



## A review on e waste its sources, types and current e waste generation statistics in India

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**Abstract** — *The new technologies that have evolved in the 20<sup>th</sup> century have clearly enhanced our life but have also contributed to the origination of waste generated from electrical goods. This waste is popularly known as e waste. This waste poses a threat to the life and health of human beings and whole of environment. Quantification of waste is the first step towards its management. In this context, this paper intends to focus on the e waste its sources, types and scenario of e-waste generation statistics in India at present.*

**Keywords**-e waste, sources of e waste ,white goods, brown goods, grey goods, composition of e waste

### I. INTRODUCTION.

The world has changed a lot with the invention of new technologies, some for the better, and some for the worse. It has both complicated and simplified life in total. For example in earlier days if someone intended to meet a person, they would just meet. And now with smart phones and social networking apps , we communicate a lot and understand each other less. Earlier we used to memorize so many phone numbers and nowadays we hardly remember our mobile numbers. Earlier we knew a lot about our neighbors and less about the world around us and now it's the exact opposite. Electronic items which were considered a luxury has now become a necessity in all sections of the society. Today the information and communication technology is affecting each and every sphere of life in a big way. But it has an ugly side to it. The electronic items which have completed their life span or have become obsolete are discarded which contributes to the generation of electronic waste or e-waste as it is popularly known.

### II. Sources of e-waste generation:

There are many sources of e-waste and two major ones are discussed in brief as follows

- a) Rapid economic growth: Industrialization and increase in job opportunities due to that, has lead to rapid economic growth which in turn has increased the purchasing power of individuals. Because of which a electronic gadget which was considered a luxury a decade ago has now transformed into a necessity and the very same gadgets discarded at end of life contributes to generation of e-waste.
- b) Innovative technologies: Rapid growth in technology and technological innovations have led to release of new devices and improved versions of existing technology. For example the pager got replaced by mobile phones and mobile phones are getting replaced by smart phones. This in turn increases the obsolescence rate of gadgets leading to generation of e-waste.

### III. Types of e-waste:

E-waste can be broadly classified into two main categories-

#### 1) Industrial e-waste

Industrial e-waste consists of all electronic items which are discarded due to end of life or have become . For example monitors and laptops, mother boards, mouse, keyboards, telephones, speakers, scanners, copiers, printers, digitizers, UPS systems, batteries and projectors etc.

#### 2) Domestic e-waste

Domestic e-waste consists of discarded televisions, refrigerators, mixers, juicers, washing machines, air conditioners, mobile charges, cameras etc.

### IV. Current e-waste generation status:

According to UNEP press release of 27 November 2006, globally, about 20-50 MT (million tonnes) of e-wastes are disposed off each year, which accounts for 5% of all municipal solid waste. In India over 7.2 MT of industrial hazardous waste, 4 lakh tonnes of electronic waste, 1.5 MT of plastic waste, 1.7 MT of medical waste, 48 MT of municipal waste are generated in the country annually according to Controller and Auditor general's report. Central Pollution Control Board (CPCB) estimated India's e-waste at 1.47 lakh tonnes or 0.573 MT per day.

A study released by the Electronics Industry Association of India (ELCINA) at the electronics industry expo – “Componex Nepcon 2009” had estimated the total e-waste generation in India at a whopping 4.34 lakh tonnes by end 2009. The CPCB has estimated that it will exceed the 8 lakh tonnes or 0.8 MT mark by 2012-13.

According to the reports of United Nations in 2014 India stands in fifth position in e waste production.

