including the complexity of domestic recycling, mismatches in tax laws, and the lack of proper documentation for scrap trade.

Recycling operates primarily as a consumer-to-business (C2B) model, which is not adequately addressed by the current GST laws designed for B2B and B2C transactions. This gap has led to widespread manipulation, such as misclassification of materials (quantity, HSN -Harmonized System of Nomenclature , and nomenclature) and the circulation of fake invoices. The absence of traceability for domestic scrap exacerbates the problem, as unrecorded scrap enters the market without documentation, enabling fraud.

Government measures like GSTR-2B, e-invoicing, and 2 per cent TDS have failed to curb these practices, as they do not target the root cause—lack of recognition for domestic scrap generation. The upcoming Extended Producer Responsibility (EPR) policy risks further exploitation unless accompanied by robust documentation and transparency mechanisms.

BME proposes VeriTransact, a digital portal to legitimize domestic scrap trade by ensuring traceability, compliance, and self-assessment. This solution aims to reduce fake invoices, stabilize market prices, and align with ESG norms. The app has garnered positive feedback from key stakeholders, including CBIC and GSTN officials.

Addressing these issues requires immediate policy intervention, including defining domestic scrap, incentivizing collectors, and integrating APIs for data validation. Failure to act could perpetuate market distortions and undermine India's circular economy goals.

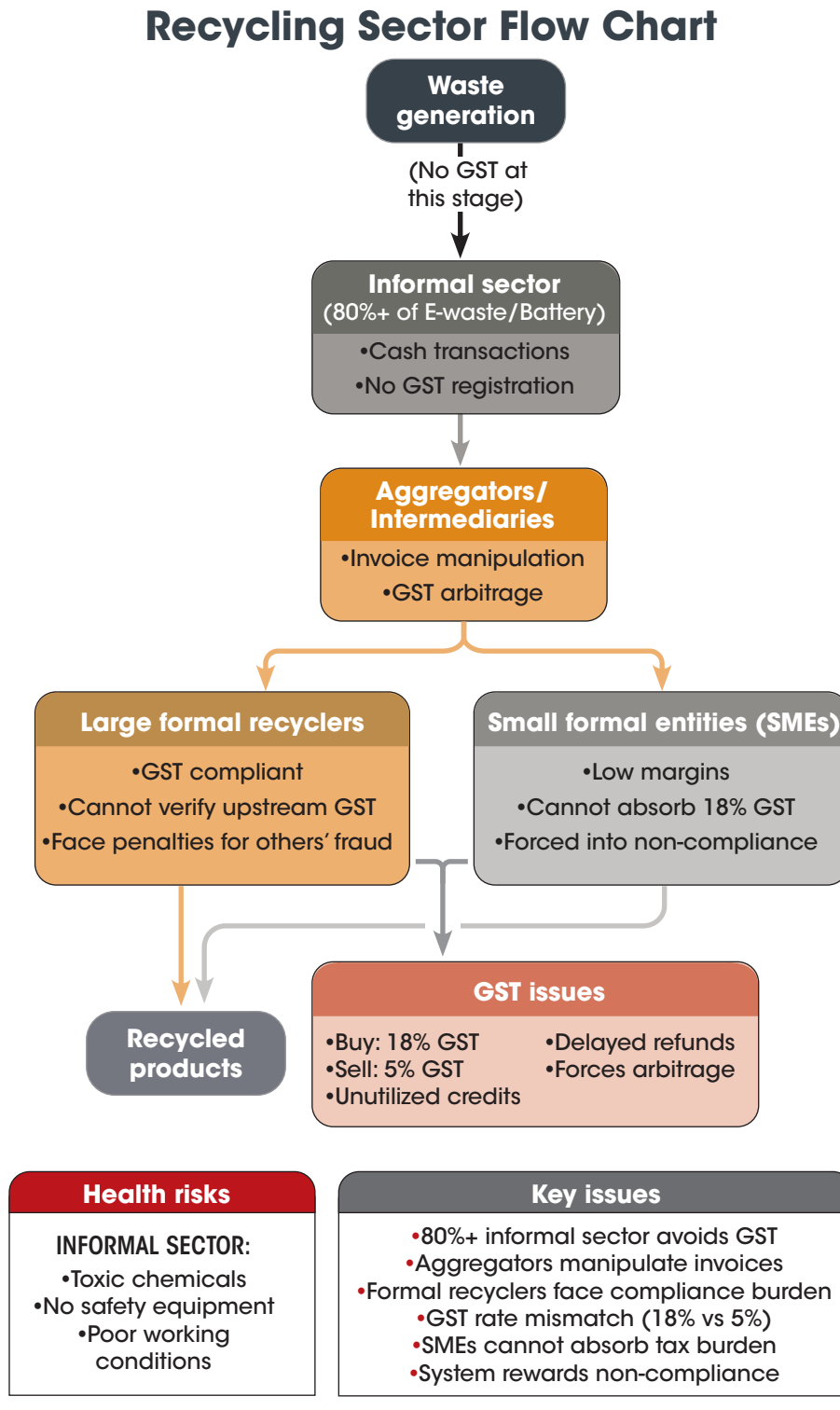
Proposed Action: Adopt VeriTransact and revise GST policies to include C2B transactions, ensuring transparency and reducing fraud in the recycling sector.

