

E-waste Management and Recycling



CED

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INTRODUCTION

Electronic waste, e-waste, e-scrap, or waste electrical and electronic equipment (WEEE) describes discarded electrical or electronic devices. "Electronic waste" may also be defined as discarded computers, office electronic equipment, entertainment device electronics, mobile phones, television sets and refrigerators. This definition includes used electronics which are destined for *reuse, resale, salvage, recycling, or disposal*.



Green businesses are the key drivers of the economy in the current global business scenario.

Of the various green initiatives, waste recycling creates the highest positive impact on the environment.

Of all the different types of waste, electronic waste has the characteristics of

- a) the fastest growing segment of waste
- b) most valuable due to its basic composition
- c) very hazardous if not handled carefully.

However, the sector is very new with only a few corporate players in India and globally.

Most of the electronic waste management sector is currently handled by the unorganized/informal sector in India. However due to lack of skills, knowledge, awareness, etc., the sector has remained highly labour intensive, environmentally unfriendly and unhealthy. If done in the right way, and in an organized fashion, e-waste management can become a dominant economic sector.

The e-waste business is highly profitable from the economic as well as environmental perspective. Automated or semi-automated large capacity plants require less labour, can consistently work at high efficiency and produce a much better quality of the final product. Therefore, they are extremely cost effective in the long run. Thus, even if there is competition of the unorganized sector, e-waste management can be an economically viable and a high returns business for the organized industry.

RECYCLING – a subject of National Interest

1. **Allows for recovery of valuable precious metals:** Most consumer electronics contain valuable materials like copper, gold and zinc that can and should be recycled. Virgin Materials are significantly more costly than recycled materials for manufacturing.
2. **Protects public health and water quality:** E-waste contains a variety of toxic substances, which may include lead, mercury and cadmium. When e-waste is disposed into landfills, these toxins can be released into the atmosphere or leak in through the land and have negative health and environmental effects.
3. **Creates Jobs:** Recycling e-waste domestically creates jobs for professional recyclers and refurbishers and creates new markets for the valuable components that are dismantled.
4. **Toxic Waste:** Mining produce toxic waste, which are linked with crop devastation and human health crises due to water contamination
5. **Saves landfill space:** E-waste is a growing waste stream. Recycling these items will help conserve landfill space.



BUSINESS POTENTIAL

As per an estimate 20 to 50 million tonnes of e-waste are generated worldwide every year.

E-waste comprises of more than 5 % of all solid waste generated and the volume is expected to increase at a rate of 300% per annum in developing countries.

In India, the total e-waste generated is expected to cross 800,000 tons in 2012. This figure is expected to grow at a rate of 30 – 50 % year on year. Of this, the currently installed and functioning capacity in the organized sector is only about 100,000 tons. The current market size itself is sufficiently large and also growing at more than 30 %. Hence there is room for many more new recyclers in the organized sector.

MARKET OVERVIEW

Buyers: Main buyers are smelters, plastic recyclers, glass recyclers, metal traders, metal buyers, metal exchanges etc.

Suppliers: As discussed earlier, the suppliers could be both household and corporate entities. It is possible to sign contracts with business houses for collection. Apart from business houses, the household WEEE can be collected through a network of scrap dealers, retail outlets etc.

Competition: The informal sector forms the biggest competitor. However, it has several Systemic weaknesses. As of today with WEEE regulations becoming more effective and overall awareness increasing, collection is becoming a problem for the unorganized sector.

Opportunity

Based on various research studies, the total e-waste production in India was about 400,000 Tons in 2009 and is likely to reach 800,000 tons in 2012. Only about 19,000 tons was recycled officially in 2009.

E-WASTE – Category, Composition and Recovery

E-Waste Category

E-Waste is categorized by the government of India under the broad class of hazardous waste. Within e-Waste, there are several categories such as Large and small household appliances, electrical and electronic toys and sporting equipment, tools, computers and related equipment etc.



Composition of e-waste

Electrical and Electronic equipment contains metallic and non metallic elements, alloys and compounds such as Copper, Aluminum, Gold, Silver, Palladium, Platinum, Nickel, Tin, Lead, Iron, Sulphur, Phosphorous, Arsenic etc.

The recycle and recovery includes the following unit operations.

1. **Dismantling:** Removal of parts containing dangerous substances (CFCs, Hg switches, PCB); removal of easily accessible parts containing valuable substances (cable containing copper, steel, iron, precious, metal containing parts).
2. **Segregation of ferrous metal, non-ferrous metal and plastic:** This separation is normally done in a shredder process.
3. **Refurbishment and reuse:** Refurbishment and reuse of e-waste has potential for those used electrical and electronic equipments which can be easily refurbished to put to its original use.
4. **Recycling/recovery of valuable materials:** Ferrous metals in electrical are furnaces, non-ferrous metals in smelting plants, precious metals in separating works.
5. **Treatment/disposal of dangerous materials and waste:** Shredder light fraction is disposed of in landfill sites or sometimes incinerated (expensive), chlorofluorocarbons(CFCs) are treated thermally, Printed Circuit Board(PCB) is incinerated or disposed of in underground storages, Mercury(Hg) is often recycled or disposed of in underground landfill sites.

