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Title

MANAGEMENT OF E-WASTE- BLACK TO GREEN

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ABSTRACT:

Environment today is losing its natural essence and sustainability due to various environmental issues. With more developments and dynamic innovations, environment is being depleted with natural resources leading to various problems of diversified nature. These problems are so diversified that it will affect the entire human community along with the other living species. Developed and developing nations alike are becoming increasingly aware of the staggering amount of obsolete electronics, or e-waste, being generated by both consumers and organizations. India is already a huge producer of Waste Electronic and Electrical Equipment (WEEE) as it has one of the fastest growing markets for Electronic and Electrical Equipment (EEE), one that is far from saturation. The consumer electronic market in India is estimated at 13.5 million units and valued at Rs. 129 billion in 2003. This represents 21% volume growth over 1998, and 41% current value growth over 1998 (Euro monitor International, 2004). From 1993 to 2000, the number of PC users in India increased 604% whilst the average growth throughout the world was much lower at 181 % Least Developed Region (LDR), 2005. This year alone, it is estimated that 450 million units of discarded electronics will enter the waste stream across America.

By 2010, this figure will rise to three billion units per year. Without proper recycling, this will result in the ejection of shocking levels of toxins into our environment; over 550 million kilos of lead, 900,000 kilos of cadmium and 180,000 kilos of mercury. India is now confronted with the huge problem of e-waste - both locally generated and internationally imported - and also both a lucrative industry and yet also a serious threat to human health and the environment.

Large e-waste centers exist in Delhi, Meerut, Firozabad, Chennai, Bangalore and Mumbai, with 25,000 recyclers working in Delhi alone. Workers are poorly-protected in an environment where e-waste from PC monitors, PCBs, CDs, motherboards, cables, toner cartridges, light bulbs and tube-lights are burned in the open, releasing lead, mercury toxins into the air. Metals and non-degradable materials such as gold and platinum, aluminum, cadmium, mercury, lead and brominates flame-retardants are retrieved. These substances are associated with a range of adverse human health conditions, including effects on the nervous system, reproductive and child developmental problems, cancer, and genetic impacts.

Generally the most valuable parts, such as microchips and hard disks, are removed in the first process, and then remnants may pass through multiple "strippers" or lower-tier scavengers who salvage the next valuable parts. At the end of the chain, the leftovers, highly toxic components, are ending up in our landfills or are exported to developing nations. As much as 50 to 80 percent of US electronic waste collected for recycling is sent to Asia, the Basel Action Network reports. Mumbai alone throws away 19,000 tone of electronic waste a year, excluding the large e-waste imports from developed nations through its port. The trend is likely to increase manifold in proportion to the growth in the electronics industry and the life-span of electronics go down. The projected growth for the e-waste generation for India is about 34% year. This is also giving a new business to domestic as well as multinational industries worldwide, with a good profit base.

Environmentally sound management" (ESM), the aim of which is to protect human health and the environment by minimizing hazardous waste production whenever possible. ESM means addressing the issue through an "integrated life-cycle approach", which involves strong controls from the generation of a hazardous waste to its storage, transport, treatment, reuse, recycling, recovery and final disposal. The growing quantity of e-Waste necessitates the development of systems which can handle the waste in such a way that minimizes negative social and environmental impacts while maximizing the positive impacts. The study focuses and put efforts to find solutions that can improve the situation with regard to environmental impacts, occupational hazards and economic revenue

Key words: Environment, Electronic-Waste, Green & Waste Management

INTRODUCTION:

Environmental management is most important, yet it is most neglected discipline. It concerns life support system and is closely linked with development and economic growth. At times, the two (development and environmental management) become irreconcilable. Today, Masses stand at the crossroads in choosing between environment and development. The industrial countries have achieved high level of development and decent standard of living at the cost of environment and depletion of natural resources. Both the industrialized countries and

underdeveloped or developing countries, damage, deplete and pollute the environment. The developing countries need growth to fulfill the basic need of their people, but not at the cost of environment. It is a fact that both the consumption and life-style of people have relevance to environmental problems; therefore living habits and attitudinal and ethical questions have now entered into the environmental management area. Developed and developing nations alike are becoming increasingly aware of the staggering amount of obsolete electronics, or e-waste, being generated by both consumers and organizations. This year alone, the EPA estimates that 450 million units of discarded electronics will enter the waste stream across America. By 2010, this figure will rise to three billion units per year. The technological revolution brought with it a consumer demand for constant upgrades to newer, faster, and more advanced models of products. The consumers are using the electronic products with a shorter life span, which posing dangerous effects on the society at large in terms of E-Waste.

E-WASTE:

Electronic waste, also known as E-Waste or waste electronic and electrical equipment (WEEE) is a generic term embracing various forms of electronic and electrical equipment (EEE) that have ceased to be of any value to their owners. The following Categories of electrical and electronic equipment covered by the WEEE Directive referred as E-Waste.