3.1.3 E-waste and battery waste: challenges in recycling value chains

The recycling sector faces significant challenges, particularly in e-waste and battery waste recycling, where informal operations represent over 80 per cent of the activities. These operations function through aggregators and intermediaries in poorly regulated environments, conducting cash transactions while avoiding GST registration requirements.

This fragmented structure creates substantial difficulties for formal recyclers who cannot verify upstream GST payments yet remain accountable for discrepancies beyond their control. When aggregators manipulate invoices or generate fraudulent

Figure 2: A typical supply chain depicting false billing and financial manipulation at different levels



documentation, recyclers lose input tax credits or face penalties for documentation mismatches they did not create.

This discourages compliant businesses while providing advantages to fraudulent actors through arbitrage opportunities. Input tax credits cannot function effectively due to limited visibility into supply chain transactions. Since GST applies at aggregation levels rather than waste generation points, earlier supply chain stages remain unmonitored, creating structural opportunities for tax avoidance.

The 18 per cent GST rate on recyclable materials creates additional complications. For low-margin recycling businesses, particularly small and medium enterprises, absorbing this tax without corresponding credits becomes economically unsustainable, forcing businesses to choose between financial survival and regulatory compliance. The composition scheme disrupts value chains by preventing larger recyclers from claiming credits on purchases from scheme participants.

False billing serves both as financial manipulation and as a structural response to GST inconsistencies. When recyclers purchase scrap materials taxed at 18 per cent but sell products taxed at five per cent, they accumulate unutilized credits. Resulting refunds are frequently delayed or rejected, pushing businesses toward arbitrage through material misclassification or invoice falsification.

Beyond these regulatory challenges, e-waste and battery waste recycling in the informal sector operates under extremely poor conditions. The hazardous chemicals involved in these processes present serious health risks to informal recyclers, who frequently lack proper safety equipment and training to handle toxic materials safely.

3.1.4 Waste paper: informality and recovery gaps

The waste paper sector is predominantly managed by the informal sector, with approximately 95 per cent of paper waste managed through informal channels. This creates multiple significant challenges for the industry and the economy. The large informal participation reduces government tax revenue, as these operations remain outside the formal tax system. Additionally, informal operations create supply chain leakages in the paper waste collection and processing system, resulting in reduced material availability for formal recycling operations.

COMMON FACILITY CENTRE APPROACH TO UPGRADE PLASTIC WASTE RECYCLING: ENHANCING QUALITY, FORMALIZATION AND CIRCULAR ECONOMY

MRAI (Material Recycling Association of India) and GIZ have jointly conceptualized a cluster development project for plastic waste recycling, approved under the Resource Efficiency Circular Economy Industry (RECEI) initiative by the Governments of the EU and India. This demonstration project is being established in Malegaon, Maharashtra, with support from central and state authorities. A roundtable discussion was held on 25 April, 2025 in Malegaon, involving representatives from GIZ, MRAI, GOPA Infra, and the Malegaon Plastic Waste Recycling Industry Association to outline the next steps.

For the successful implementation of the Plastic Waste Management Rules and Extended Producer Responsibility (EPR) provisions, it is essential to transition the plastic waste recycling industry from informal to formal operations while improving product quality. The cluster development initiative plays a key role in this transformation by integrating advanced machinery for segregation, cleaning, environmental controls, and refining in a common facility to produce near-virgin quality recycled plastics. Formalizing this sector will also lead to better GST compliance and increased tax revenue, as currently a large portion of waste management operations remain outside the formal taxation system.

The project aims to formalize the sector, enhance recycled plastic quality, increase production capacity, and boost profitability for recycling units. By bringing informal enterprises into the organized sector, it will ensure proper accounting and tax contributions while supporting India's efforts in efficient plastic waste management and circular economy practices. This structured approach will not only improve environmental sustainability but also strengthen the economic framework through enhanced GST collection in the waste management sector.

The informal handling of paper waste often involves improper waste management practices, as these operators lack economic incentives to follow environmentally sound procedures and safety standards. In India, 76 per cent of paper production is waste paper based i.e. waste paper is used as the raw material, making the sector heavily dependent on recovered materials. However, the dominance of the informal sector creates inefficiencies in material recovery and processing. The lack of organized collection and processing systems makes it financially unviable to recover optimal quantities of raw materials domestically. Consequently, the paper industry faces increased dependence on imported raw materials to meet production demands, which affects the sector's cost competitiveness and increases foreign exchange outflows. This situation undermines the potential for developing a robust domestic circular economy in the paper sector.