TECHNOLOGY



Electronic Waste Recycling Equipment CP Manufacturing Inc. (www.cpmfg.com)



The materials being recovered are largely ferrous metals, aluminum, copper, circuit boards as well as the plastics ABS, HIPS, PC and ABS-PC.

Increased Recovery, Challenges Overcome

This electronic waste technology and equipment is field-proven to accomplish high recovery rates. It provides the conveyor systems, shredders, overbelt magnets, eddy current separators as well as top-of-the-line optical sorters.

Low Cost Technology Suppliers from China				
Product:	99% separation rate E-scrap Recycling Machine			
Supplier :	Zhengzhou Zhengyang Machinery Equipment Co. Ltd.			
Brand Name	Zhengyang			
FOB Price:	US \$10,000 - 28,000 / Set			
Place of Origin:	Henan China (Mainland)			
Usage	E-scrap recycling machine			
Type	printed circuit board/computer board			
Model Number & capacity	Model	Production (Kg/Hr)	Power (Kw)	
	ZY-500A	400-500	55	
	ZY-500B	300-400	50	
	ZY-350	80-150	45	
Description:	Circuit board recovery equipment is combined with the domestic and international advanced. The developed crusher and high pressure electrostatic separation equipment innovation is strong, the recycling of the process route is advanced and reasonable. The equipment can be used for all kinds of circuit boards, computer board, TV board, aluminumplastic plate, with copper, printed circuit board and the processing waste, such as waste electrical appliance for mechanical crushing recycling, the metal recovery rate is high, the recovery of 98% purity metal.			

INFRASTRUCTURE REQUIREMENT

Power	70 KW
Water	Negligible for drinking purpose
Manpower	10 Direct 3 - 5 Indirect

FINANCIAL ASPECTS

Estimated Project Cost	
Land Cost	10 lacs
Plant & Machinery Cost	15- 20 lacs
Working Capital Cost	3 lacs
Payback Period – 1 to 2 years	

REGULATORY REQUIREMENT & GOVERNEMENT POLICIES

(Guidelines for Environmentally Sound Management of Electronic Waste by Central Pollution Control Board, Ministry of Environment & Forests (Govt. of India))

The dismantler has to comply with following legal requirement:

1. To obtain authorization and registration from the State Pollution Control Board
2. To ensure that no damage is caused to the environment during storage and transportation of e-waste.
3. To ensure that the facilities and dismantling & recycling processes are in accordance with the standards or guidelines published by the Central Pollution Control Board from time to time
4. Dismantler to ensure that dismantled e-waste are segregated and sent to the registered recycling facilities for recovery of materials & Recyclers to ensure that dismantled materials are sent to the registered or bonafied industries for use of recycled material as their raw materials
5. To ensure that non-recyclable/non- recoverable components are sent to authorized Treatment Storage and Disposal Facilities (TSDF)
6. To file return in form 3 to the SPCB/PCC on or before 30th June following the financial year to which that returns relates.
7. Should not process any E-waste for recovery or refining of materials, unless he is registered with SPCB/PCC as a recycler for refining and recovery of materials.

FINANCIAL ASSISTANCE FOR E- WASTE MANAGEMENT FROM GOVERNMENT OF GUJARAT

Under the scheme any private or public institutions is eligible to get benefit for recovery of waste from E-waste/ Electronic waste/ Photography waste upto 50% of eligible fixed capital investment with ceiling of Rs. 4 crore.

For details refer: http://ic.gujarat.gov.in/?page_id=355

FINANCIAL ASSISTANCE FOR E- WASTE MANAGEMENT FROM MINISTRY OF ENVIRONMENT & FORESTS ,GOVERNMENT OF INDIA

Under the scheme any private or public institutions is eligible to get benefit for establishment of E-waste recycling facilities upto 25% of the total projed cost as central subsidy, subject to matching grant by the State/UT government concerned and limited to a maximum of Rs. 12.5 crores.

In case of NE states, upto 50% of the total project cost would be provided as central subsidy, subject to 25% contribution by the state government concerned. In case of NE states, the central subsidy would be limited to Rs. 25 crores.

For details refer: http://www.gpcb.gov.in/Portal/News/12_1_criteria_for_central_subsidy.pdf

Note: This project profile is based on secondary study to facilitate prospective entrepreneurs to assess a prima facie scope. It is, however, advisable to get a detailed feasibility study prepared before taking a final investment decision.