1. Large household appliances
2. Small household appliances
3. IT and telecommunications equipment
4. Consumer equipment
5. Lighting equipment
6. Electrical and electronic tools (with the exception of large-scale stationary industrial tools)
7. Toys, leisure and sports equipment
8. Medical devices (with the exception of all implanted and infected products)
9. Monitoring and control instruments
10. Automatic dispensers

Source: EU, 2002

E-WASTE IN GLOBAL CONTEXT:

The use of electronic devices has proliferated in recent decades, and proportionately the quantity of electronic devices that are disposed of, is growing rapidly throughout the world. A study by UNEP (2005) found that every year, 20 to 50 million tons of E-Waste are generated worldwide. In 1994, it was estimated that approximately 20 million Personal Computers (PCs) became obsolete. By 2004, this figure was to increase to over 100 million PCs. Cumulatively, about 500 million PCs reached the end of their service lives between 1994 and 2003(Puckett and Smith, 2002). This fast growing waste stream is accelerating because the global market for PCs is far from saturation and the average lifespan of a PC is decreasing rapidly. The figure 1 will define the level of e-waste in United States.

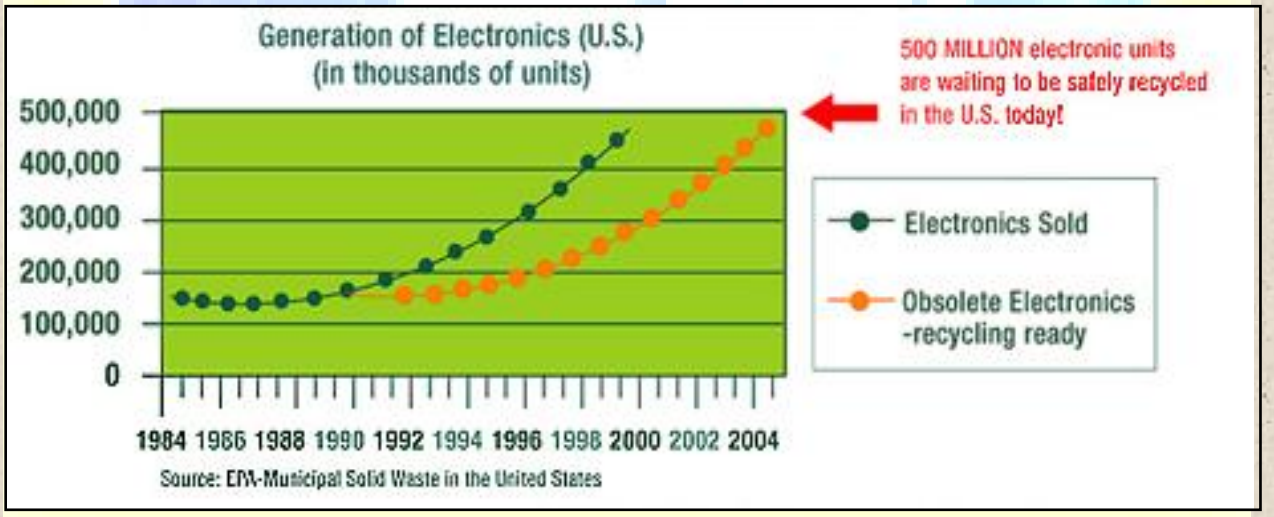

Figure 1

E-WASTE IN INDIAN CONTEXT:

India is already a huge producer of WEEE as it has one of the fastest growing markets for EEE, one that is far from saturation. The consumer electronics market in India is estimated at 13.5 million units and valued at Rs. 129 billion in 2003. This represents 21% volume growth over

1998, and 41% current value growth over 1998 (Euro monitor International, 2004). From 1993 to 2000, the number of PC users in India increased 604% whilst the average growth throughout the world was much lower at 181% (LDR, 2005). A report by a New Delhi based NGO, Toxics Link (2004), on computer waste, estimated that in India business and individual households make approximately 1.38 million personal computers obsolete every year. India is now confronted with the huge problem of e-waste - both locally generated and internationally imported - and also both a lucrative industry and yet also a serious threat to human health and the environment.

While there have been some initiatives to set regulations for e-waste management, overall, these hazardous wastes are still typically dismantled and recycled by hand in India in unorganized scrap yard settings that lack safeguards and government guidelines. Though the Indian Supreme Court banned the import of hazardous waste in 1997, 600 tons of e-waste still entered the country in the last six months under the guise of charitable or re-usable materials, all duty-free. It is estimated that the US alone exports 80 percent of its e-waste to China, India and Pakistan.

Large e-waste centers exist in Delhi, Meerut, Firozabad, Chennai, Bangalore and Mumbai, with 25,000 recyclers working in Delhi alone. Workers are poorly-protected in an environment where e-waste from PC monitors, PCBs, CDs, motherboards, cables, toner cartridges, light bulbs and tube-lights are burned in the open, releasing lead, mercury toxins into the air. Metals and non-degradable materials such as gold and platinum, aluminum, cadmium, mercury, lead and brominates flame-retardants are retrieved. According to Toxics Link, a Delhi-based non-governmental organization (NGO), India annually generates $1.5 billion worth of e-waste domestically, with the booming IT sector being the largest contributor, as 30 percent of its machines reach obsolescence annually. Bangalore alone generates 8,000 tons a year. A report put out by International Resource Group (IRG) estimates that by 2012, India's domestic waste alone would amount to 1,600,000 tons.