Sorting of PET bottles at Aasra Trust, a waste pickers' NGO and medium-scale aggregator in Mumbai

Sorted plastic waste from domestic use, to be used in recycled plastic manufacturing

3.1.5 Plastic waste: challenges in taxation and policy alignment

Engagement with a medium-sized aggregator has revealed critical challenges in the plastic waste sector. A major issue is the high GST rate on recycled plastics, which disproportionately affects small-scale workers. Under the current system, unregistered sellers supplying to larger GST-compliant buyers face an 18 per cent deduction. For instance, material worth INR 10 results in only INR 8.20 after this deduction. Reducing the GST rate to five per cent would increase their earnings to INR 9.50—a significant improvement for operators working with very narrow profit margins.

Another challenge is the fragmented nature of the informal sector, and lack of common facility for smaller players, which creates a heavy reliance on aggregators and limits bargaining power on pricing. Since 95 per cent of the plastic waste sector is managed by informal operators, this dependency further weakens their financial position.

Additionally, there is a notable disparity between government bodies, particularly the Ministry of Finance (MoF) and the Ministry of Environment, Forest and Climate Change (MoEFCC). The Extended Producer Responsibility (EPR) framework is not aligned with GST policies, creating inconsistencies. The issue of fake EPR certificates in 2024 highlights a loophole that must also be addressed within the GST system to prevent fraud.[11]

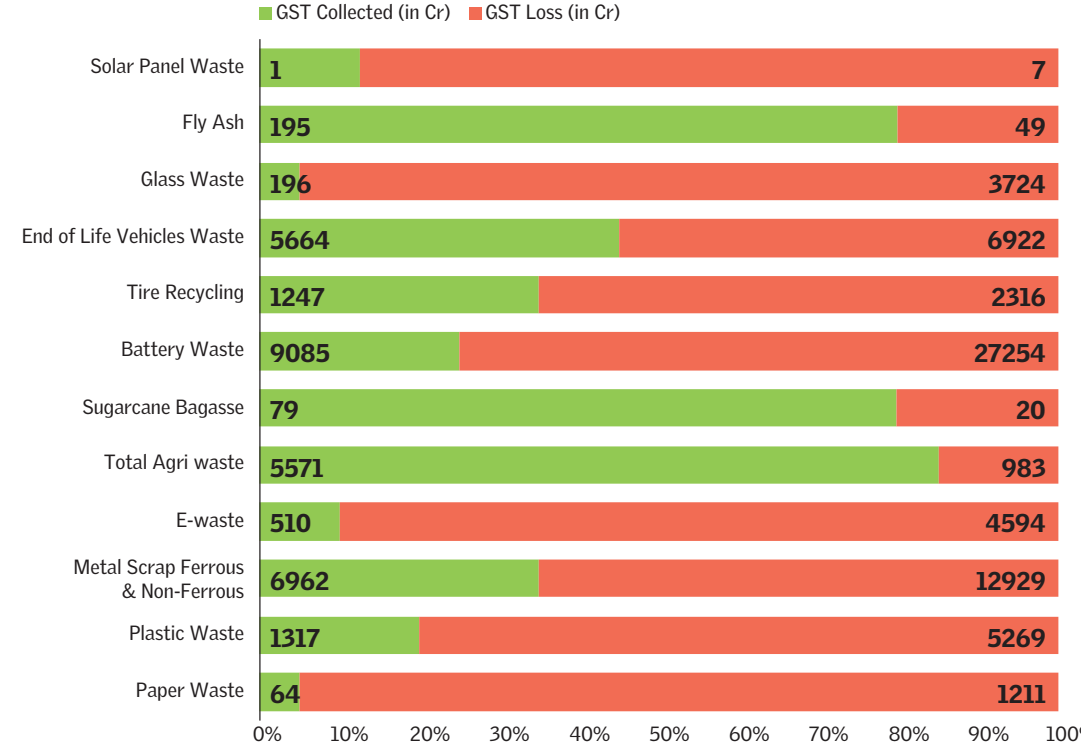
Stakeholder discussions emphasize that the government should prioritize human welfare and environmental sustainability, alongside business interests. If financial constraints are a concern, increasing the GST on virgin plastic could be considered. This approach would generate additional revenue for the government while making recycled materials more affordable and competitive in the market.

3.2 Market analysis of GST loss and collection

In India, the waste management sector functions through two parallel systems: the formal sector and the informal sector. The formal sector consists of registered businesses that follow tax regulations, including the Goods and Services Tax (GST). In contrast, the informal sector operates outside this framework—without registration, tax compliance, or official oversight.

