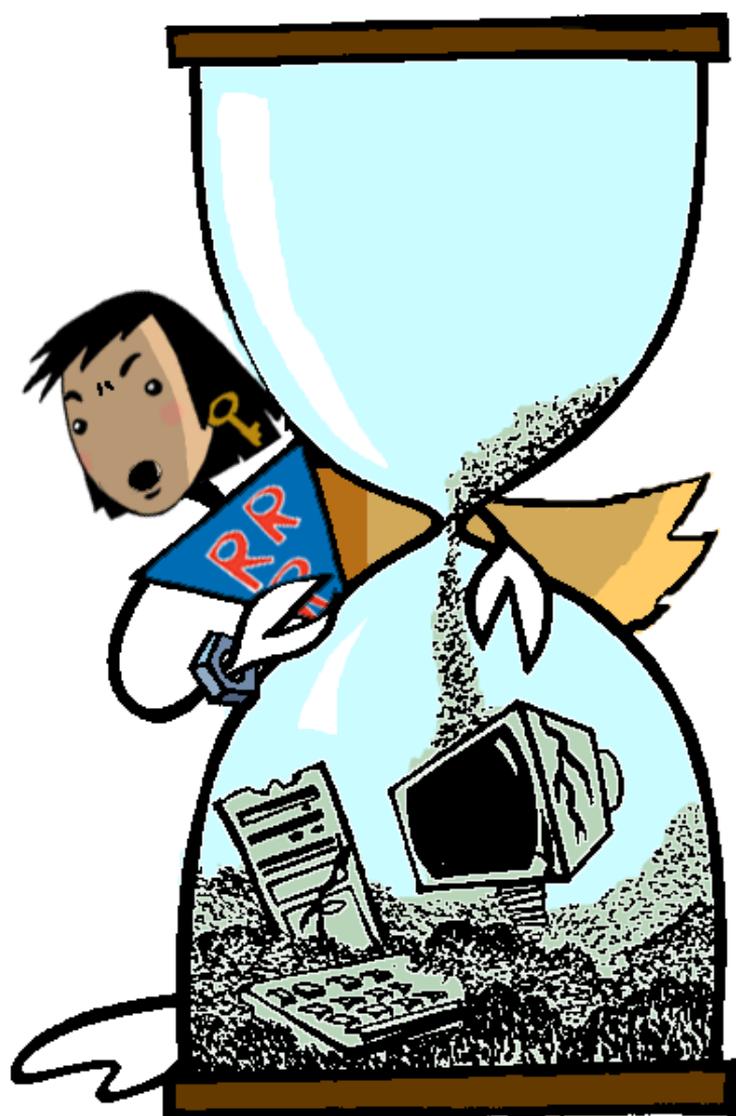




Toxics Link  
for a toxics-free world

## **E-WASTE IN CHENNAI**

# **Time is running out**



**Toxic e-waste patterns in Chennai underline the fact that the IT industry and the government need to take immediate steps to curb this menace before it overwhelms the city**

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# Wasting the IT dream

## E-waste

Electronic waste, or e-waste as it is popularly called, is a collective terminology for the entire stream of electronic wastes such as used TVs, refrigerators, computers, mobile phones, etc.

Computer waste is the most significant of all e-waste due to the gigantic amounts as well as the rate at which it is generated. In addition, its recycling is a complex process that involves many hazardous materials.

### Salient features of Manufacturers Association of Information Technology (MAIT) report

- ▲ Total PC sales for the period April-September 2003 stood at 12.58 lakh units, a 32 per cent rise over the same period the previous year.
- ▲ MAIT has revised its growth projections for the full year from 20 to 30 per cent following the shooting market conditions.
- ▲ There is a fall in entry-level prices of PCs, notebooks, servers, inkjet and laser printers.
- ▲ Households bought 88 per cent more PCs compared to first half of previous year.
- ▲ The trend of increased PC purchase in smaller towns and cities continued as that of the previous year.

Source: *The Hindu*, 7/1/04; *Business Line*, 6/01/04

## Obsolescence

The most disturbing aspect of computer waste is the incredible rate at which it is accumulating. According to the International Association of Electronics Recyclers, about 40 million components are being scrapped each year. This figure is expected to climb to 100 million by 2010. There are various reasons for the current scenario of obsolescence. These include:

- ▲ The unbelievable number of hardware and software products that pound the market everyday, in turn, generate a demand for greater chip speeds, memory and computing power.
- ▲ The universal belief that service efficiency is primarily driven by superior hardware and software results in regular scrapping of computers.
- ▲ Poor design of computers, which do not facilitate upgradability adds to the problem.
- ▲ The steady decline in the prices of computers and computer peripherals leads to greater demand.

## India's techno-trash

E-waste is of particular concern to India. Currently, India is setting a shining example not only in the IT sector, but unfortunately, also in importing e-waste. The primary source of computer waste in India is imports from developed countries though, recently, domestic waste also has shot up due to the astounding growth in the IT sector and its application in various new sectors, including governance.

According to the report on the Indian IT Sector by Radha Gopalan<sup>1</sup>, *the rate of obsolescence of computers in India is 2% per week, i.e., in 50 weeks time the value of the computer is effectively zero*. Industries in India are primarily profit-minded with absolutely no

## Wasting the IT dream



E-waste is rising as companies overseas take advantage of lacunae in our laws to export huge quantities of it.

concern for the environment. This is evident in the abysmal record of these industries in the post-consumer phase of e-waste, especially take-back initiatives which are non-existent in India. The lack of strict environmental laws, or poor implementation of them, helps these industries shirk their responsibility.

