



(REVIEW ARTICLE)



E-Waste: A judicious management for the protection of human health and environment

Gurdev Singh *

S.D.W.G. Govt. College Beetan Distt. Una Himachal Pradesh-176601, India.

International Journal of Science and Research Archive, 2024, 12(02), 435–437

Publication history: Received on 31 May 2024; revised on 08 July 2024; accepted on 10 July 2024

Article DOI: <https://doi.org/10.30574/ijrsra.2024.12.2.1253>

Abstract

In 1959, Robert Noyce's invention of the first monolithic integrated circuit chip revolutionized the electronics industry, leading to an explosion of new electronics devices for human convenience. However, this digital revolution, coupled with scientific and technological advancements, has also given rise to a pressing issue: electronic waste, or E-Waste. The United Nations Institute of Training and Research (UNITAR) warn that global E-Waste is accumulating at a rate five times faster than it is being recycled. In 2022 alone, a staggering 62 million tons of E-Waste were produced worldwide. E-waste is laden with toxic materials such as lead, beryllium, cadmium, and many other toxic materials, posing significant threats to both human health and the environment. Improper disposal of E-Waste can contaminate soil and groundwater, exacerbating these hazards. To mitigate these risks, it is imperative to manage E-Waste judiciously and in an environmentally friendly manner. In India, the Ministry of Environment, Forest and Climate Change has established the E-Waste Management Rules of 2022 to regulate E-Waste management practices. The primary objective of this paper is to raise awareness about the importance of responsibly managing E-Waste to safeguard human health and preserve the environment. Effective management practices are essential to address the health hazards and environmental consequences associated with toxic materials in E-Waste.

Keywords: Invention; Digital; Hazard; Revolution; Toxic; Imperative

1. Introduction

Electronic waste, commonly referred to as E-waste, constitutes discarded electronic devices ranging from computers and mobile phones to televisions and refrigerators. As technology advances and consumer electronics become more pervasive, the volume of E-Waste generated globally has escalated dramatically. Managing this waste stream is crucial due to its environmental and health impacts, as well as its potential for resource recovery. The homes, Government office, hospitals and private sector are the major contributor to the E-Waste; which include Personal Computers, television, radio, cellphones, washing machines, Dvd player, Air Conditioner, Monitors, ECG devices, Electronic Microscopes, Incubators, Fax Machine, Xerox Machines, Scanners and Mixer Signal generator etc. This paper provides an overview of the challenges posed by E-Waste and the efforts undertaken to address them, focusing particularly on legislative frameworks and global trends in E-Waste Management.

2. Global E-Waste Scenario

According to statista reports China is the largest E-Waste generating country in the world followed by United States. The major E-waste producing countries are summarized below in the figure1 :

* Corresponding author: Gurdev Singh

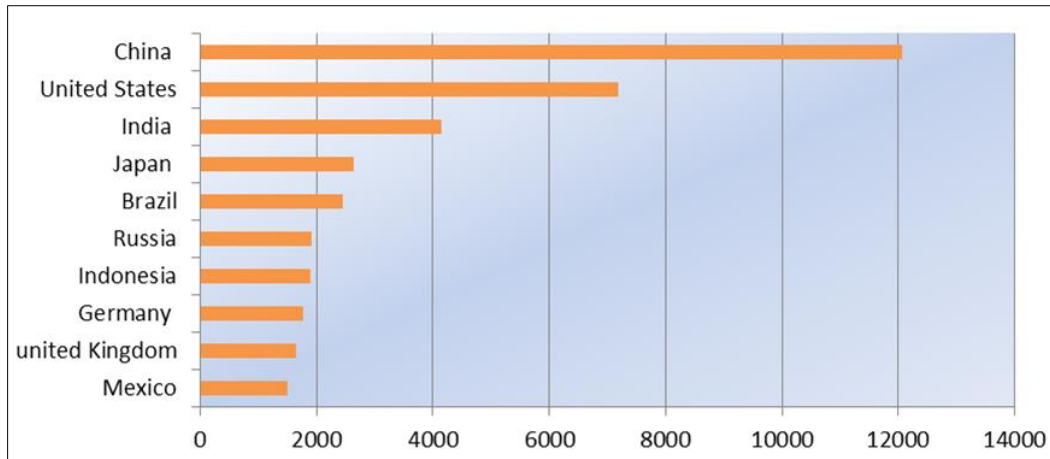


Figure 1 E-Waste generation in metric tons (Source Statista @2024)