This dual system has major implications. The dominance of the informal sector results in significant revenue loss for the government under GST. Moreover, while the informal sector plays a vital role in waste collection, segregation, and recycling, it faces several challenges. These include low operational efficiency, unsafe and

Graph 1: Proportions of GST collection and loss (in crore)



Source: CSE Analysis

Table 2: GST revenue analysis by waste category— formal vs informal sector market distribution

Waste type	Market value (in crore INR)	Percentage utilized by informal sector (%)	GST rate	Formal market size (in crore)	Informal market size (in crore)	GST collected (in crore)	GST loss (in crore)
Plastic Waste	36,587[12]	80	18	7,317	29,270	1317	5,269
Metal Scrap Ferrous & Non-Ferrous	1,10,500[13]	65	18	38,675	71,825	6962	12,929
E-waste	28,355[14]	90	18	2,836	25,520	510	4,594
Total agri waste	1,31,084[15]	15	5	11,1421	19,663	5571	983
Sugarcane bagasse	1,972[16]	20	5	1,578	394	79	20
Battery waste	2,01,878[17]	75	18	50,470	1,51,409	9085	27,254
Tire recycling	19,796[18]	65	18	6,929	12,868	1247	2,316
End of Life Vehicles Waste	69,922[19]	55	18	31,465	38,457	5,664	6,922
Glass Waste	78,410[20]	95	5	3,921	74,490	196	3,724
Fly Ash	4,883[21]	20	5	3,906	977	195	49
Solar Panel Waste	45	90	18	4	40	1	7
Paper Waste[22]	25,500	95	5	1,275	24,225	64	1,211
Total				259,797	449,138	30,891	65,278

Source: CSE Analysis

unhygienic working conditions, poor wages, lack of legal protection, and no access to health or social security benefits. Workers often operate with outdated methods and limited access to modern technology, further hampering productivity and safety.

In some waste streams, over 80 per cent of the operations are controlled by informal players. This high level of informality not only makes regulation and monitoring difficult but also prevents the integration of better practices and technologies in the sector.

Based on an analysis by the Centre for Science and Environment (CSE), the following insights have emerged regarding the extent of informality and its impact across different waste sectors and impact on GST collection and loss (*see Table 2: GST revenue analysis by waste category— formal vs informal sector market distribution*):

According to CSE's analysis (*see Table 2: GST revenue analysis by waste category—formal vs informal sector market distribution),* paper and glass waste show the highest informal sector participation at 95 per cent. Paper waste operates in an INR 25.5 thousand crore market under five per cent GST, collecting only INR 64 crores while losing INR 1.2 thousand crores in potential revenue. Glass waste, valued at INR 78.4 thousand crores and taxed at five per cent per cent, collects INR 196 crores but loses INR 3.7 thousand crores. E-waste and solar panel waste follow with 90 per cent informal operations. E-waste, worth INR 28.4 thousand crores with 18 per cent GST, collects INR 510 crores but loses INR 4.6 thousand crores. Solar panel waste, the smallest market at INR 45 crores, loses seven crores against collecting just one crore.

Battery waste, the largest market at INR 2.02 lakh crores, has 75 per cent informal operations under 18 per cent GST. This collects INR 9.1 thousand crores while losing the highest amount of INR 27.3 thousand crores. Plastic waste shows 80 per cent informal participation in an INR 36.6 thousand crore market, collecting INR 1.3 thousand crores but losing INR 5.3 thousand crores under 18 per cent GST.

The metal scrap sector, operating under 18 per cent GST, has 65 per cent informal participation within an INR 1.11 lakh crore market. While it generates INR

Agricultural waste aggregated to be used as fuel in industries in Panipat

Agricultural waste generated in the field to be used as fuel in industries, Haryana

7 thousand crore in tax revenue, it results in a loss of INR 12,900 crore due to widespread informality. Tire recycling, worth INR 19.8 thousand crores with 65 per cent informal operations, collects 1.2 thousand crores while losing INR 2.3 thousand crores. End-of-life vehicles show 55 per cent informal operations in an INR 69.9 thousand crore market, collecting INR 5.7 thousand crores and losing INR 6.9 thousand crores under 18 per cent GST.

Informal operations account for 15 per cent of the agricultural waste sector. This INR 1.31 lakh crore market under five per cent GST collects INR 5.6 thousand crores while losing only INR 983 crores. Sugarcane bagasse and fly ash show 20 per cent informal operations. Sugarcane bagasse, valued at INR 1,972 crores under five per cent GST, collects INR 79 crores and loses INR 20 crores. Fly ash, worth 4,883 crores, collects INR 195 crores while losing INR 49 crores.

