

IE Insight

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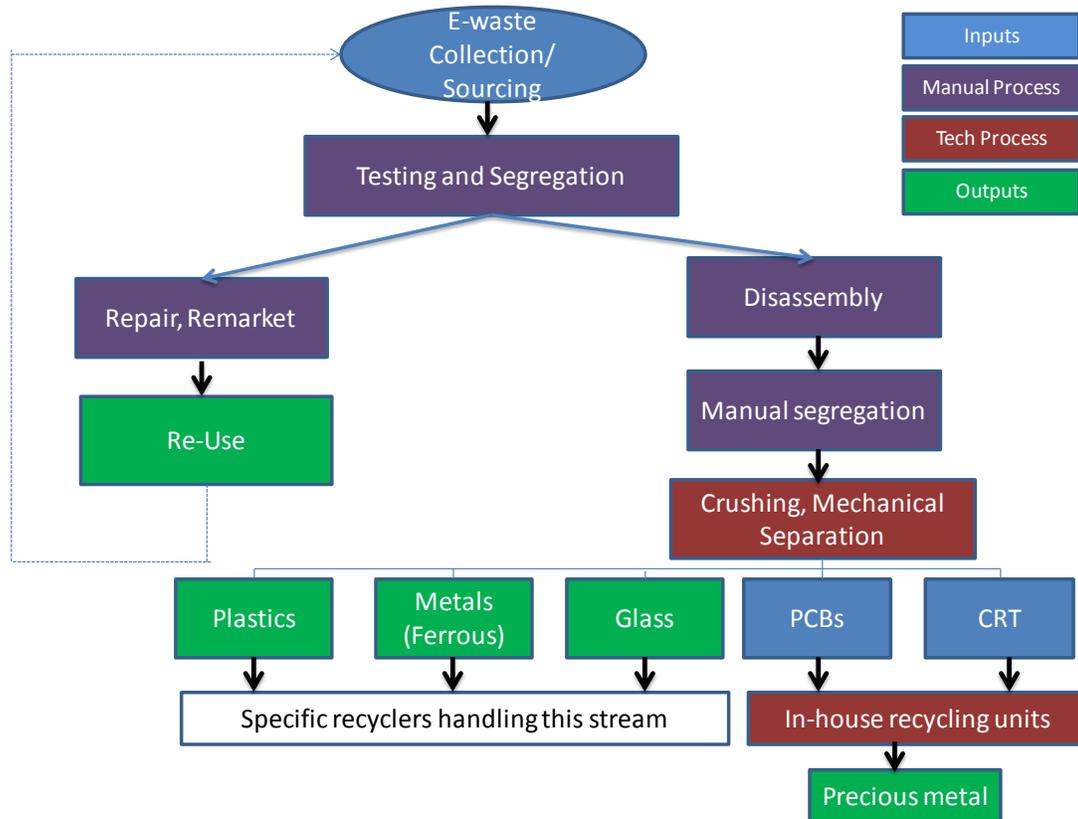
Garbage to Gold: eWaste Processing in India



IndigoEdge

Bangalore | Paris

OVERVIEW – WHAT IS E-WASTE PROCESSING?



E-waste comprises end of life electronic goods, such as computers, televisions and cell phones. Items with smaller life spans constitute a large share of e-waste. Thus, **computers, TVs and mobile phones are major constituents of e-waste.**

Recycling is all about reducing the carbon footprint. During the life of these products, **30-75% of the carbon footprint occurs in manufacturing** the product. Further, in terms of world demand – **electronic products consume 30% of world gold production, 30% of copper output and 14% of the total world silver production.**

Recovering these elements from end of life products reduces the burden on primary production. The printed circuit boards – **PCBs – are the most valuable e-waste** in terms of presence of precious metal. Gold, Silver,

Palladium and other precious metals are used in the leads and solder in PCBs. Copper is also present in abundance – **nearly 20% of the weight of a PCB is due to Copper.** Hence, recovery of metal from PCBs is a major function of recycling e-waste.

PCs and mobile phones contain the most complex PCBs and higher number of PCBs compared to other e-waste. Hence, these devices are highly valuable waste!

