



Used Electronics: Opportunity or Toxic Waste

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Abstract— *This Paper attempts to provide a brief insight into this relatively new concept of e-waste, its generation in India and the environmental and health concerns attached to it. It highlights the e-waste recycling economy in the thriving informal and the nascent formal sector and the urgent need for a more clear-cut legislation and forward looking vision. The Paper also looks into the global trade in e-waste and the international experience in this regard. A list of references too has been given at the end for further reading*

Keywords— *hazardous waste, recycling e waste, Extended Producer Responsibility (EPR), e waste, Unorganized Sector in India*

I. INTRODUCTION

The information and communication revolution in the 20th Century has brought enormous changes in the way we organize our lives, our economies, industries and institutions. These in modern times have enhanced the quality of our lives but at the same time, these have led to manifold problems including the problem of massive amount of hazardous waste and other wastes generated from electric products. These hazardous and other wastes pose a great threat to the human health and environment. The issue of proper management of wastes, therefore, is critical to the protection of livelihood, health and environment. Wastes are such items which people are required to discard because of their hazardous properties. Our daily activities give rise to a large variety of different wastes arising from different sources. Thus, municipal waste is a waste type consisting of everyday items that are discarded by the public. It may contain hazardous waste including most paints, chemicals, light bulbs, fluorescent tubes, etc. Biomedical waste is waste generated by hospitals and other health providers and consists of discarded drugs, waste sharps, microbiology and biotechnology waste, human anatomical waste, animal waste, etc. Radioactive waste is any material that contains a concentration of radionuclide greater than those deemed safe by national authorities, and for which, no use is foreseen. Like hazardous waste, the problem of e-waste has become an immediate and long term concern as its unregulated accumulation and recycling can lead to major environmental problems endangering human health.

II. WHAT IS E-WASTE?

New technologies and the globalization of the economy have made a whole range of products available and affordable to the people changing their lifestyles significantly. But on the other hand, it has also led to unrestrained resource consumption and an alarming waste generation. Both developed countries and developing countries like India face the problem of e-waste management. Electronic waste, e-waste, e-scrap, or Waste Electrical and Electronic Equipment (WEEE) describes loosely discarded, surplus, obsolete, or broken electrical or electronic devices. Environmental groups claim that the informal processing of electronic waste in developing countries causes serious health and pollution problems. Some electronic scrap components, such as CRTs, contain contaminants such as lead, cadmium, beryllium, mercury, and brominate flame retardants. Activists claim that even in developed countries recycling and disposal of e-waste may involve significant risk to workers and communities and great care must be taken to avoid unsafe exposure in recycling operations and leaching of material such as heavy metals from landfills and incinerator ashes.

The countries of the European Union (EU) and other developed countries to an extent have addressed the issue of e-waste by taking policy initiatives and by adopting scientific methods of recycling and disposal of such waste.

III. E-WASTE GENERATION IN INDIA

All over the world, the quantity of electrical and electronic waste generated each year, especially computers and televisions, has assumed alarming proportions

Although no definite official data exist on how much waste is generated in India or how much is disposed of, there are estimations based on independent studies conducted by the NGOs or government agencies. According to the Comptroller and Auditor- General's (CAG) report, over 7.2 MT of industrial hazardous waste, 4 lakh tones 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. 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. The contribution of individual households is relatively small at about 15 per cent; the rest being contributed by manufacturers. Though individual households are not large contributors to waste generated by computers, they consume large quantities of consumer durables and are, therefore, potential creators of waste.