### Scrapping the hi-tech myth

To take stock of the scenario of e-waste, especially computer waste, Toxics Link has conducted a pioneering study in and around Delhi. This study, amongst other things, has brought to light the areas where this e-waste is recycled, the mechanism employed to recover the components, the sources of e-waste and the dumping of e-waste from developed economies. Fearing that the findings could just be a tip of an iceberg, Toxics Link has decided to conduct a similar study in South India.

The second phase of the study was done in Chennai keeping in mind the contribution of this southern capital to India's IT revolution, and the fact that it is a major port of South India. The study, carried out from September 2003 to February 2004, primarily focused on computer waste because of the massive amounts of dumping from developed countries.

### Objectives of the study

- ▲ To identify the sources and trade routes of e-waste, especially computer waste.
- ▲ To identify the e-waste hotspots in Chennai.
- ▲ To study the fate of post-consumer e-waste and the economics involved.

### Methodology

The methodology involved exploratory surveys, unstructured interviews and photo documentation, besides data collection.

Exploratory surveys were conducted primarily to identify areas where e-waste is handled. The areas surveyed include:

- ▲ Richie Street – An electronics market where all types of electronic goods are sold, repaired, refurbished and resold.
- ▲ Royapuram and Thiruvotriyur – Areas adjoining ports and known for their recycling activities.
- ▲ New Moore Market, Chintadaripet, Pudupet – Well-known scrap or second-hand goods market of Chennai known to handle scrap from a wide range of sources.
- ▲ Mannadi, Kosapet, Otteri – A plastic recycling belt of Chennai. This was a bottom-up approach to identify the sources and areas of computer waste by tracing the source of plastics from computers.
- ▲ Saidapet, Madras Export Processing Zone (MEPZ), Purasawalkam, Periamedu, Vepery – Areas recommended by Maintenance and Service Providers (MSPs) and hardware engineers who procured used computer parts from these areas.

Unstructured interviews were conducted to get the perception of various stakeholders on the problem of

## Wasting the IT dream

e-waste. The stakeholders include:

- ▲ MSPs and hardware engineers
- ▲ Experts
- ▲ Customs department
- ▲ Second-hand computer dealers
- ▲ Scrap dealers and plastic recyclers

Constant visits and informal discussions with scrap dealers over a period of time helped us get a clear picture on the source of computer waste, the product lifecycle of various computer peripherals and the economics involved.

Some scrap computer components were also procured to document the make, place of manufacture and the user's address to trace the source of the waste.

### Limitations of the study

- ▲ E-waste is now treated as a very sensitive issue, which made it difficult for us to acquire detailed information about the areas of e-waste recycling and the recycling processes.
- ▲ Questions related to health effects and wages went unanswered during interviews.
- ▲ In most places, permission to take photographs and the entry into the yards was denied.

**Disclosing the real identity and the real purpose of the study discouraged the subjects to provide information. So we had to devise innovative ways to engage in conversations in order to obtain information.**

## Where does e-waste come from?

The computer hardware sector has displayed a phenomenal growth in the past five years and is keeping pace with the growth in the software sector. This astounding growth is primarily due to the impact of information technology in various sectors.

The private sector believes that service efficiency and keeping pace with IT are two sides of the same coin. So they keep a close watch on the developments in the hardware sector and upgrade their hardware regularly. This naturally results in a regular stream of e-waste.

The single most important factor is the regular fall in prices of computers, which makes them affordable to people of a wide range of incomes. This trend could almost wipe out the existing market for second-hand computers.

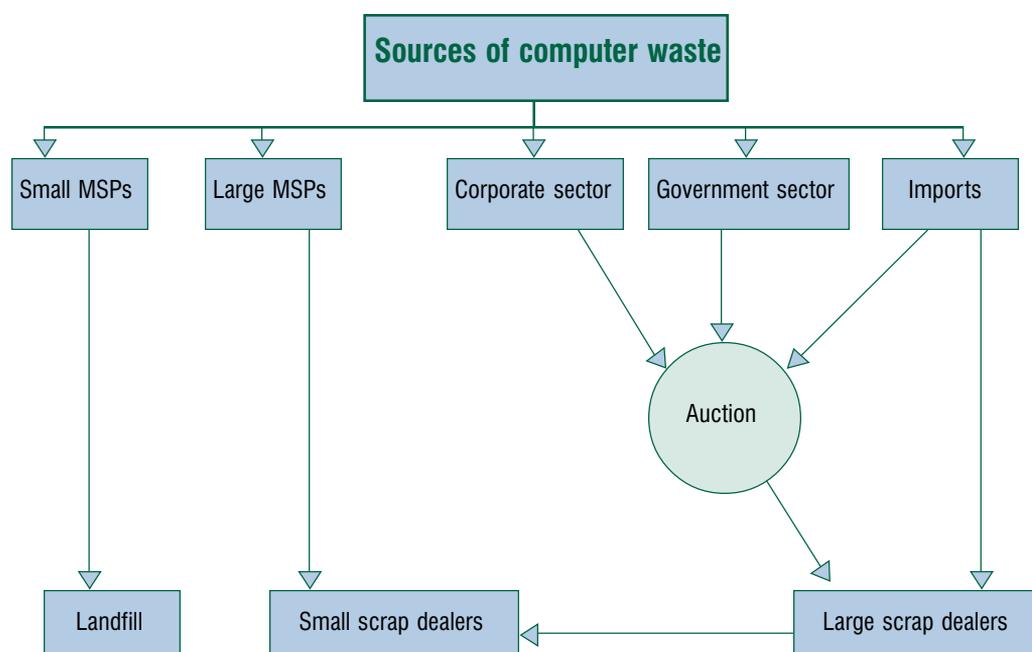
The sources of computer waste in Chennai are:

- ▲ Illegal imports
- ▲ Government departments
- ▲ Private sectors such as banks
- ▲ Corporates in IT business
- ▲ Companies that have shut down operations
- ▲ Large MSPs

The household sector's contribution to computer waste in Chennai is very negligible as it prefers take-back programmes and keeps the scrap dealer as the last option. This scenario is all set to change as the recent Manufacturers Association of Information Technology (MAIT) report<sup>2</sup> suggests a massive surge in the consumption of computers by households.

The interviews and surveys conducted till date were not able to throw light on the computer waste arising from the hardware manufacturing sector. This may be due to the fact that India assembles more computers than manufactures them.

**Figure 1: Dynamics of post-consumer computer waste**



## Where does the e-waste come from?

### Distribution chain

Chennai, as many other places in India, generates its own domestic e-waste. In recent years though, the port of Chennai has been deluged by e-waste from other countries.

In general, the bigger players handle this e-waste from offshore sources, which they import illegally or obtain through a customs auction. There are a few units which handle imported e-waste exclusively.

Domestic waste has its own share of takers (generally small players) such as the scrap dealers in New Moore Market. Apart from this, a recycling unit situated in the southern suburb of Urapakkam sources computer scrap directly from IT firms.

But there is movement of waste across these channels especially when the quantity is large or when the han-

### Sound Bytes

▲ “We handle only imported electronic waste. We import scrap computers and photocopiers from Dubai and scrap cables from Spain.”

– Prabhakar, MEPZ

▲ “I’ve seen consignments quoted as used computers but in reality they are just scrap.”

– PRO, Chennai Customs

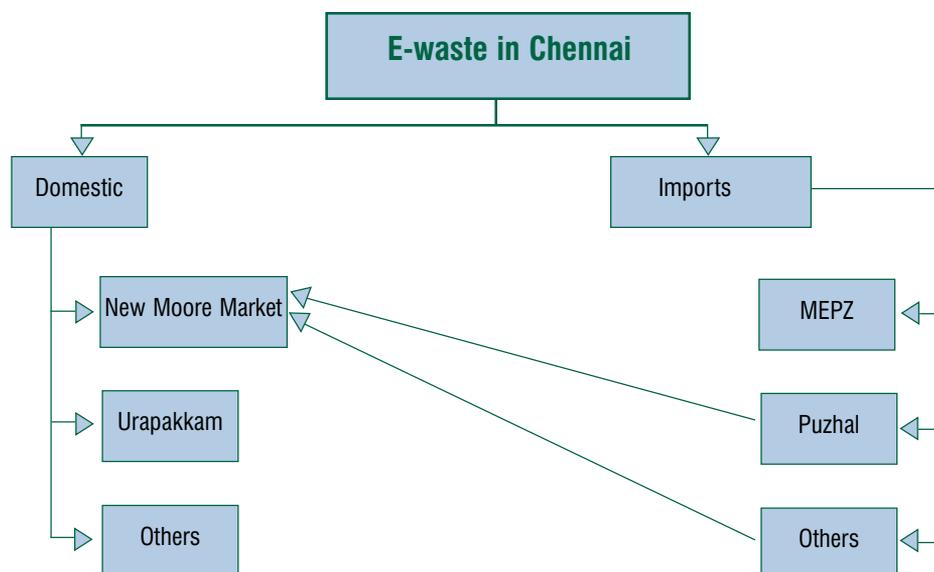
▲ “I employ wage labour when there is more scrap but other people have full-time employees.”

– Devan, scrap dealer from New Moore Market

▲ “Only 5-10 per cent of the capacitors recovered from circuit boards can be reused. The rest is of no use due to the crude process employed in recovery or due to leakage.”

– T.N. Durairaj, TND Systems

Figure 2: Flow of e-waste in Chennai city



## Where does the e-waste come from?

dling needs skilled labour. For example, the scrap dealers in New Moore Market buy monitors from the importer near Puzhal and some computer scrap from the scrap dealers in Narasinghapuram who, generally, handle other metal scrap.

## Post-consumer e-waste recovery and recycle

A computer, in reality, is a storehouse of toxic substances (see annexure 1). The presence of this concoction of toxic substances has made effective and eco-friendly recycling a distant dream, even for developed countries. In India, most of the recovery and recycling of computer waste happens in the unorganised sector in a crude and extremely hazardous manner.