Typically, e-waste processing refers to the end-processing stage of precious metal recovery. However, we believe that in developing economies like India, refurbishing is a valid form of e-waste processing.

E-WASTE AND INDIA

India is estimated to produce about 300,000 tons of e-waste per annum. Our internal estimates are that the “valuable e-waste” of computers, laptops and mobile phones would be about 100,000 tons per annum.

Currently, bulk of the **collection process happens in the unorganized sector in India**. Scrap collectors go door to door and offer value for household e-waste. Small enterprises also dispose e-waste through this channel. Large organizations, particularly IT companies, are now **adopting more organized methods of disposal**. Large lots are auctioned or sold to authorized recyclers.

In the concept of Extended Producer Responsibility (EPR), the OEM manufacturer of the product is responsible for collection of End of Life products through community drives, retail outlets and other mechanisms. These are then to be sold or delivered to recyclers. **India has**

The Economics of Recycling

A PC weighs about 28 kg when fully assembled. Thus, there are about 38 PCs per ton of PC e-waste collected. On an average, PCBs constitute about 4% of the weight of the PC.

Value of PGM per ton of PCB*			
	Weigh (g or kg)	Cost (/ g or kg)	Value (Rs)
Gold (g)	390	3000	1,170,000
Palladium (g)	90	1200	108,000
Silver (kg)	1.5	47047	70,571
Copper (kg)	190	435	82,650
Lead & Tin (kg)	31	233	7,223
Aluminium (kg)	145	103	14,935
Other	(assumption)		10,000
Total (Rs)			1,463,379

introduced the EPR legislation, effective from May 2012.

However, the quality of enforcement is yet to be seen. Further, the financial incentives offered by the unorganized sector may outweigh that offered by the producers. Hence, consumers may still have a big incentive to opt for the unorganized sector for disposal.

Studies indicate that the emerging economies are best positioned to exploit the manual processes and developed economies provide large scale technology solutions for end processing.

This has been found to be true to a large extent in the Indian market. Authorized recyclers typically segregate PCBs and other metal-rich components and send them overseas for precious metal extraction. Umicore in Belgium is one such end processor.

The main revenue stream from recycling is the PGM recovery from PCBs. The table below shows the revenue from recovery from 1 ton of PC e-waste.

Revenue from Recycling 1 ton		
Weight of PC	28	kg
No of units	36	per ton
Weight of PCB	40	per ton
Total Revenue	58,535	Rs

The revenue is about Rs 58,535 from complete recycling of 1 ton of PC e-waste. Revenue per kg is ~Rs 58.

The next scenario is when 35% of the PCs are repaired and re-sold at the rate of Rs 2,500 per PC. Both these

assumptions are conservative. The remaining 65% is recycled as above.

Revenue with repair, re-sale & recycling		
No of units repaired	13	35% of units
Selling price	2,500	Rs per PC
Value from re-sale	32,500	Rs
Value of PGM	38,047	65% recycled
Total Revenue	70,547	Rs

Market Realities

The Indian market has a few distinct differences compared to developed markets, which affects the e-waste processing industry hugely:

1. All e-waste has value. Households and corporate expect a price for their discarded electronic items.
2. E-Waste collection rate is extremely high through the unorganized labor. 90-95% of e-waste in India gets collected.
3. A miniscule portion of e-waste collected goes to the organized sector for end processing or recycling. Most of it is refurbished or recycled over open fires/ acid baths in the unorganized sector.

The revenue now is Rs 70,547 – an increase of 21%.

Revenue per kg is ~Rs 70.

In terms of cost of e-waste as raw material, there are 2 distinct types – assorted heaps which are sold on a weight basis and lots of similar components (only TVs, only PCs) which could be sold on a per piece basis. Either way, the **cost of e-waste varies between Rs 15 to Rs 40 per kg**, for PCs.

As mentioned before, bulk of e-waste collection happens in the unorganized sector. However, most recyclers find the ***kabadiwalla* as an unviable source of raw material due to high prices.**

This implies that the **organized sector players who have set up recycling facilities are starved for raw material.** A smallest capacity unit for e-waste recycling available in the market handles about 10,000 MT per annum. However, the collection of e-waste is far below this and most units run at 25-30% capacity at best.

