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Comparison Study of Electronic waste Management in India & Switzerland

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Abstract:-*Electronic equipments have taken a position mark in our lives. In India wealthy class is using up to date devices like cell phones, laptops, computers, microwave ovens, fridge, televisions etc and then pass it on to the poor class. There are no proper way for disposal or recycling of E- wastes. Using descriptive studies, the investigation discovers the management of electronic waste in the two countries, discussing their system flows and key issues. This study discuses about the growing difficulty of e-waste in India, present technologies and rules for its control, demanding situations to put in force e-waste after which in the end after giving solutions for decreasing e-waste the Study will finish itself with the aid of announcing save earth.*

Keywords: *E-Waste Management, Sustainability, disposal, recycle, reuse.*

INTRODUCTION

"Electronics waste" explained as discarded computers, electronics equipments from offices, musical electronic devices, cell phones, television sets and refrigerators etc. as loads of excess electrical components are regularly commingled (fine, recyclable, and non-recyclable), various public policy supporter apply the term "e-waste" broadly to all additional electronic scraps. managing of solid waste has turn into a critical problem for almost all the major cities in India. Increase in population joined with the fast urbanization of Indian cities, has result in new utilization patterns, which usually affect the waste flow through the successive adding of new form of waste. Over the previous two year, remarkable advance in technology and the changing way of life of people has lead to an increasing rate of consumption of electronic products. A trend today is dependence on information technology. The fast growth of technological alteration has guide to the fast obsolescence rate of IT equipments added to the large import of scrap computers systems from overseas creating remarkable situation for waste management. Electronics products include unsafe and toxic material that posses ecological chance if wastes are disposed or incinerated. Televisions and computer systems video display units use cathode ray tubes (CRTs) which incorporates giant quantities of lead. Printed circuit boards incorporate by and large plastic, copper, small quantities of chromium, lead solder, nickel and zinc. In addition, many electronics merchandise have batteries that frequently include nickel, cadmium and different heavy metals. These poisonous substances can contaminate soil, ground water and air, as well as affect the people of the unit and the community living around it. additionally, the human resources in e-waste reprocessing actions may suffers dangerous health and environmental issues. Hence there is a apparent motive to be worried about the trade, the technology in practice and the existing improper disposal practices of e- Waste in India.

Sources of E- waste:

Electronics waste especially computer waste is increasing exponentially in volume due to growing demand of information technology and its function in the national enhancement practice. various managing divisions, community with private unit are quick supplying old electronic machines for example computers, telephones, etc, with in the waste supply. basis of E-waste are:

- Individual household and small commercial enterprise
- Large commercial enterprise, Institutions, authorities homes and foreign embassies
- PC producers and stores
- E waste from imports

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- Secondary market of antique PCs

Categories of E-waste

The electric and electronics equipment can be broadly labeled into following categories.

- Large family appliances (refrigerator, freezer, washing device, cooking appliances, and so on.)
- Small household home equipment (vacuum cleaners, watches, grinders, etc.)
- IT and telecommunication system (PCs, printers, telephones, and many others.)
- Consumer gadget (TV, radio, video digicam, amplifiers, and so forth)
- Lighting equipment (CFL, high depth sodium lamp, and so forth.)
- Electrical and electronic equipment (drills, saws, sewing gadget, and many others.)
- Toys, amusement, and sport gadget (computer/ video video games, electric powered trains, etc.)
- Medical devices (apart from all implanted and inflamed merchandise radiotherapy system, cardiology, dialysis, nuclear medicine, etc.)
- Monitoring and manipulate gadgets.

HAZARDOUS RELATED WITH E-WASTE

Waste electronics equipments should no longer be shared with improper managed municipal waste intended for landfills since electronics waste be able to include higher than 1000 various substances, lots of which might be poisonous, for example lead, mercury, arsenic, cadmium, selenium, and hexavalent chromium. Some of the toxic consequences of the intense metals are given below.

Lead

Lead have an effect on to the valuable and peripheral nervous structures of human beings, blood structures, kidney and reproductive device in people. the principle packages of lead in computer systems are: glass panels and gasket (frit) in pc video display units, and solder in published circuit boards and different components.

