

# RECYCLING PLASTICS

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## THE PLASTICS FACTSHEET 3



Recycling of plastics has an enormous potential to mitigate the consequences of plastic use and consumption. Using recycled plastics for downstream applications can reduce our reliance on fossil fuels. A study estimates that we save approximately 3.8 barrels of petroleum by recycling a tonne of plastic waste.<sup>1</sup>

### The recycling business

Recycling of plastics usually involves 'downcycling' into lower-quality products. The starting point of recycling is the sorting of plastic waste (based on colour, transparency, hardness, density and opacity of the scrap). The sorted waste is then sent to granulators to obtain granules using traditional mechanical and grinding techniques. The converters use these granules to make finished plastic products. The majority of such units (granulators and convertors) are often located in slums, and function as single-machine extruding units. Scrap storage is done in the backyards, and washing is done in open drums. These activities are often termed as backyard recycling. The technologies used in these industries are also old and local and polluting in nature.

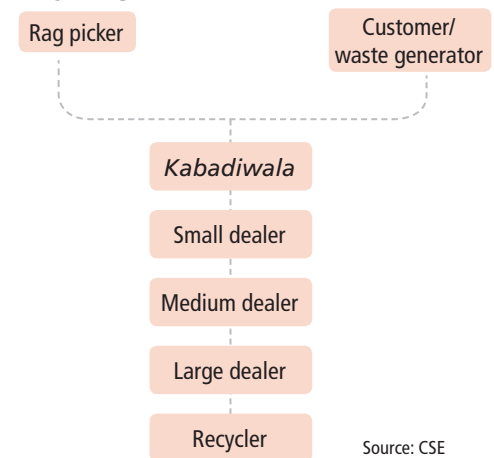
According to PlastiIndia Foundation, the apex body of associations, organisations and institutions connected with plastics and the plastic industry, 5.5 million metric tonnes (MMT) of plastic gets recycled yearly in India.<sup>2</sup> This is about 60 per cent of the total plastic waste that is generated in the country – 70 per cent of this amount is recycled at registered facilities, 20 per cent by the unorganised sector, and the remaining 10 per cent gets recycled at home.<sup>3</sup> The remaining 40 per cent of the total plastic waste in India ends up uncollected, littering and choking our drains, waterbodies and land. According to a report by the Federation of Indian Chambers of Commerce and Industry (FICCI), if plastic waste is

managed properly, the Indian recycling industry could be looking at a turnover of US \$2 billion.<sup>4</sup>

About 3,500 organised and over 4,000 unorganised recycling units are in operation across India, employing over 600,000 people directly.<sup>5</sup> As per the Central Pollution Control Board's Annual Report 2017-18, only 14 state pollution control boards have submitted their data and information on implementation of the Plastic Waste Management Rules, 2016. This information includes data on registered and un-registered recyclers in these respective states (*see Table 1*).

For collection, the recycling industry depends heavily on the informal sector such as rag pickers and waste collectors; this sector channelizes the items to small dealers/aggregators, from where they reach a medium/large dealer and finally, to the recycling units (*see Figure 1*). Items such as PET bottles and plastic containers can fetch a price of Rs 15-20 per kg. A high-quality bucket made of virgin plastic can fetch between Rs 25-40 a kg. Items like carry bags and wrappers of packaged foods

**Figure 1: The un-organised sector recycling chain**



Source: CSE

- <https://www.teriin.org/sites/default/files/files/factsheet.pdf>
- <https://plastindia.org/pdf/Indian-Plastics-Industry-Report-2018-2.pdf>
- <http://164.100.228.143:8080/sbm/content/writereaddata/SBM%20Plastic%20Waste%20Book.pdf>
- <http://ficci.in/spdocument/22977/FICCI-Circular-Economy.pdf>
- <https://plastindia.org/pdf/Indian-Plastics-Industry-Report-2018-2.pdf>