### Monitors

The scrap dealers least prefer the monitors once they enter the post-consumer phase unless the CRT is in working condition. The recovered CRT is procured by TV mechanics, who, in turn, use it in portable TV sets. In the case of importers there is absolutely no attempt to recover CRTs as they obtain only scrap. They in turn use their work force to recover copper from yoke and dispose the CRT glass. Some of the



Recovered monitors are procured by TV mechanics for portable TV sets.

scrap dealers' attempts to melt and reuse the monitor glass was futile. So they dumped the scrap CRTs.

### Circuit boards and motherboards

Circuit boards and motherboards are used to recover working components manually after which the boards are heated to recover thin copper sheets. In some recycling units they are cut into 5-10 mm bits and then they are exported for recovery.

### Printers

The most important component recovered from a printer is the motor.

### Hard disks

Hard disks are either resold or broken to recover the aluminium casing, actuator (magnet), platter, and circuit board inside. These are sold separately.

### Plastics

Nearly 20 per cent of a computer is made up of plastics – primarily Alpha Butadiene Styrene (ABS) used for making CPU and keyboard housings. Plastics actually substituted metals, especially in CPU housings. In recent years, even polycarbonate is used to enhance the aesthetics.

ABS plastics are a high quality plastic and harder than most other varieties. Their hardness and the requirement of specialised equipment for their recycling discourage its retrieval. In Chennai, the ABS plastics from computer components are separated and sold on weight basis to plastic recyclers. These recyclers collect ABS

## Where does the e-waste come from?

plastics from various other sources, and after pelletising them, pack them off to Mumbai or Delhi where the pellets are recycled into chairs and trays. According to experts from the Central Institute of Plastics Engineering and Technology (CIPET) there is very little chance of this coming back to the manufacturing stream.

## Computer waste hotspots

The prime areas that handle computer waste in and around Chennai are:

### New Moore Market (Kannappar Thidal)

This is a second-hand goods market situated close to the central railway station in Periamedu area of central Chennai. This market is a source of used goods – from small screws to large electrical devices. Used rubber and textiles are also refurbished and sold here.

By exploring the narrow lanes in this market we identified four main computer scrap dealers here who also handle other electronic and electrical scrap. The main sources of computer scrap for these dealers are public and private sector units. They obtain the scrap through auctions. They also obtain computer waste, especially monitors, from an importer near Puzhal and other scrap dealers in Narasinghapuram. Working computer peripherals are sold as such (e.g., monitors, printers). Non-working peripherals are broken down to recover reusable components such as copper from yoke of monitors, motors from printers, actuators and platters from hard disks, etc. Gold-coated areas in circuit boards and the pins are separated and treated with acid to recover the gold. The scrap dealers also burn wires to recover copper.

### Computer waste destinations in Chennai

- ▲ New Moore Market (Kannappar Thidal): Second-hand goods market. Source of used goods from small screws to large electrical devices.
- ▲ Puzhal: Considered as the largest e-waste scrap yard by many. Housed in a residential area.
- ▲ MEPZ (Sanatorium): Hotspot for imported e-waste. Units housed under a high security area.
- ▲ New Moore Market: Main hub of recovery and recycling for e-waste. Proximity to electronics market (Richie Street).
- ▲ Urapakkam: The unit has formal tie ups with corporate groups. Only dismantling and segregation done here.

### Madras Export Processing Zone (MEPZ)

MEPZ is situated in the southern suburb of Sanatorium about six to eight kilometres from the airport. It houses an array of 100 per cent export-oriented industries. There are two units within MEPZ that handle electronic scrap, especially computer and photocopier



E-waste dump in New Moore Market area.

## Where does the e-waste come from?

scrap. Their primary aim is to recover copper from the e-waste. We witnessed a huge pile of CRTs with their broken tips after yoke removal, cables strewn all over the yard and plastic cabinets from monitors and printers in one of these locations. There were about four-five workers separating copper from cables with their bare hands.

The other unit is also involved in recovery process primarily from imported computer waste. During our visit we witnessed a work force of about 20 people working amidst a huge pile of circuit boards. A significant portion of the work force are women who are generally employed in the segregation process. The segregated computer and other electronic scrap undergoes volume reduction with the help of a custom-made crusher (which reduces the circuit boards into 5-10 mm sized bits), and is then exported.

### Puzhal

This northern suburb is about 8-10 kms from the city limits, on the Chennai-Calcutta highway. High walls and huge metal gates completely obscure this unit from view, which is located next to a school. According to the dealers in New Moore Market, this is the largest computer scrap yard in Chennai and deals primarily with imported computer waste. Frequently, the scrap dealers from New Moore Market buy computer scrap from this unit. They are involved in recovery of copper from computer scrap and the mechanism is not known.

Apart from this unit, the area has another copper recycling unit which also handles computer scrap. The study could not throw more light on the mechanisms employed or the source as we were denied permission to enter this place.

### Urapakkam

This small town is well outside the city on the Chennai-Kanyakumari highway. Citiraya Precious Metals is a registered subsidiary under the Singapore-based Citiraya Industries Ltd. Their unit near Chennai is just a collection point where the e-waste is dismantled and segregated. The segregated e-waste is exported to Singapore where it is recycled. They handle about 50 metric tonnes of e-waste every month. They deal only with domestic waste; their client base includes Nokia, Sony, Redington, Hewlett-Packard, Compaq, etc.

Apart from the above-mentioned areas there are smaller players, like the scrap dealers in Narasinghapuram and Saidapet, who occasionally handle e-waste.