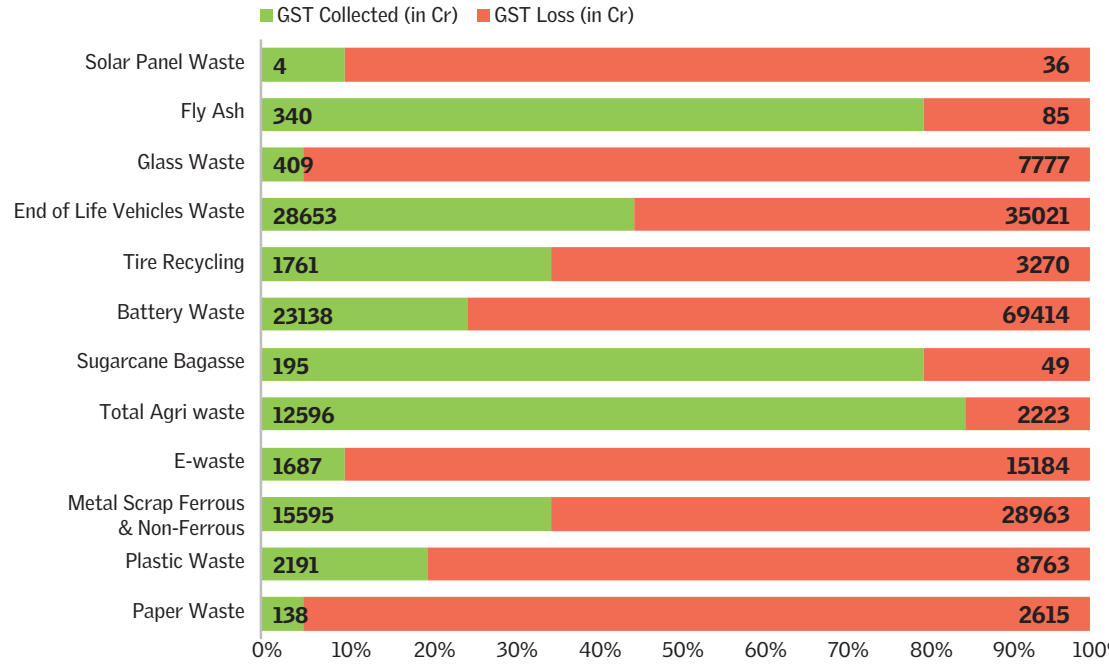
If things remain unchanged over the next 10 years—meaning a business-as-usual scenario—the projected value in 2035 will be as follows:

Table 3: Business-as-usual scenario and change in GST collection and loss in 2035

Waste type	Market value in 2035 (in crore INR)	Percentage utilized by the informal sector (%)	GST rate	Formal market size (in crore)	Informal market size (in crore)	GST collected (in crore)	GST loss (in crore)
Plastic waste	60,857	80	18	12171	48,685	2,191	8,763
Metal scrap ferrous and non-ferrous	2,47,546	65	18	86,641	1,60,905	15,595	28,963
E-waste	93,729	90	18	9,373	843,56	1,687	15,184
Total agri waste	2,96,379	15	5	2,51,922	44,457	12,596	2,223
Sugarcane bagasse	4,887	20	5	3,910	977	195	49
Battery waste	5,14,178	75	18	1,28,544	3,85,633	23,138	69,414
Tire recycling	27,952	65	18	9,783	18,169	1,761	3,270
End-of-life vehicles waste	3,53,742	55	18	1,59,184	1,94,558	28,653	35,021
Glass waste	1,63,723	95	5	8,186	1,55,537	409	7,777
Fly ash	8,500	20	5	6,800	1,700	340	85
Solar panel waste	224	90	18	22	202	4	36
Paper waste	55,053	95	5	2,753	52,300	138	2,615
Total				6,79,289	1,147,479	86,708	1,73,400

Source: CSE Analysis

Graph 2: Proportions of GST collection and loss (in crore) in 2035 in a business-as-usual (BAU) scenario



Source: CSE Analysis

CSE has done further analysis for phased change, and the following scenarios have been considered for phased rationalization of GST as well as formalization of the informal sector. A 100 per cent formalization represents a hypothetical scenario that has been considered to analyze the potential outcomes if the government were to successfully bring the entire waste recycling sector of India under formal operations.

BENEFITS OF FORMALIZING WASTE MANAGEMENT OPERATIONS

A. Government support for small-scale waste management industries
Formalized waste management businesses can access significant government funding through existing small and medium enterprises (SMEs) schemes, transforming informal operations into sustainable enterprises.

1. Access to subsidized loans, quick access to substantial loans for collection vehicles, sorting machinery, and processing equipment. For instance, loans up to INR 1 crore can be accessed for equipment procurement.

2. National Small Industries Corporation (NSIC) Subsidy Support
- Equipment assistance for specialized machinery from international suppliers
- Marketing support for municipal and commercial contracts

3. International Market Access: Government-funded participation in trade fairs to promote recycled products and establish technology partnerships.

4. Registration with the District Industries Centre (DIC) enables informal waste collectors to become legitimate businesses, making them eligible for significant government benefits.