- America
- China
- Japan
- Germany
- India

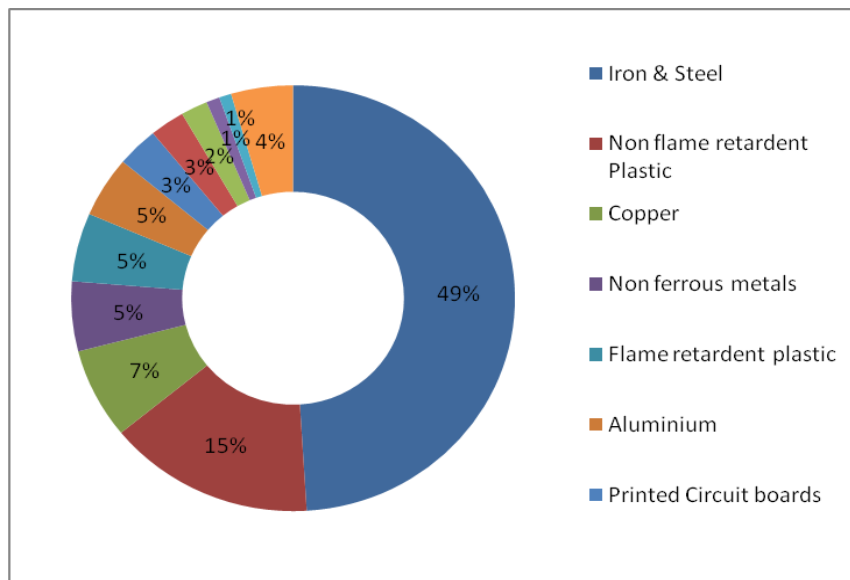
In the year 2014 1.6 crores tonnes of e waste generated in Asia and India generated 17 lakhs tonnes of e waste. The main sources of electronic waste in India are the government, public and private (industrial) sectors, which account for almost 70 per cent of total waste generation.

Individual households contribute only 15 per cent of e waste; the rest being contributed by manufacturers. Individual households do not contribute to waste generated by computers but they consume large quantities of consumer durables and are, therefore, potential creators of waste.

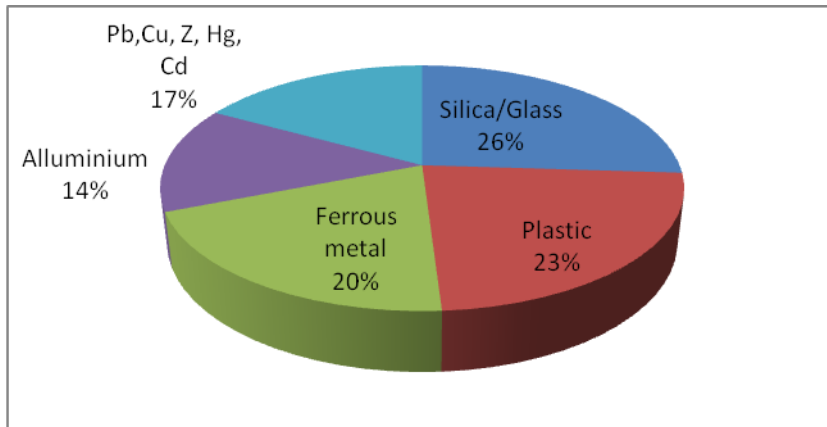
**Classification of electronic items:**

Electronic items are classified as (a) white goods consisting of air conditioners, refrigerators, washing machine etc. (b) Brown goods consisting of televisions, cameras etc. (c) Grey goods consisting of computers, fax machines etc.

**Composition of e-waste:** The composition of e-waste is diverse and can be categorized as ‘hazardous’ and ‘non-hazardous’. Broadly, it consists of ferrous and non-ferrous metals, plastics, glass wood and plywood, printed circuit boards, concrete, ceramics, rubber and other items. The chart below shows the composition of e-waste by weight.