### E-waste in Municipal Solid Waste (MSW) dumps

In India there are dumping grounds and no scientific landfills. These are already well beyond their carrying capacity and are toxic bombs ready to explode. They cannot take in any more toxics in the form of lead, cadmium or mercury from computer wastes.

Some amount of e-waste reaches the MSW stream since this is the easiest way of disposal, especially if it



An IBM component from the New Moore Market area.

## Where does the e-waste come from?



A monitor being dismantled in the New Moore Market area.

is from smaller contributors like households. However, the amount of e-waste from households is negligible as their effort is to reuse it.

In Chennai, however, small MSPs are the main contributors to MSW. Instead of disposing their waste through a scrap dealer, they take the easy way out by dumping the waste into the MSW stream. The problem of this toxic trash becoming a part of MSW could

have been foreseen, as the customer base of new PCs has grown drastically whereas that of second-hand computers has shrunk.

During one of our surveys we had found broken cathode ray tubes in the solid waste dumping ground allotted for Alandur Municipality. The most disturbing fact was that it was in the vicinity of a burning dump close to the road. Our interviews with MSPs indicate that disposed cartridges do reach the MSW stream.

### Hazardous handling

It is an undeniable fact that in India the recycling sector is primarily unorganised and the working conditions are far from satisfactory. In computer scrap recycling, the workers risk their lives by working in hazardous conditions and handling hazardous substances to salvage some valuable materials from this techno-trash.

One can witness the presence of protective gears like gloves, masks, and helmets when they stroll along the narrow lanes of New Moore Market. Ironically, a few meters away it is common to see that this toxic trash is

**Table 1: Mechanism of recovery and the recovered components**

Computer component	Recovered component	Mechanism employed
Monitor	Cathode ray tube, circuit board copper, plastics	Dismantling using screw drivers (the broken CRTs are dumped)
Hard disk	China steel, aluminium, actuator (magnet), platter, circuit board	Broken using a hammer
Circuit board	Capacitor, condenser, copper, gold, chipped board	Gold recovery through acid treatment Copper recovery through heating Crushing of boards by custom-made crushers
Printer	Motor, plastics	Dismantling using screw drivers
Cables and wires	Copper, aluminium	Burning or stripping

## Where does the e-waste come from?

**Table 2: Toxic elements of a computer**

Toxic constituents	Components of PCs
Lead and cadmium	Printed circuit boards
Lead oxide and cadmium	Cathode Ray Tubes (CRTs)
Mercury	Switches and flat-screen monitors
Cadmium	Computer batteries
Poly Chlorinated Biphenyls (PCBs)	Capacitors and transformers
Brominated Flame Retardants (BFRs)	Printed circuit boards, plastic casing cable
Poly Vinyl Chloride (PVC)	Cable insulation releases highly toxic dioxins and furans when burned to retrieve copper from the wires.

handled in the most hazardous way possible.

The retrieval of copper or aluminium is done by open burning of wires in narrow lanes without any protective gear. This process is hazardous as burning of PVC results in the emission of carcinogenic dioxins and furans. Dismantling and breaking of monitors and hard disks is done with screw drivers and hammers. The recovery of gold from gold-coated plug-ins is done through the hazardous process of acid treatment. The most worrying factor is that the plug-ins containing the gold are treated along with the plastic casings which might emit toxic fumes endangering the lives of the workers.

The broken CRTs laden with toxic lead and the rest of the scrap generated in the recovery process like broken plastics are dumped not too far from the working area.

## The economics of e-waste in India

The economics revolves around three main stakeholders in the e-waste business. They are:

- ▲ The **importers** who have their own e-waste recycling unit, and make the highest profits.
- ▲ The **scrap dealers** who make profits in the range of Rs 8,000-10,000 per month.
- ▲ The **workers** who work for daily wages ranging from Rs 50-80.

### Imports

The majority of the world's e-waste is generated in the backyard of developed nations due to their affluent lifestyle. They are apt to shy away from the issue of recycling. Instead, they find an easy way out by exporting their waste to developing economies which open their doors to this toxic trash in the name of free trade.

The constant dumping or transfer of e-waste, especially computer waste, from USA and other developed countries reaches countries such as India in the name of recyclables.

The dumping of e-waste by the West in Asian countries is reaching alarming proportions. The complicated recycling and recovery processes required to effectively deal with this toxic trash are out of the reach of developing countries. Apart from this, exporters see profit in this trade. According to US based Silicon Valley Toxics Coalition's study it was found to be ten times cheaper to export computer scrap than to recycle it.

About 80 per cent<sup>3</sup> of the world's electronic trash is

transferred to Asia every year. India gets a decent share of this toxic pie. The earlier study by Toxics Link, Delhi had shed light on the culprit countries involved in this toxic trade.

India has, like most other countries, ratified the Basel Convention that strictly prohibits the transboundary movement of hazardous substances, including e-waste. The Indian government has its own law in the form of Hazardous Waste Management & Handling rules (1989) which have been amended in 2003. These prohibit the import of e-waste without the prior permission of Ministry of Environment and Forests (MoEF). On the other hand, our exim policy allows the import of second-hand computers not older than 10 years and donation of computers to non-profit organisations (see annexure 2). These provisions in our exim policy are unduly utilised by irresponsible developed economies to dump obsolete computers or computer scrap into our country.