Cadmium

Cadmium compounds are poisonous, they could bioaccumulate, and they pose a hazard of irreversible outcomes on human fitness. Cadmium happens in positive additives consisting of floor mount gadgets (SMD) chip resistors, infrared detectors, and semiconductor chips.

Mercury

Mercury can reason harm to diverse organs consisting of the mind and kidneys. most importantly, the growing fetus is fairly inclined thru maternal exposure to mercury. Mercury is used in thermostats, sensors, relays, switches (e.g. on revealed circuit boards and in measuring device), scientific gadget, lamps, cellular telephones and in batteries.

Hexavalent chromium/chromium VI

Chromium VI continues to be used for corrosion protection of untreated and galvanized steel plates and as a decorative or hardener for metallic housings. It without problems passes via cell membranes and is then absorbed— producing numerous toxic results in contaminated cells.

Methods of treatment and disposal

- Land filling
- Incineration
- Pyrolysis
- recycle & reuse

Indian Scenario

The announcement estimates that India's modern-day e-waste production is 2.75 lakh tonnes from TVs, over one lakh tonnes from fridges, 56300,three hundred tonnes from laptop, 1700 from printers. however, China's problem from e-waste is an awful lot greater than that of India. It now produced five lakh tonnes by fridge waste and 3 lakh tonnes of computer waste.

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other than the e-waste generated by domestic consumption, India, China and different developing international locations additionally ought to confront the felony and unlawful dumping of e-waste by means of western international locations, especially the India which is, as of now, no longer bound via worldwide agreements on unsafe wastes because it has rejected to signal such treaties.

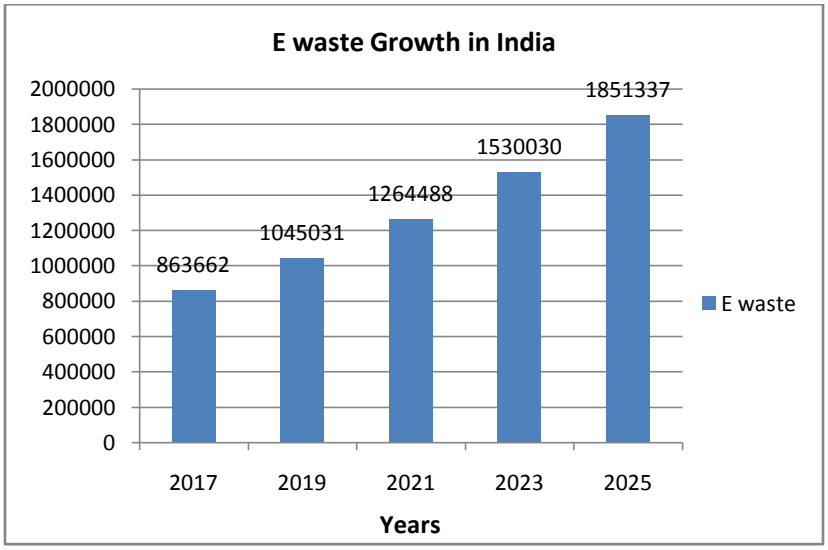

Figure 1: E waste Growth in India Year wise (Source: Information technology Department)

State Scenario

The top most states in India are in sequence of main involvement to WEEE, consist of Maharashtra, Andhra Pradesh, Tamil Nadu, Uttar Pradesh, West Bengal, Delhi, Karnataka, Gujarat, M.P., and Punjab.
The urban position of major WEEE producers are Mumbai, Delhi, Bangalore, Chennai, Kolkata, Ahmadabad, Hyderabad, Pune, Surat, and Nagpur.
This is due to the presence of a large number of Info Tech Parks & electronic products manufacturing companies situated in these areas, which plays the main role in waste generation.