**Table 1: State-wise observations on plastic recycling**

| No. | States            | Waste generated in 2017-18 (MT/annum) (approx.) | Number of plastic recyclers (2017-18)     |
|-----|-------------------|---|---|
| 1   | Arunachal Pradesh | 6   | No recycling or unregistered units        |
| 2   | Bihar             | 2280  | 1 registered and 40 unregistered units    |
| 3   | Chandigarh        | No data   | 126 registered units                      |
| 4   | Gujarat           | 269808  | 869 registered units                      |
| 5   | Jammu & Kashmir   | 27870   | 22 unregistered, 187 registered units     |
| 6   | Manipur           | 24  | 4 registered units                        |
| 7   | Meghalaya         | 15.096  | 4 registered units                        |
| 8   | Madhya Pradesh    | 50457.07  | 25 registered units                       |
| 9   | Nagaland          | No data   | 7 registered units                        |
| 10  | Odisha            | 12092.205                                       | 12 registered units                       |
| 11  | Punjab            | 54066.1   | 246 unregistered and 140 registered units |
| 12  | Tripura           | 28.5  | No registered or unregistered units       |
| 13  | Uttar Pradesh     | 206733.45                                       | 34 registered and 16 unregistered units   |
| 14  | Uttarakhand       | No data   | 255 registered and 14 unregistered units  |

Source: [https://cpcb.nic.in/uploads/plasticwaste/Annual\\_Report\\_2017-18\\_PWM.pdf](https://cpcb.nic.in/uploads/plasticwaste/Annual_Report_2017-18_PWM.pdf)

(chocolates, chips or sweets) do not get collected as they are usually highly contaminated and fetch lower prices, between Rs 2-4 per kg.

### What gets recycled?

In most Indian cities, items such as carry bags, *gutkha/ paan masala* pouches and sachets, styrofoam items, disposable cutlery items, material such as wrappers of packaged food like chocolates, sweets and chips, PET bottles, and tetrapack items form the major part of the plastic litter. India recycles only three types of thermoplastics – HDPE, PET and PVC (see *plastic categorisation in Factsheet 1*). The categories PP, PS and LDPE are partially recyclable; but they are usually not recycled in India due to the economic unviability of their recycling process (see *Table 2*).

Of the types of plastics recycled in India, PVC (polyvinyl chloride) accounts for 45 per cent, LDPE (low density polyethylene) for 25 per cent, HDPE (high density polyethylene) for 20 per cent, PP (polypropylene) for 7.6

per cent and other polymers such as PS (polystyrene) for 2.4 per cent.

India does not have any standards for recycling. Most of the recycled products cannot be used for food-grade packaging – they are used in lower scale applications. For instance, a PET bottle does not get recycled to PET, but into a fibre which is then used to make shirts, shoes or jackets. It is possible for recycled plastics to be mixed with virgin material for producing high-grade plastic products that can be used to store food. But this requires a more organised industrial scale set-up equipped with modern technology. Also, high-quality recycling has its own requirements such as uncontaminated input material – most of waste plastic is contaminated and thus cannot be sent for high-quality recycling.

Generally, plastics degrade with each recycling. Because of this, they can be recycled only three to four times in their lifetime.<sup>6</sup> This opens us to a question: does plastic get recycled or ‘downcycled’? What is needed is a clear strategy to first remove and eliminate

6. [https://cpcb.nic.in/uploads/plasticwaste/LCA\\_Report\\_15.05.2018.pdf](https://cpcb.nic.in/uploads/plasticwaste/LCA_Report_15.05.2018.pdf)