Scrap units import e-waste surreptitiously, flouting laws.

## The economics of e-waste in India

In Chennai, imports of computer scrap come in mainly from the USA, Singapore, Malaysia, the Middle East and Belgium. Of these, Singapore and the Middle East could in all probability be acting as turntable ports for computer scrap coming originally from the European Union.

There are scrap units in Chennai that exclusively handle imported e-waste suspected to be imported under the category of 'Mixed Metal Scrap' or 'Mixed Cable Scrap'. This mode of entry from offshore sources was unearthed by tracking the nature of import through Customs records of a particular unit operating within MEPZ which handles imported e-waste alone. Inter-

**Table 3: Economics of computer recycling**

Component	Cost of buying	Recovered components	Selling price
Monitors			
Monochrome	Rs 200-250 (working)	Sold as a whole	Rs 300
	They generally won't buy non-working, but sometimes it comes along with other scrap	Sold as a whole or Copper from yoke recovered	Rs 80-120 Rs 20-25 for 150- 200 gms
Colour	Rs 300-350/piece or in bulk (working)	CRT	Rs 500
	Non-working generally in bulk	Copper from yoke	Rs 20-25 for 150-200 gms
Hard disks	Rs 25-50/piece or in lots	a) Actuator b) Aluminium casings c) Circuit boards	Rs 25/piece By weight Rs 25/Kg
Printers	Rs 150-300 based on working condition.	a) Plastics and metal by weight b) Motor	Rs 100-125
Circuit and mother boards 486 board and processor (working/non-working)	Buy in bulk	Gold from circuit boards, processor pins, etc.	Rs 300
Motherboard			Rs 150
Keyboards			Rs 15
Mouse			Rs 10

*ABS plastics from computers is sold @ Rs 15/Kg; Copper recovered is sold @ Rs 125/Kg to the smelter*



## The economics of e-waste in India

views with the yard supervisor of this unit revealed that a consignment of computer scrap was expected to be imported during the second week of November, 2003. Cross-checking his claim with the Customs record revealed that it was indeed quoted as 'Mixed Metal Scrap'.

This was also confirmed by various Customs authorities who added that it is not unusual for consignments to contain merely 5-10 per cent of the quoted material while the rest can be anything else. There are several other recycling units housed in the fully export-oriented MEPZ, which process e-waste from offshore sources.

**Table 4: Data of imports suspected to contain e-waste**

Bill of entry No.	Bill of entry date	Imported as	Quantity (Metric tonnes)
14877	16/07/2002	Mixed metal scrap	68.460
17394	26/08/2002	Mixed metal scrap	25.070
17394	26/08/2002	Mixed metal scrap	25.070
18409	12/09/2002	Mixed metal scrap	48.010
18409	12/09/2002	Mixed metal scrap	48.010
21440	07/11/2002	Mixed metal scrap	75.980
21440	07/11/2002	Mixed metal scrap	75.980
22769	27/11/2002	Mixed metal scrap	78.240
22769	27/11/2002	Mixed metal scrap	78.240
31706	08/05/2003	Mixed metal scrap with non-ferrous REC 23 PCT	78.000
32704	26/05/2003	Mixed metal scrap	74.780
32704	26/05/2003	Mixed metal scrap	74.780
35750	14/07/2003	Mixed metal scrap	39.330
36082	18/07/2003	Mixed metal scrap mixed cable scrap with non-ferrous	72.890
37780	14/08/2003	Mixed metal scrap	48.590
38714	29/08/2003	Mixed metal scrap	54.740
39592	12/09/2003	Mixed metal scrap	36.890
39592	12/09/2003	Mixed metal scrap	36.890
41080	10/10/2003	Mixed metal scrap with non-ferrous REC	37.680
41998	27/10/2003	Mixed metal scrap	52.320
43335	13/11/2003	Mixed metal scrap with non-ferrous	27.600
44289	27/11/2003	Mixed metal scrap	20.100
44997	08/12/2003	Mixed metal scrap with non-ferrous	26.090
46078	26/12/2003	Mixed metal scrap with non-ferrous	64.460
46149	29/12/2003	Mixed metal scrap	25.320
46573	07/01/2004	Mixed metal scrap with with non ferrous RECoF 23 app	27.600