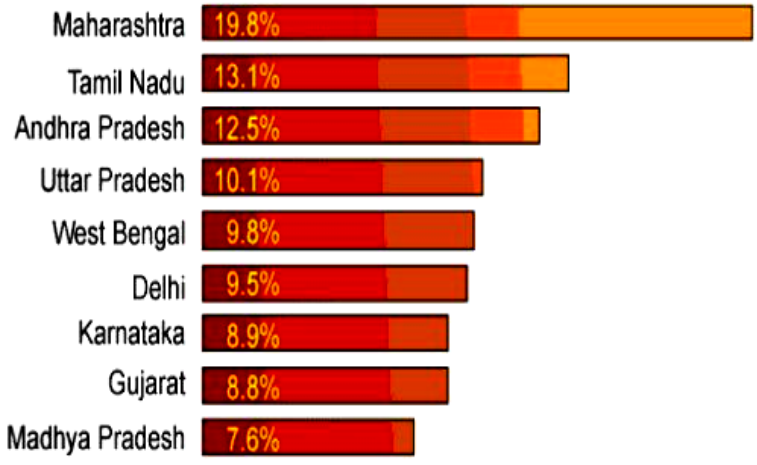

Figure 2: State wise E waste generation in India (Tonnes/year)

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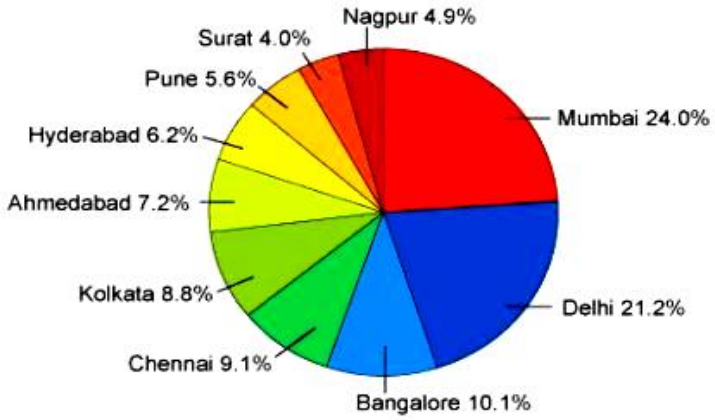

Figure 3: City wise generation of E waste (Tonnes / Year)

Comparison of Electronic Waste Recycling In Switzerland & India

Switzerland is one of the few nation with above a decade of benefit from in managing E- waste. India, alternatively, is most effective now experiencing the issues that e- waste poses. The paper goals to provide the reader perception into the disposal of quit – of – life appliances in both international locations, which include appliance collection and the financing of recycling systems in addition to the social and surroundings elements of the modern practices.

electronic waste recycling is gaining currency around the arena as large portions of electronics are getting into the waste flow. managing the growing volumes of e- waste correctly and correctly in cost and environmental impact is a complicated challenge. first of all, unique logistic necessities are necessary for amassing the e- waste. Secondly, e-waste includes many unsafe substances which can be extraordinarily risky to human fitness and the environment, and consequently disposal calls for unique management to stop the leakage and dissipation of toxics into the surroundings. on the same time, it's far a rich source of metals consisting of gold, silver and copper, which can be recovered and brought back into the production cycle. This unique function of e- waste has made e-waste recycling a rewarding business in each advanced in addition to growing countries. at the same time as a few international locations have prepared structures for the gathering, recycling, disposal and tracking, other countries are nonetheless to discover a answer that ensures jobs while minimizing the poor environmental influences of e- waste recycling. Switzerland turned into selected as it turned into the first U . S . A . to implement an industry extensive organized machine for the gathering and recycling of electronic waste. India became chosen as the other united states of america for observe because it isn't always only most of the fastest developing markets for the consumption of digital appliances, however additionally because it has a massive recycling enterprise and has emerged as a major market for old and junked computer systems.

E waste recycling in Switzerland

Background

Switzerland, with one of the highest in keeping with capital earning in the international, is likewise among its most technologically superior nations. the full installed computer base in Switzerland is 3.15 million pcs, which translates into one computer for almost every individuals, over 99% of the families have fridges and over 96% have TVs. despite the fact that marketplace penetration of electrical and digital goods is high, the marketplace for new home equipment remains robust, with annual consistent with capita spending on ICT products topping US $3600, the highest inside the world.