IV. HARMFUL EFFECTS CAUSED BY IMPROPER COMPUTER & ELECTRONIC WASTE RECYCLING

Electronic waste affects nearly every system in the human body because they contain a plethora of toxic components including Mercury, Lead, Cadmium, Polybrominated Flame Retardants, Barium and Lithium. Even the plastic casings of electronics products contain Polyvinyl Chloride. The health effects of these toxins on humans include birth defects, brain, heart, liver, kidney and skeletal system damage. They will also significantly affect the nervous and reproductive systems of the human body

A. Recycling e-waste: a thriving economy of the unorganized sector

Developing countries with rapidly growing economies handle e-waste from developed countries, and from their own internal consumers. Currently, an estimated 70 percent of e-waste handled in India is from other nations, but the UNEP estimates that between 2007 and 2020, domestic television e-waste will double, computer e-waste will increase five times, and cell phones 18 times. India has the label of being the second largest e-waste generator in Asia. According to a MAIT – GTZ estimate, India generated 330,000 lakh tonnes of e-waste in 2007, which is equivalent of 110 million laptops. More than 90 per cent of the e-waste generated in the country ends up in the unorganized market for recycling and disposal. The unorganized sector mainly consists of the urban slums of the metros and mini-metros, where recycling operations are carried out by the unskilled employees using the most rudimentary methods to reduce cost. A study by the Basel Action Network (BAN) in partnership with the Toxic Link reveals that e-waste is received and processed in India in similar manner as is done in China, or the condition could be even worse.

B. E-waste economy in the organized sector

In July 2009, organized recyclers formed the e-waste recycler's association but facing stiff competition from the unorganized sectors, they have been able to capture only 10 per cent of the total share of the e-waste market. A problem facing the organized sector is the lack of proper collection and disposal mechanisms and appropriate technologies in the face of a large informal sector.

V. MANAGEMENT OF E-WASTE

A. The Hazardous Waste (Management and Handling) Rules, 2003

In 1986, India enacted its first comprehensive environmental law, namely, the Environmental (Protection) Act, 1986 (EPA) after the Bhopal Gas tragedy and as a commitment under the Stockholm Conference in 1972. Section 3 of the Environment (Protection) Act, 1986, gives all-encompassing powers of setting standards, laying down procedures and supervision on the Central Government. The Rules under the EPA bestow upon the Union Government Comprehensive powers to "take all such measures as is necessary or expedient for the purposes of protecting and improving the quality of environment and preventing, controlling and abating environmental pollution".

B. THE HAZARDOUS WASTES (MANAGEMENT, HANDLING AND TRANSBOUNDARY MOVEMENT) RULES, 2008

In its endeavour to frame appropriate legislation for e-waste, the Central Government drafted the Hazardous Material (Management, Handling and Transboundary Movement) Rules, 2007 to prohibit transboundary movement of hazardous waste as envisioned by the Basel Convention, The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal is the most comprehensive global environmental agreement on hazardous and other wastes. It was signed by 173 countries on 22 March 1989 and entered into force on 5 May 1992. It was basically created to prevent the economically motivated dumping of hazardous wastes from richer to poorer countries, which had resulted from a tightening of environmental regulations and a steep rise in the cost of hazardous waste disposal in industrialized countries. On 24 September 2008, these rules were notified as the *Hazardous Wastes (Management, Handling and Transboundary Movement Rules, 2008* by the Ministry of Environment and Forests in supersession of the Hazardous Wastes (Management and Handling) Rules. As per these Rules, every person desirous of recycling or reprocessing hazardous waste including electronics and electrical waste is required to register with the Central Pollution Control Board.¹¹⁹ The units handling e-waste are required to register with the CPCB. The waste generated is required to be sent or sold to a registered or authorized re-cycler or re-processor or re-user having environmentally sound facilities for recovery of metals, plastics, etc.¹²⁰ The CPCB has to be satisfied that an applicant for recycling or reprocessing waste is utilizing environmentally sound technologies and possesses, adequate technical capabilities, requisite facilities and equipment to recycle, reprocess or reuse hazardous wastes, before granting registration to such applicants. Further, the Ministry of Environment and Forests has constituted a Coordination Committee to oversee the implementation of the Hazardous Wastes (Management, Handling and Transponder)