Source: Customs

Figure 3: Mode of import of computer waste

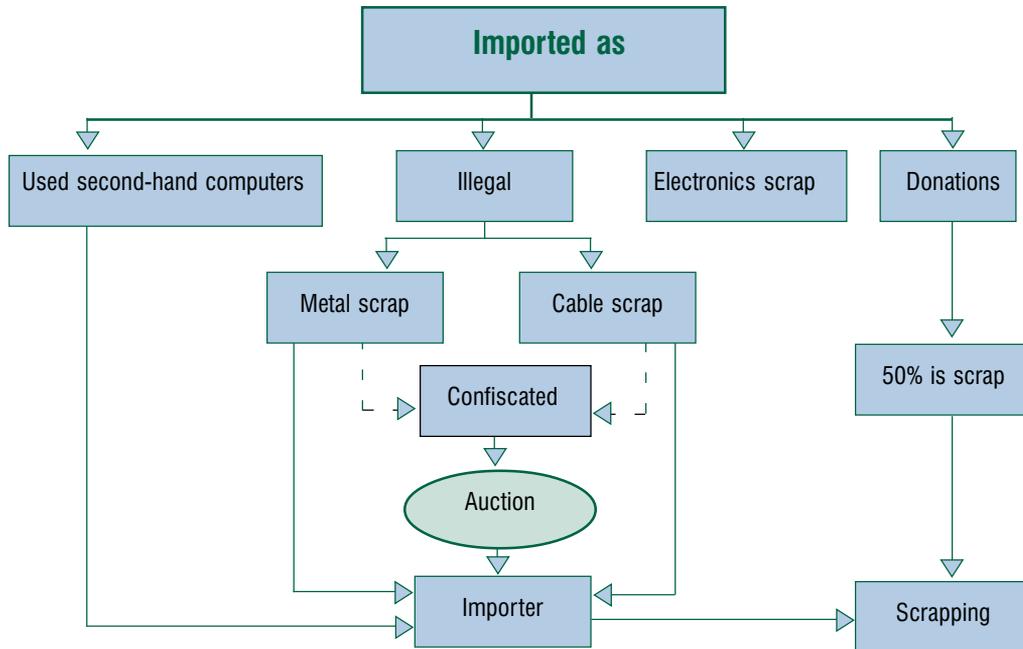


Table 5: Computer waste imported as mixed electronic computer scrap through Chennai Port

Bill of entry date	Supplier name	Exporting country*	Quantity***
06/01/03	Ace Royal Inc.	USA	9071.94 kg
30/01/03	Phoenix Trading International S.A.**	Belgium	45,500 kg
07/02/03	2021 Impex Private Ltd.	Non-traceable	13,000 kg
21/02/03	2021 Impex Private Ltd.	Non-traceable	10,650 kg
13/03/03	2021 Impex Private Ltd.	Non-traceable	13.140 MT
17/03/03	2021 Impex Private Ltd.	Non-traceable	13 MT
30/06/03	2021 Impex Private Ltd.	Non-traceable	12.750 MT
03/07/03	Azan Traders	USA	14,014 kg
26/09/03	Raw Materials Trading Inc.	USA	10,236 kg
10/11/03	Raw Materials Trading Inc.	USA	28.501 MT
19/11/03	Raw Materials Trading Inc.	USA	13.842 MT
01/12/03	2021 Impex Private Ltd.	Non-traceable	8,100 kg
01/01/04	2021 Impex Private Ltd.	Non-traceable	9.25 MT

\* Exporting country was identified through web searches ([www.exporters.com.sg](http://www.exporters.com.sg), <http://www.grn.com>)

\*\* The Belgian supplier collects e-waste from various parts of European Union

\*\*\* MT: Metric Tonnes

Source: Customs

# Charting the future

## Extended Producer Responsibility (EPR)

The basic principle of EPR is that producers should be held accountable for the entire lifecycle of the product, and not just for the supply chain. The idea aims at building a sense of eco-responsibility among profit-minded corporates.

EPR is least practiced in India due to our inadequate laws and the double standards of corporates who practice the concept elsewhere. For example, IBM started its take-back program about a decade back in Europe but there are no signs of it in India.

The Indian government should call for a strict EPR practice for e-waste as this problem should mainly be addressed by the manufacturer. The government should set up an agency under the Ministry of Environment and Forests, which should take care of the issues related to EPR.

EPR should necessarily involve 3 integral components

- ▲ Product take-back programs
- ▲ Remanufacturing
- ▲ Redesigning

### Product take-back

The producer of the product should own the responsibility when it is discarded. This is the first and foremost step in EPR. The company could do this directly or by a third party (The buy-back scheme for

### Corporate culprits

During the course of our study, we came across post-consumer waste of almost all major brands in the unorganised recycling sector. Some of the brands are HP, IBM, Wipro, Seagate, Compaq, Samsung, L&T and TVS. HP has a take-back in almost all developed countries.



HP cartridges and toners in India is done through a third party called Tech Pacific<sup>1</sup>).

### Remanufacturing

The procured e-waste should be used as an effective resource base so that the maximum recoverables re-enter the manufacturing process. This will reduce the dependence on virgin raw materials.

### Redesigning

Redesigning the computer and its components is a front-end solution to this e-waste menace. Some of the redesigning components that will effectively address the problem include:

- ▲ Designing the computers to ensure clean and safe mechanism for recovering raw materials.
- ▲ Clearly indicating hazards of dismantling and recycling in the form of warning labels.
- ▲ Replacing the hazardous substances in the manu-

## Charting the future

facturing processes with suitable alternatives (see annexure 3).

- ▲ Scope for upgrading – certain IBM PC models are equipped with extra bays and card slots to allow upgrading.

## Banning imports

Even after ratifying the Basel Convention, which prevents the transboundary movement of hazardous waste, the Indian government turns a blind eye to the dumping activities. The government should strictly ban the import of e-waste that can be used as raw materials. Strict monitoring in ports should be enforced so that the curb on imports is implemented. The ridiculous process of auctioning the banned goods should be stopped immediately. Instead, the consignment should be sent back and severe punishment should be imposed on the importer. Most importantly, awareness should be raised among enforcement agencies such as the Customs department.

## Organising the recycling sector

The recycling sector, though informal, plays a vital part in recovery and reuse of computer components. Promotion of eco-friendly recovery and recycling techniques should be developed in collaboration with premier technology institutions.