There is a **highly attractive refurbished goods market** which is gaining rapid pace. Companies buy consumer electronics from consumers or OEMs (factory rejects) and refurbish them and sell re-branded goods at attractive margins. The cost of refurbished goods is much lower than the new product. The organized players are now offering warranty also on these products.

COMPANIES, STATUS AND INVESTMENTS

There are a large number of players in the official list of authorized recyclers in the country. These are authorized by the Pollution Control Boards of each state. However, only a handful of these are engaged in any significant value addition. Many are pure scrap trading entities.

Below are profiles of the leading players in the sector.

Company	Funding	Status
ATTERO Roorkee	Investment from DFJ, IUVP, Granite Hill and IFC.	Claim to be at ~100 cr in revenues with capability to set up small scale (2000 MT) metal extraction plants. Installed capacity of 36,000 MT
ECO RECYCLING LIMITED Mumbai	Public listed, Nippon Magnetic, Bennett Coleman	2013 revenues of ~25 cr. The company does not do extraction, but does refurbishing.
E-PARISARAA Bangalore	Self funded	Mostly into collection, data destruction and segregation. PCBs sent to Umicore.
EARTH SENSE RECYCLE Chennai	Self funded	Mainly into collection & segregation. Parent group is into bio-medical waste handling.
RAMKY EWASTE RECYCLING Hyderabad	Part of Ramky Enviro Engineers	Do not seem to be active in the business any more.
GREENSCAPE ECO New Delhi	Self funded	Focus on collection and refurbishment
CEREBRA INTEGRATED TECH Bangalore	Public Listed	In planning stage. Currently focus is on refurbished PC/ Laptops.
INTARVO New Delhi	Sonoma Mgmt Partners, Motilal Oswal, NEA	At a nascent stage
GREENDUST New Delhi	KPCB, Sherpaloo, Vertex	Refurbishing manufacturer defective products. Claim to have revenues of over Rs 100 cr.

As can be seen, there is basically a single large player in the Indian market – Attero. Their installed capacity is probably higher than the total amount of e-waste that

is available for end processing for an organized player. In the refurbishing space, GreenDust is an interesting play and has seen a lot of investor interest.

GLOBAL LANDSCAPE

Typically, the economic size of plant for precious metal extraction is about 100,000 MT per annum. Reportedly, there are fewer than 10 such plants across the world.

In the developed world, the leading players are integrated metals players – in copper, iron and more.

Umicore in Belgium are the largest players in precious metal recovery from PCBs. They are into various businesses like catalysis, energy materials and performance materials.

Stena Technoworld AB in Sweden have a dedicated facility for recycling CRTs. Over 10 M CRTs have been recycled at their facility. The parent group is into aluminium and steel manufacturing.

In Asia, **Cimelia Resource Recovery** Pte Ltd is based in Singapore. It was an acquisition target for Cerebra in India but the deal was called off.

CONCLUSIONS

The Indian market has seen the entry of technology and hardware companies (Cerebra, Eco Reco, Intarvo etc) into the recycling industry as opposed to the global landscape, where metals players backward integrated. Keeping in view the capabilities and overall competitiveness of India, there is very limited scope for more players in the metal extraction and recovery business.

However, there is low capital investment and large untapped market for refurbished goods.

The main issue for all players remains the supply chain challenge to ensure access to sufficient raw material.

Until there is an effective implementation of the EPR Rules and standardization of e-waste collection, the industry will continue to have just one or two dominant players.

Overall, we do not expect much fresh investment activity in the sector. In keeping with global trends, metals players in iron and copper smelting may enter this business as a sustainable source for their raw material. At that point in time, we may see some M&A action. The most valued companies would be the ones with a strong supply chain to ensure raw material supply.

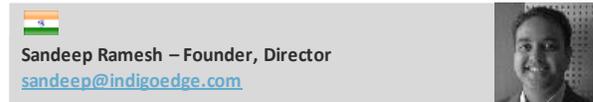
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