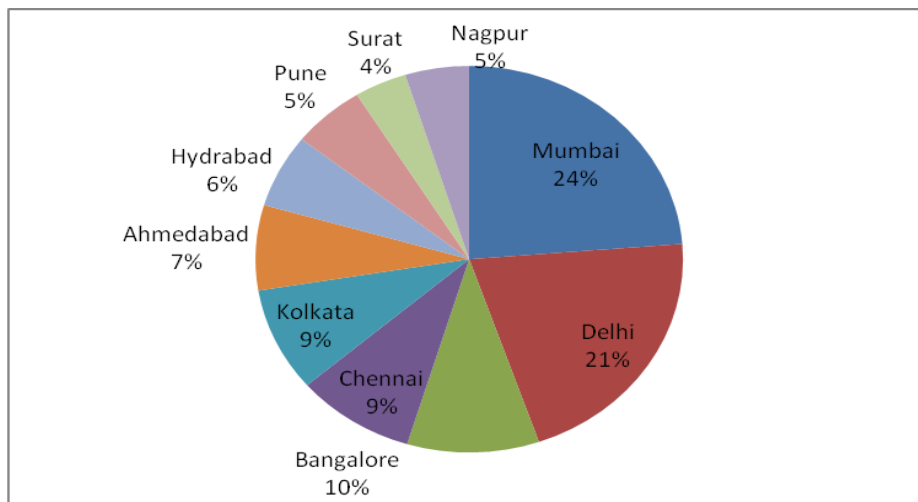


The material composition of personal computers is shown in the chart below

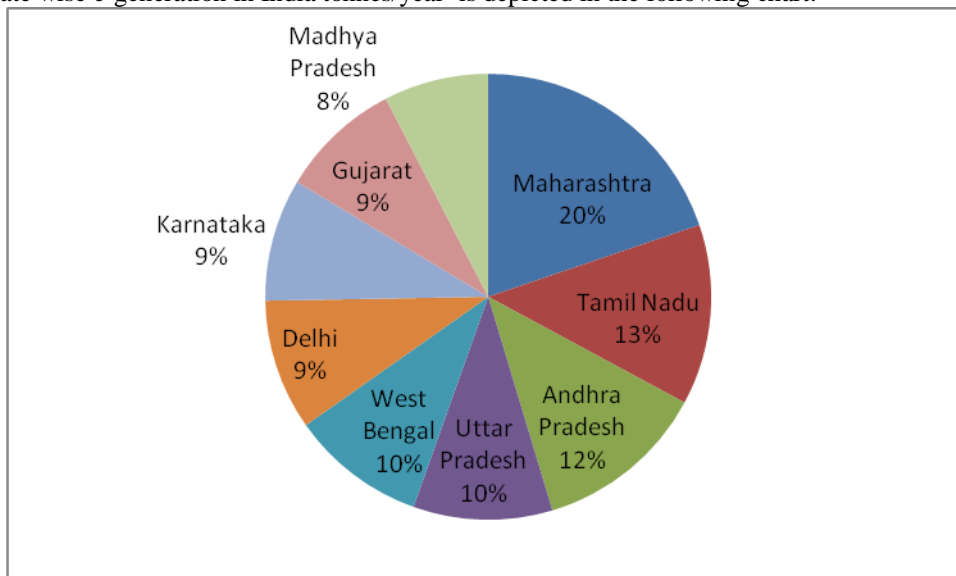


Source: Environment Canada

The city wise e-generation in India tonnes/year is depicted in the following chart:



The state wise e-generation in India tonnes/year is depicted in the following chart:



Source : Country level WEEE assessment study by the International Resource Group Systems South Asia Pvt. Ltd (IRGSSA), (m/s IRG Systems South Asia Pvt. Ltd), 2005.

### **Conclusion**

As interpreted from the above charts among cities of India, Mumbai tops the list in e waste generation which amounts to 24% of the total e waste generation of India in Tonnes/year followed by Delhi and Bangalore at 21% and 10% respectively. State wise Maharashtra tops the list of e waste generation with 20% of the total e waste generation of India in Tonnes/year followed by Tamilnadu (13%) and Andhra Pradesh(12%). Rest of the state with percentage contribution is shown in the chart.

Asian countries ( India China Pakistan ) and Africa have emerged as majority of disposal market for majority of e – waste. 70 % of E –waste generated in developing countries is dumped by developed countries. Reuse and Recycle being cheaper may be one of the reasons for dumping in developing countries. Import of e-waste is banned in India but it enters India with different nomenclature as mixed metal scrap or goods meant for charity. The occurrence of Cobalt-60 radiation tragedy at Mayapuri in Delhi in which a gammacell irradiator landed in the hands of a local scrap dealer leading to a radiological accident wherein one person lost his life and six persons were admitted to hospital, served as a wakeup call drawing attention to the mounting quantity of hazardous waste including e-waste in the country while revealing systemic problems on the issue of waste disposal. A report of the United Nations predicted that by 2020, e-waste from old computers would jump by 400 per cent on 2007 levels in China and by 500 per cent in India. E-waste from discarded mobile phones would be about seven times higher than 2007 levels and, in India, 18 times higher by 2020.

The common ways to manage e waste is to dispose it on to a landfill site or to incinerate it. But for designing a landfill facility or an incinerator the e waste needs to be quantified first. This paper has made an attempt to introduce to the readers the quantity of e waste generation in India so as to spread awareness about how grave the problem of e waste management will become in the coming years.

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