The unorganised sector should be formalised by issuing licenses to the existing ones. A watchdog committee should be set up to ensure that they handle domestic waste only, and that too in an eco-friendly manner .

It is high time that the government gets involved in the management of e-waste by implementing the above-mentioned recommendations on a war footing.

## ANNEXURES

### Annexure 1: Composition of a personal desktop computer based on a typical desktop computer, weighting 70 lbs

Name	Content (% of weight)	Recycling efficiency	Use/location
Plastics	22.9907	20%	Includes organics, oxides other than silica
Lead	6.2988	5%	Metal joining, radiation shield/CRT, PWB
Aluminum	14.1723	80%	Structural, conductivity/housing, CRT, PWB, connectors
Germanium	0.0016	0%	Semiconductor/PWB
Gallium	0.0013	0%	Semiconductor/PWB
Iron	20.4712	80%	Structural, magnetivity/(steel) housing, CRT, PWB
Tin	1.0078	70%	Metal joining/PWB, CRT
Copper	6.9287	90%	Conductivity/CRT, PWB, connectors
Barium	0.0315	0%	Getter in vacuum tube/CRT
Nickel	0.8503	80%	Structural, magnetivity/(steel) housing, CRT, PWB
Zinc	2.2046	60%	Battery, phosphor emitter/PWB, CRT
Tantalum	0.0157	0%	Capacitors/PWB, power supply
Indium	0.0016	60%	Transistor, rectifiers/PWB
Vanadium	0.0002	0%	Red phosphor emitter/CRT
Terbium	0	0%	Green phosphor activator, dopant/CRT,PWB
Beryllium	0.0157	0%	Thermal conductivity/PWB, connectors
Gold	0.0016	99%	Connectivity, conductivity/PWB, connectors
Europium	0.0002	0%	Phosphor activator/PWB
Titanium	0.0157	0%	Pigment, alloying agent/(aluminum) housing
Ruthenium	0.0016	80%	Resistive circuit/PWB
Cobalt	0.0157	85%	Structural, magnetivity/(steel) housing, CRT, PWB
Palladium	0.0003	95%	Connectivity, conductivity/PWB, connectors
Manganese	0.0315	0%	Structural, magnetivity/(steel) housing, CRT, PWB
Silver	0.0189	98%	Conductivity/PWB, connectors
Antimony	0.0094	0%	Diodes/housing, PWB, CRT
Bismuth	0.0063	0%	Wetting agent in thick film/PWB

*continued on next page*

*Annexure 1 continued from previous page*

<b>Name</b>	<b>Content (% of weight)</b>	<b>Recycling efficiency</b>	<b>Use/location</b>
Chromium	0.0063	0%	Decorative, hardener/(steel) housing
Cadmium	0.0094	0%	Battery, blu_green phosphor emitter/housing, PWB, CRT
Selenium	0.0016	70%	Rectifiers/PWB
Niobium	0.0002	0%	Welding allow/housing
Yttrium	0.0002	0%	Red phosphor emitter/CRT
Rhodium	0	50%	Thick film conductor/PWB
Platinum	0	95%	Thick film conductor/PWB
Mercury	0.0022	0%	Batteries, switches/housing, PWB
Arsenic	0.0013	0%	Doping agents in transistors/PWB
Silica	24.8803	0%	Glass, solid state devices/CRT,PWB

*Source: Handy and Harman Electronic Materials Corp, 72 Elm Street, North Attleboro, MA 02760,  
www.handyharman.com*

### **Annexure 2: Import of used computers in Chennai Port (January-September, 2003)**

<b>Product description</b>	<b>No. of items</b>	<b>Weight(Kgs)</b>
Used computers (PII-Dell)	142	
Used computers (PI-IBM)	106	
Used computers (non-branded)	158	
Used computers (486)	344	11,334
14" used computer digital monitor	80	
15" used computer digital monitor	60	
14" used computer analog monitor	235	
14" used computer analog monitor	150	2,500
Used 15" computer monitor	636	
Used 17" computer monitor	48	7,641
Second hand refurbished monitors	175	270
Used computer printers and accessories	237	5,000

*Source: Customs*

### Annexure 3: Eco-friendly initiatives by corporates

▲ 9 Japanese electronic firms spent more than \$1.5 billion on environmental design and compliance for the 2001-02 period with Matsushita spending \$413 million. ([www.greenbiz.com](http://www.greenbiz.com))

▲ Following is the list of companies that have redesigned some of their models in an eco-friendly way by replacing toxic lead from their manufacturing processes:

Company	Models redesigned
Fujitsu	1. FS8500 server group 2. Handy terminals Team Pad 7500 Series 3. Gs8500FX server group 4. Liquid Crystal Displays BL series 5. VSP3700 line printer 6. page printers PS2160 series
NEC	Used lead-free solder in 1999 in PC motherboards and in other computer parts as of 2000
Panasonic	By 2000, a total of 4 products and 13 variations featured lead-free solder
Sony	Has introduced lead-free solder in part on all-printed wiring board soldering processes with exception of some product categories.  As of 2000 lead-free solder used in Sony's notebooks
Toshiba	By 2001 using lead-free for DynaBook SS3490 personal computer

*Source: Web searches; Personal communication with Almitra Patel*

### Sources

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