**Table 2: Categories of plastics and what gets recycled**

| Type                    | Category   | Examples   | Recyclable |
|-------------------------|--|--|------------|
| Thermoplastics          | PS (Polystyrene)   | Foam hot drink cups<br>plastic cutlery, containers and yogurt      | Partially  |
|                         | PP (Polypropylene)   | Lunch boxes, take-out food,<br>containers, ice cream containers    | Partially  |
|                         | LDPE (Low-density polyethylene)  | Garbage bins and bags  | Partially  |
|                         | PVC (Plasticized polyvinyl chloride<br>or polyvinyl chloride)  | Juice or squeeze botels  | Yes        |
|                         | HDPE (High-density polyethylene)   | Shampoo containers<br>or milk bottles                              | Yes        |
|                         | PET (Polyethylene terephthalate)   | Fruit juice and soft drinks bottles                                | Yes        |
| Thermoset<br>and others | Multi-layer and laminated plastics,<br>polyurethane foam, Bakelite,<br>polycarbonate, melamine,<br>nylon etc | Car parts, mattresses, circuit boards<br>and electrical insulators | No         |

Source: Model Framework for Segregation, CSE, 2018

the non-recyclable varieties – the PS, PP and LDPE. This should be followed up with initiatives to ensure complete recycling of the remaining varieties.

### Recycling in the GST regime

The recently imposed Goods and Services Tax (GST) has had a telling impact on the plastic recycling sector. Before GST came in, there existed a generous gap in the taxation between recycled and virgin products. For example, recycled polyester staple fibre (PSF) enjoyed a 2 per cent excise duty, while virgin PSF had 12.5 per cent excise duty.<sup>2</sup>

The coming of GST upset the apple-cart: taxes stood at 18 per cent for both virgin and recycled plastics. Input costs escalated by 16 per cent due to the new tax regime. In an environment where market linkages for recycled products are weak and plastic scrap availability is intermittent, the business model of the recycling sector struggles to break even. It affects plastic recyclers more if the plastic scrap is imported.

These input cost escalations due to GST and customs duties are passed on by the recyclers to the secondary waste collectors by reducing the rates of waste plastic. For example, pre-GST rate of PET bottles was Rs 20 per kg; post-GST, the rates came down to Rs 12 per kg. Similarly, rates of milk pouches came down to Rs 8 per kg from the earlier Rs 12. Rates of hard plastics such as HDPE dipped by 30 per cent post-GST.<sup>7</sup>

In 2017, GST rates for domestic plastic scrap were reduced from 18 per cent to 5 per cent. However, the per unit rate of waste plastic is still not at par with what it was in the pre-GST era. The reason is simple: in the pre-GST taxation regime, domestic plastic scrap was tax-free. The selling prices for recycled granules has been affected by similar GST rates on virgin and recycled granules. Recyclers are compelled keep the selling price low to stay competitive with virgin granules. This has affected the revenue of recyclers; it also restricts market scale-up of recycled granules.

The informal sector – consisting of ragpickers,

7. Based on interview of an official from a large company providing CSR support to plastic recyclers

*kabadiwallahs* and small and medium dealers – is feeling the pinch in a big way. With most of the plastic scrap selling at cheaper rates post-GST, it has hit the bottom-line of the most vulnerable segment in the business.

### **The concept of EPR (Extended Producer Responsibility)**

The Plastic Waste Management Rules, 2016 had incorporated EPR for the first time. The Rules mandated that producers, within six months of the notification of the Rules, must work out modalities (either individually or collectively) for a waste collection system based on EPR through their own distribution channels or through the local body concerned, and by involving the state urban development departments.

Further, the Rules stipulated that the primary responsibility for collection of used multi-layered plastic (MLP) sachets or pouches or packaging lies with

producers, importers and brand owners who introduce the products in the market. Various EPR tools like buy-back pricing, incentivising the informal sector through inducing value to MLP, etc have been tried by producers. But a lack of proper guiding principles for implementation of EPR on the ground, and no clearly laid down targets, have put paid to these efforts.

Currently, the Ministry of Environment, Forest and Climate Change (MoEFCC) is formulating a national framework for implementing EPR under Rule 9 of the Plastic Waste Management Rules, 2016. Under the proposed framework, modalities will be fixed for producers/brand owners and importers of plastic products for implementing the EPR framework, working in consonance with state urban departments/urban local bodies/Central and state pollution control boards and other stakeholders involved in the plastics value chain.