3. Hazardous elements in E-waste and risk to human health and environment

E-Waste may contain hazardous chemicals and toxins (such as mercury and lead, arsenic, cadmium, chlorine etc.) that can leak into the environment if left un-removed, causing numerous health and environmental problems. Most E-waste contains harmful toxins including lead, mercury, arsenic, cadmium, chlorine and bromine, which can leak into the groundwater and bio-accumulate in the food chain causing detrimental damage to the soil, water supply, vegetation, wildlife and humans.

4. E-Waste Management

Managing E-Waste is crucial due to its hazardous elements and precious metals, which pose significant risks to both health and the environment and possible loss of precious metals. Therefore, it is imperative to address this pressing global issue through effective E-Waste management practices, ensuring a safer environment and better human health outcomes. In India E-waste management is carried through the E-Waste (Management) Rules, 2022 were published by the Government of India in the Ministry of Environment, Forest and Climate Change; vide notification number S.O. 360 (E), dated the 19th May, 2022 in the Gazette of India. These rules may be called the E-Waste (Management) Rules, 2022.

5. E-Waste as a Treasure

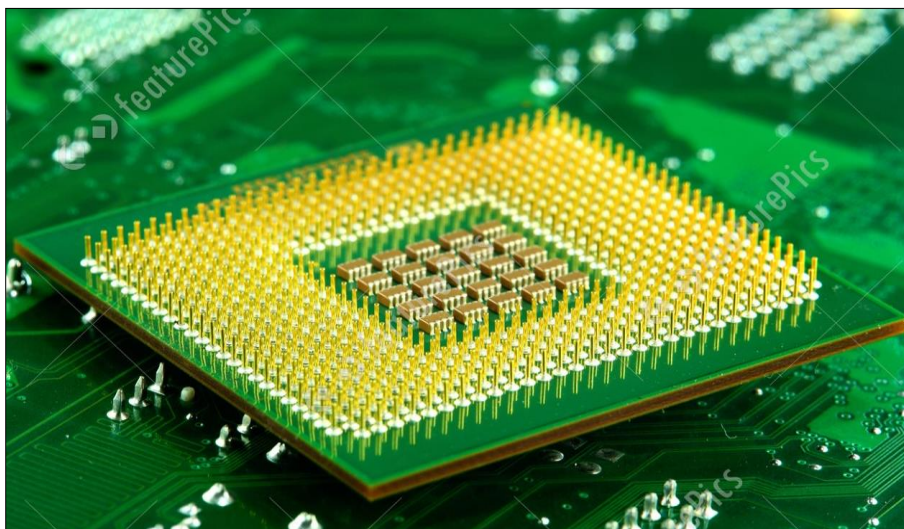


Figure 2 Precious metal gold in Microprocessor chips (source Wikimedia)

E-Waste contains valuable metals such as gold, silver, platinum, and others. Recycling these precious elements, particularly copper and gold, has become a significant source of income, predominantly within the informal sectors of

developing or emerging industrialized countries. According to UN Economic report on E-Waste “It’s uncommon to throw away gold, silver or platinum jewellery, but that is not true about electronic and electrical goods containing the same precious metals; up to 7 per cent of the world’s gold may currently be contained in E-Waste.”

6. Conclusions

The effective E-Waste management is crucial for safeguarding both public health and the environment. Governments worldwide should prioritize awareness campaigns to educate the public about the importance of proper disposal and recycling of electronic waste. By implementing advanced recycling technologies on a global scale, according to E-waste management rules, we can minimize the adverse impacts of E-Waste, conserve valuable resources, and promote sustainable development for future generations.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

- [1] Electronic Fundamentals and Applications by John Ryder
- [2] E-WASTE AND ENVIRONMENTAL ISSUES BY BHALLA RESHAM
- [3] Information at <https://www.statista.com/>
- [4] Information at <https://moef.gov.in/moef/index.html>
- [5] information at <https://www.unitar.org/>