B. Benefits for recognized informal workers
Official recognition provides informal waste pickers access to comprehensive social welfare schemes that improve their quality of life and economic security, such as:

1. Healthcare and insurance: Substantial health insurance coverage for medical treatments. For instance, coverage typically ranges from INR 5,000 to INR 1,00,000 annually, plus life and accident insurance with subsidized premiums.

2. Educational support: Annual scholarships are provided for children at various education levels—for example, INR 3,000–5,000 for students in classes 1 to 10, along with merit-based awards ranging from INR 15,000–25,000. Special state-level schemes like Maharashtra's Lek Ladki Yojana offer INR 1,00,000 to girls who complete secondary education.

3. Financial security: Monthly pension benefits are offered through contributory schemes, typically ranging from INR 1,000–5,000 after the age of 60. These schemes also provide formal credit access to support equipment upgrades and improvements.

4. Professional recognition: Official registration through government schemes ensures workers are documented and integrated into formal systems that provide comprehensive social security and financial protection.

Scenarios

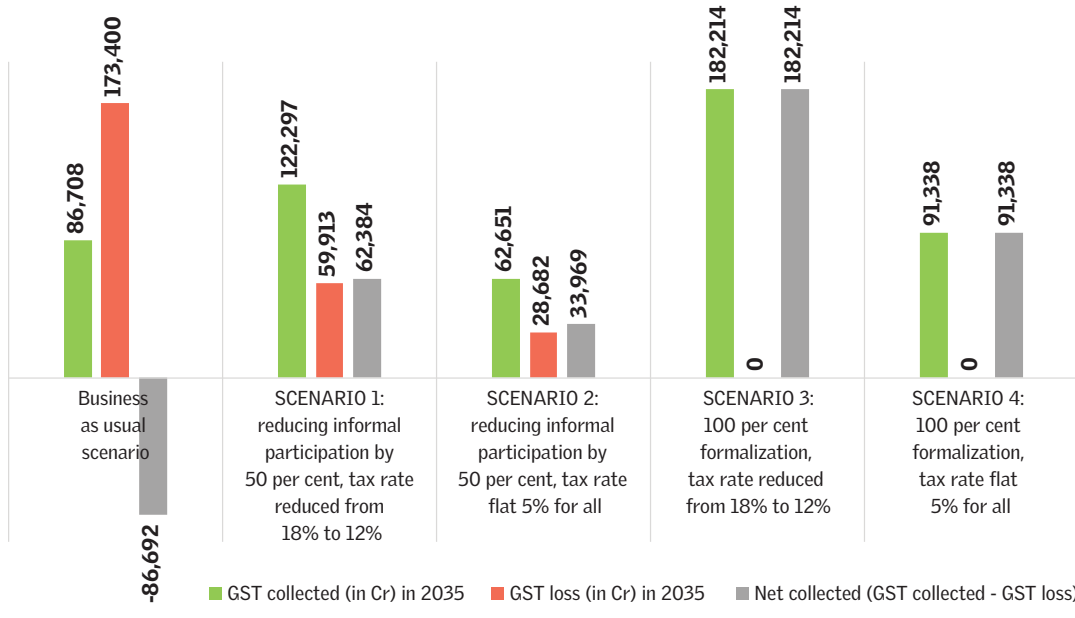
Scenario 1: Reducing informal participation by 50 per cent, tax rate reduced from 18 per cent to 12 per cent
Scenario 2: Reducing informal participation by 50 per cent, tax rate flat five per cent for all
Scenario 3: 100 per cent formalization, tax rate reduced from 18 per cent to 12 per cent
Scenario 4: 100 per cent formalization, tax rate flat five per cent for all

This table shows different future scenarios for GST (goods and services tax) revenue and how they would compare to the current business-as-usual situation in India.

Table 4: Projected changes in GST collection and loss in 2035 in different scenarios

Scenarios	GST collected (in crore) in 2035	GST loss (in crore) in 2035	Net collected (GST collected – GST loss)
Business-as-usual scenario	86,708	1,73,400	-86,692
Scenario 1: Reducing informal participation by 50 per cent, tax rate reduced from 18 per cent to 12 per cent	1,22,297	59,913	62,384
Scenario 2: Reducing informal participation by 50 per cent, tax rate at flat five per cent for all	62,651	28,682	33,969
Scenario 3:100 per cent formalization, tax rate reduced from 18 per cent to 12 per cent	1,82,214	0	1,82,214
Scenario 4: 100 per cent formalization, tax rate at flat five per cent for all	91,338	0	91,338

Graph 3: GST collection, loss and net collection in different scenarios



Source: CSE Analysis

The current business-as-usual situation shows the government losing INR 86.69 thousand crores, making it the only scenario where the government faces a financial loss.

Under *Scenario 1*, where informal participation is reduced by half, and the tax rate is reduced from 18 per cent to 12 per cent, the government would gain INR 62.38 thousand crores. This reflects an improvement of INR 1.49 lakh crore over the current loss-making scenario, demonstrating that even with a lower tax rate, expanding formalization can significantly boost overall tax revenue.