### **The tale of Tikri Kalan: A case study**

The Tikri Kalan PVC market in Delhi, Asia's biggest, is a formal trading area sprawled over 7-8 square kilometres. On a daily basis, more than 385 kinds of plastic waste products including pipes, brushes, car fittings etc are managed by this trading site, which has a minimum trading capacity of 100 tonnes per day. The site's market association says there are roughly 1 lakh people engaged in this business here.



#### **How is the plastic waste collected, processed and transported?**

The market receives plastic scrap from *kabadiwallahs* operating in or outside Delhi; the scrap is sold depending on its resin quality. The collection and transportation of the waste is primarily driven by small trading operators. *Chugnewallahs* (rubble segregators) sell their ware to *panni* (plastic carry bag) dealers; *kabadiwallahs* (itinerant buyers) sell to *kabadi* shops. The *panni* dealers and *kabadi* shops, in turn, sell to bigger *kabadiwallahs*, who sells it further to the traders in the PVC market.

Usually, *kabadiwallahs* sell their plastic scraps in the market after asking traders if they are keen to buy it for a negotiable amount. Sometimes, the traders themselves demand a particular resin (HDPE, PP, LDPE or PVC). When the mixed waste arrives in the market, workers segregate materials according to resin and colour of the plastic scrap. Dismantling follows – grinding, washing and drying.

Notably, the sorting unit of the market is specialised in black PP scrap trading: it can segregate PP into three different categories namely, good; medium and low, depending on its quality. The first category (good) of PP is hard and, seemingly, 'pure'. The second (medium) is one which has already passed through a recycling process. Both these categories can be sent to factories for pellet formation. The third category (low) contains different varieties of plastics that cannot be separated; hence, it is sent to waste-to-energy plants or the brick-kiln industries.

In recycling factories in Narela, Bawana and Bahadurgarh, higher grade plastic scraps are recycled into pellets and are used to make equivalent lower quality of plastic products. For instance, cheaper shoes and furniture are made from PVC grains; inferior buckets, mugs and jugs from PP grains. Low quality spectacles and pens are the by-products from acetate.

### **What determines plastic scrap prices?**

The daily 'market rate' of plastic scrap is decided by the retail markets of Delhi, such as Sadar Bazar and Inderlok; traders in these markets are specialised in trading in wholesale quantities of items made from recycled plastic grains. This rate sets the price slab from which appropriate prices for plastic scrap are deduced at every stage of the value chain (from manual segregation of scrap to the finally recycled pellets). Communication about the market rates passes through multiple mediums, from commission agents to traders based all over India. Suppliers share the information on prices when they do their rounds for collection from their kabadi dealer shops. The information thus rapidly channelises down the value chain to all scrap traders in the PVC market and elsewhere.

Two of the key parameters that influence plastic scrap price are the price of crude oil and the changing season. When crude oil price is low, plastic scrap prices go down. In winter, prices are usually high (compared to in summers), while the monsoon period exercises a big impact on the operation of the market as all trading activities get reduced. The commodity becomes wet which changes its bulk mass due to seepage of water inside the bags, and therefore, cannot be sold.

### **How green is this trading site?**

Local communities have been up in arms against the PVC market. In 2018, the National Green Tribunal (NGT) – on behalf of the residents of village Mundka – filed a petition in the Delhi High Court. The petition said pollution caused by burning of plastics, leather, rubber, motor engine oil and other waste materials and continuous operation of illegal industrial units dealing with such articles on agricultural lands was impacting the environment adversely. In another petition, residents of village Neelwal complained of pollution caused by illegal and unauthorised industrial activities of shredding, cleaning, recycling and burning of plastics, rubber articles and other waste materials in the villages of Nangloi, Ghewara, Neelwal, Mundka, Kamruddin Nagar, Tikri Kalan, Ranhaula etc, spread along the Delhi-Haryana border. The cases remain under arbitration.