INTERFACES BETWEEN E-WASTE, HUMAN & ENVIRONMENT:

When electronics split open as they are crushed into trucks and dumped into landfill, the electronics release a stew of toxic materials. When plastic casings are burned, which happens in and fill fires, and is purposefully done in developing countries where electronics are being sent

as trash, carcinogenic dioxin is emitted into the air. Lead, mercury, cadmium, and the poly brominates flame retardants contained in computers and other electronics are all Persistent, Bio Accumulative toxins (PBTs) that can leach into the environment, gather in the body, and pose significant risk to humans and ecosystems. The Figure 2 will define the which substances are associated with a range of adverse human health conditions, including effects on the nervous system, reproductive and child developmental problems, cancer, and genetic impacts.

Toxic Materials	Birth Defects	Brain Damage	Heart, Liver, Lung & Spleen Damage	Kidney Damage	Nervous/ Reproductive System Damage	Skeletal System Damage
Barium		X	X			
Cadmium	X		X	X	X	X
Lead	X	X		X	X	
Lithium	X	X	X	X	X	
Mercury	X	X	X	X		
Nickel	X		X	X	X	
Palladium	X	X	X	X		
Rhodium			X			
Silver	X	X	X	X	X	

Figure 2

MANAGEMENT OF E-WASTE:

A study by Toxics Link (2003) examined the Indian E-Waste management system and identified that the main incentive for the players is to be financially profitable and to raise environmental and social awareness. E-Waste recycling has become a profitable business, flourishing as an unorganized sector, mainly as backyard workshops. The biggest drawback of the current Indian system is the uncontrolled emission of hazardous toxics that are going into the air, water and soil. The health hazards from fumes, ashes and harmful chemicals affect not only the workers who come into contact with the E-Waste, but also the environment. Therefore, different approaches to E-Waste management have to be found in order to formalize the E-Waste recycling sector and bring more responsibility to the producers, while maximizing the positive impacts. Extended producer responsibility (EPR) and awareness of general public can be the only two better choices

available as such. EPR is being propagated as a new paradigm in waste management. The basic principle of EPR is that producers should be held accountable for the entire lifecycle of the product including their final disposal. This would shift responsibility away from the municipalities to include the costs of treatment and disposal into the price of the product, reflecting the environmental impacts of the product. As far as consumers are concerned it becomes the duty of each of us to make the waste green by proper recycling , or by disposing of into the hands of experts.

CONCLUSION:

The growing quantity of E-Waste necessitates the development of systems which can handle the waste in such a way that minimizes negative social and environmental impacts while maximizing the positive impacts. With the rapidly expanding E-Waste sector both globally and in India, E-Waste management is a strategic business opportunity as many rare and valuable metals can be recovered and manpower in India is affordable. It is, however, extremely Important to do this is a sustainable manner, taking into account the cost of labor, the structure of the economy including the important informal sector, the existing regulatory framework and the possibilities and limits of law enforcement in order to find solutions that can improve the situation with regard to environmental impacts, occupational hazards and economic revenue. Therefore, sophisticated E-Waste management technologies should be adapted to the Indian scenario and must have the ability to adapt flexibly to future changes in the quantity and quality of the waste flows. We believe the better people understand the issues surrounding electronics recycling, the more committed they will become to helping solve the problem.

REFEFERENCES:

- Economic Survey 1999-2000
- Encyclopedia of the Sustainable Development". Atmosphere, Climate & Environment Information Programme. Manchester Metropolitan University.

- Editorial (2005) Electronic waste – an emerging risk? Environmental Impact Assessment Review (25), p. 431-435.
- Empa (2004) E-Waste pilot study Delhi: knowledge partnerships with developing and transition countries. Empa. http://www.ewaste.ch/.
- EU (2002a) Directive 2002/96/EC of the European parliament and of the council of 27 January 2003 on waste electrical and electronic equipment (WEEE) —joint declaration of the European parliament, the council and the commission relating to article 9. Official Journal L037, 13/02/2003, p. 4-39. http://europa.eu.int/eur-lex/en/.
- EU (2002b) Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS). Official Journal L037, 13/02/2003, p. 19– 23.
- Toxics Link (2004) Time is running out. http://www.toxicslink.org/
- Toxics Link (2003) Scrapping the high Tech Myth: Computer waste in India. http://www.toxicslink.org
- UNEP (1989) Basel convention on the control of trans boundary movements of hazardous wastes and their disposal, United Nations Environment Programme /Secretariat of the Basel Convention;. http://www.basel.int/text/documents.html.
- Widmer R, et al. (2005) Global perspectives on E Waste, Environmental Impact Assessment Review (25), p. 436-458.