Scenario 2 involves the same level of formalization but with a flat five per cent tax rate for all waste streams. Here, the government still achieves a profit of INR 33.97 thousand crores, which is INR 1.21 lakh crores better than the business-as-usual scenario. Although this represents the lowest gain among all reform scenarios, it still transforms loss into substantial profit.

Scenario 3 is the most profitable approach where complete formalization is achieved alongside a 12 per cent tax rate. This generates the highest government gain of INR 1.82 lakh crores with zero tax losses since all businesses operate formally. This scenario delivers an improvement of INR 2.69 lakh crores over the current situation.

Scenario 4 combines full formalization with a five per cent flat tax rate, resulting in government gains amounting to INR 91.34 thousand crores. This is the second-most profitable scenario, generating INR 1.78 lakh crore more than the business-as-usual case, with no tax losses owing to complete formalisation. The pattern is clear: all reform scenarios transform the government's position from an INR 86.69 thousand crore loss to substantial profits ranging from INR 33.97 thousand crores to INR 1.82 lakh crores. The extent of formalization matters more than tax rate levels, as bringing businesses into the formal economy eliminates revenue leakage and creates sustainable gains for the government.

4. Conclusions and Recommendations

The comprehensive analysis reveals significant financial and operational challenges within India's waste management framework. The government currently experiences substantial revenue losses due to the continued operation of the informal sector, and these losses are projected to increase substantially over time.

The existing informal operations create adverse health conditions for workers, who receive inadequate compensation and rely on inefficient technology. These circumstances not only compromise worker welfare but also undermine the overall effectiveness of waste management systems.

Based on the current data, CSE's analysis reveals that the formal waste management market is valued at INR 260 thousand crore while the informal market is significantly larger at INR 449 thousand crore. The government currently gains INR 30.9 thousand crore in GST revenue but loses INR 65.3 thousand crore due to informal operations.

In ten years, under the business-as-usual scenario, this situation will deteriorate substantially. The government will collect about INR 86.7 thousand crore in taxes from the formal sector, but will simultaneously lose approximately INR 173.4 thousand crore rupees due to informal sector operations. This means the government will lose exactly double the amount it collects, creating a net loss of INR 86.7 thousand crore rupees. This finding highlights a critical imbalance in the current system that requires immediate attention.

Despite the enactment of waste management policies like the Solid Waste Management Rules (2016) and earlier regulations, India has made uneven progress in integrating the informal waste sector across major waste streams, including plastics, e-waste, and others. The formal sector is likely to continue operating in parallel with informal systems in the absence of effective integration and coordination mechanisms. However, the projections show that reducing informal participation by just 50 per cent, while lowering tax rates to 12 per cent, could transform this massive loss into a gain of over INR 62.4 thousand crore rupees, representing a 173 per cent improvement from the current deficit situation.

While Extended Producer Responsibility (EPR) processes have been introduced, the current framework lacks sufficient incentives to create viable business cases for formal sector expansion. The absence of attractive financial incentives prevents the successful transition from informal to formal operations.

The transformation of India's waste management sector requires comprehensive policy reform that addresses both economic efficiency and social responsibility. Only through such integrated approaches can the country achieve sustainable waste management while protecting the interests of all stakeholders involved.

Hence, based on the analysis and discussion, the following recommendations are proposed:

4.1. Phased GST rationalization

The government should implement GST rationalization through a phased approach. The analysis shows that current high GST rates create barriers to formalization, with the government losing INR 65 thousand crores annually due to informal sector operations. By 2035, this will worsen to a net loss of INR 86.7 thousand crore under business-as-usual scenario.

GST rationalization should prioritize reducing rates for waste streams currently taxed at 18 per cent—particularly metal scrap, plastic waste, e-waste, and battery waste—bringing them down to 12 per cent initially, or at the very least, to a more moderate rate. This would encourage informal operators to enter the formal system while enhancing overall government revenue collection.

4.2 Formalization of the informal sector

The study analyzed four reform scenarios, all of which are profitable for the government. Even partial formalization (50 per cent of current involvement) with reduced tax rates generates substantial gains, ranging from INR 34–182 thousand crore rupees depending on the approach.

Since tax rates will be minimal at a minimum of five per cent, the benefits of formalization will be advantageous for informal players. Additionally, workers should be formally recognized by the government, and their right to sell recovered materials must be preserved. As there will be substantial gains, the government should focus on bringing the informal sector under different social schemes and providing workers with better healthcare facilities, insurance, child care, and loans, apart from existing government benefits.

4.3. EPR integration with GST regime

To strengthen India's circular economy, GST policies should be better aligned with Extended Producer Responsibility (EPR) regulations. One approach could be offering GST incentives to producers who meet EPR targets through formal recycling channels. This would encourage collaboration between businesses and authorized recyclers while supporting a gradual shift toward formalization.