VI. PROPOSITION TO CONTROL AND PROMOTE THE USE OF EWASTE

A. Need for stringent health safeguards and environmental protection laws in India

The Government has consulted various non-governmental organizations (NGOs) in the process of developing a dedicated set of rules, which would govern the management and handling of electronic and electrical waste. The MoEF has proposed to notify separate Rules on e-waste under the Environment (Protection) Act, 1986. One of the salient features of MoEF is the concept of Extended Producer Responsibility (EPR) has been enshrined in the proposed Rules.) The rules propose to extend producers' responsibility to the post-consumer stage of the product life cycle and fix their responsibility for collection of end of life products and to ensure that such wastes are channelized for safe handling. In addition, Producers are required to finance, and organize a system to meet the costs involved in the environmentally sound

management of e-waste generated from the 'end of life' of their own products and the historical waste available on the date from which these rules come into force.

B. Awareness program

The new draft rules put the onus of creating awareness of the hazardous constituents of e-waste and its management on the producers. The awareness among the consumers regarding hazardous constituents of e-waste can be created through active propaganda in print & electronic media and strong extension program. The awareness through media may not be feasible by the producers individually. This task may have to be taken up by agencies like Municipal Bodies/State Pollution Control Boards/Central Pollution Control Board.

C. Choosing safer technologies and cleaner substitutes

Two of the most toxic compounds that are found in the components of e-waste are the Polybrominated biphenyls (PBB) and Polychlorinated biphenyls (PCB). Significantly, the new draft rules on e-waste management have, among others, covered these compounds. Owing to stringent standards prevailing in the developed countries, most companies in these countries have moved to adopt safer technologies for producing electronic items devoid of toxic metal oxides

D. Monitoring of Compliance of Rules

The State Pollution Control Boards or Committees responsible for grant of authorization, monitoring compliance of authorization and registration conditions can take action against violations of rules. On the other hand, the Central Pollution Control Board (CPCB) can monitor the compliance of conditions stipulated for granting registration.

E. Recognizing the Unorganized Sector in India

Currently, there are 23 formal recycling and reprocessing units having environmentally sound management facilities which are registered with the Central Pollution Control Board (CPCB) located in Andhra Pradesh, Karnataka, Maharashtra, Haryana, Rajasthan, Tamil Nadu, Uttar Pradesh and Uttarakhand. The formal units perform collection, segregation, shredding and resource recovery employing automated, semi-automated or manual operations for the recycling of e-waste. Some of the viable recycling facilities in the formal sector are the Attero Recycling Plant in Roorkee, Uttarakhand, E-Warrrd and E-Parisara in Bengaluru and Earth Sense in Hyderabad. That the e-waste sector can be made into a viable business model is indicated by a Bengaluru-based successful conglomeration of 70 informal recyclers –called the Harit Recyclers Union.²¹⁴ There is a concern that the new draft regulations may enable only the registered big investment companies to recycle e-waste with an aim to control illegal trade and accompanying pollution. However, it is the unorganized sector which is currently handling more than 90 per cent of the e-waste generated in the country. The Centre for Science and Environment, an NGO in fact apprehends that ignoring the informal sector may actually make the implementation of draft rules ineffective. There is a concern that organized business could well lead to more and more waste being imported into the country, only to be outsourced to the poorest and the most unorganized for reprocessing. Such concerns can be dispelled if the informal or unorganized sector is upgraded to provide a support system for the integrated recycling and treatment and disposal facilities. It would enable to bring the unorganized sector in the mainstream of activities while ensuring environmental compliances.

VII. CONCLUSIONS

The future scenario has, indeed, presented both challenges and opportunities in terms of minimizing waste, managing e-waste as well as developing cleaner and more sustainable products. It is, therefore, important that viable solutions are found to address the problem of the e-waste involving skilled manpower from the informal sector of the economy and the use of appropriate technology. Besides, the urgent need for evolving sound policy and robust regulatory mechanism for safe and sustainable e-waste management can hardly be over emphasized. More importantly, the cardinal principles of accountability, transparency and sustainability need to be incorporated in any policy or regulation on e-waste to ensure its proper implementation.

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