The informal recycling sector plays a significant role in waste management, but inconsistent practices can create challenges for EPR compliance. By linking GST benefits to verified recycling, the system could improve traceability and ensure fair competition—benefiting both responsible informal operators and formal recyclers. This would help scale up sustainable waste management while maintaining livelihoods in the sector.

In addition, the Ministry of Environment, Forest and Climate Change (MoEFCC) oversees EPR, while the Ministry of Finance (MoF) manages GST. However, these ministries currently operate in separate silos. It is essential for both ministries to collaborate and establish a system that incentivizes stakeholders to adopt circular economy practices, ensuring benefits for both the environment and financial sustainability.

4.4. City-based implementation plans through consultation and collaboration

The government should create city-specific plans that use non-governmental organizations to support small waste sector businesses. These plans should map existing informal networks, identify key collectors and aggregators, and create tailored transition paths for different waste businesses.

This approach addresses challenges faced by small players who operate with low profit margins and limited cash flow, making it hard for them to handle additional GST payments and complex documentation.

Regular consultation with industry stakeholders throughout implementation will ensure reforms address practical challenges. The consultation process should include industry associations, think tanks, recyclers from different waste streams, and waste management organizations.

4.5. Aligning GST policy with environmental and industry goals

The government is actively promoting recycling through various policy initiatives, but high GST rates are undermining these efforts. NITI Aayog has identified 11 focus areas in waste management to facilitate India's transition from a linear to a circular economy. However, the current GST structure contradicts these recycling objectives.

In the case of ferrous scrap, the National Steel Policy (NSP) 2017 projects that secondary steel production will contribute 35–40 per cent of India's total crude steel capacity by 2030–31. Yet the existing 18 per cent GST rate on ferrous scrap creates compliance burdens for businesses and prevents scrap from entering organized recycling channels.

While the government seeks to enhance recycling activities, high GST rates are hindering progress. GST rates on waste materials require reduction to align with the government's recycling policy framework and related environmental and industry goals.

4.6. Common facility centre (CFC) for small-scale informal players

To promote the development of Common Facility Centres, collaboration among civil society groups, non-governmental organisations, and the government is essential. These centres should be operated by workers from the unorganized sector, providing them with a dedicated platform for sorting, cleaning, and basic recycling activities. Specialized vehicles can be deployed to support operations, and workers currently engaged in these activities within the vicinity should be encouraged to utilize the facilities.

This initiative will improve operational efficiencies, leading to better profits for small-scale operators while increasing the overall amount of waste managed. By reducing reliance on middle operators, it will also incentivize the formalization of informal workers. To establish such a system, organizing the unorganized sector through registration will be necessary. Additionally, implementing a lower GST rate for these operations could enhance compliance and ultimately lead to higher GST revenue for the government. This approach will not only improve working conditions but also contribute to a more structured, efficient, and sustainable waste management ecosystem.

The analysis shows that in all considered scenarios the government will achieve better GST collection. The current business-as-usual situation shows the government losing INR 86.69 thousand crores. All reform scenarios transform the government's position from this loss to substantial profits ranging from INR 33.97 thousand crores to INR 1.82 lakh crores.

However, beyond financial considerations, the government must prioritize human welfare within the waste management sector. Informal sector workers play a vital role in both the Indian economy and environmental protection, with their numbers estimated to be as high as four million. Their contributions warrant recognition through improved working conditions, formal acknowledgment of their services, and supportive policy measures. The informal sector currently faces unsafe and unhygienic working conditions, poor wages, lack of legal protection, and no access to health or social security benefits.

The initiatives should target the current scenario in which over 80 per cent of operations in certain waste streams are dominated by informal players, making regulation and monitoring particularly challenging. The transition support should include access to better technology, safety equipment, and formal integration into social security systems while maintaining their essential role in waste management. These measures would facilitate the transition to a more efficient environmental system while ensuring worker welfare and maximizing government revenue potential.

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Notes...

Notes...

India's shift toward a circular economy demands a reform of its GST framework, which currently favours linear consumption over circular material flows. The lack of tax differentiation between virgin and recycled materials disadvantages eco-friendly alternatives, stifling circularity.

This report demonstrates that GST rationalization for industrial waste materials can transform government finances from an INR 87,000 crore loss under business-as-usual scenarios to substantial profits ranging from INR 34,000 crores to INR 1.8 lakh crores across various reform scenarios. Multiple industry stakeholders have consistently identified this tax restructuring as essential for enabling material circularity.

Beyond financial gains, the analysis emphasizes supporting millions of informal sector workers who dominate over 80 per cent of certain waste streams. Proposed reforms include integrating these workers into formal social security systems while providing better technology, safety equipment, and improved working conditions. This comprehensive approach ensures that fiscal policy aligns with circular economy principles while maximizing government revenue and protecting worker welfare.

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