Switzerland additionally ranks many of the top international locations inside the world regarding environment protection. Ranked 7th on the 2005 environmental Sustainability Index, Switzerland is the first united states in the global to have mounted a proper system to control e- waste.

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System Overview

The collection of waste and reprocessing of e-waste in Switzerland is an deliberately improved and organised arrangement. As declared previous to, the Swiss arrangement is depend on EPR—both officially and operationally. This places mutually the material with the economic task of an environmentally proper dumping of end-of-life electronics with the producers and consumers of these products. The complete effective dependability is though with the two PROs–SWICO and S.EN.S–who control and manage the arrangement on behalf of their component producers.

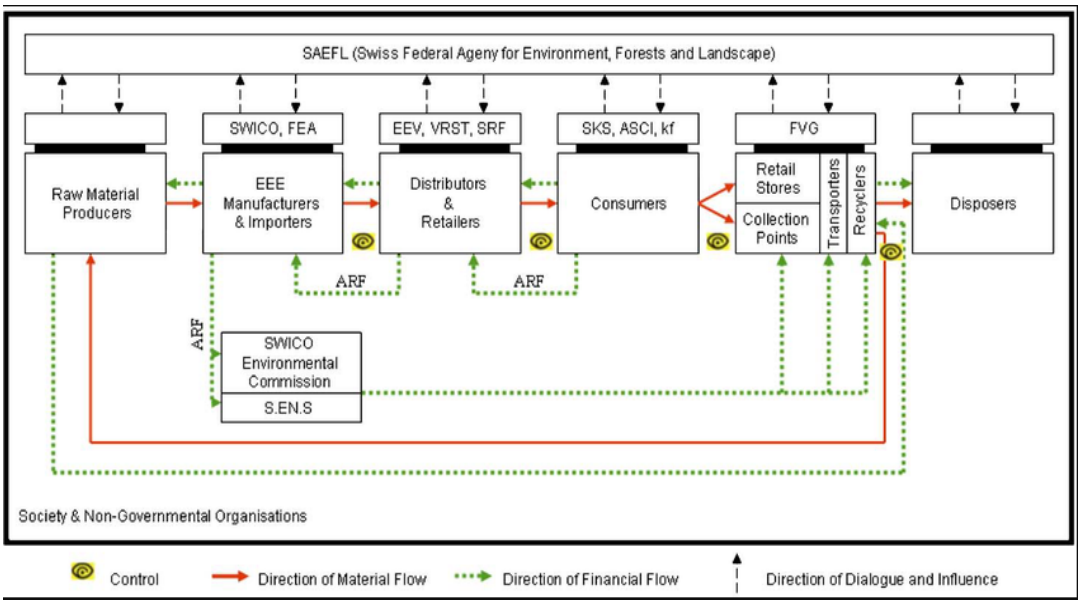

Figure 4: Flow of materials and finances in the Switzerland of e-waste recycling

financial flows within the advanced world, in which recycling is urged by way of non marketplace activities and government guidelines, recycling in developing international locations, in like India, is a marketplace driven, for-income hobby. that is based totally at the relative aspect charges. while industrial raw material has a common fee for the sector, the labour cost vary, which makes recycling lucrative as it's a labour in depth activity (Porter, 2002). The economic flows in India indicate a wholly market driven gadget, wherein 'waste' is considered a 'aid'. The amassing and recycling does now not rely upon outside financing and is self sustaining. due to the fact the gathering and recycling is a predominantly manual operation, and given low labour and nonexistent management and compliance prices, recyclers are capable of take out a profit even after buying the waste. The charges, of path, do not take into account the excessive external prices.

E waste recycling in India

India, with more than 1 billion human beings, is the most heavily populated country in the world. Although the penetration of India's market for consumer durables is substantially decrease than that of advanced nations, the size of India's marketplace in absolute terms is larger than that of many excessive income international locations. Moreover, India is one of the rapid developing economies of the world and the domestic call for purchaser durables in India has been skyrocketing. From 1998 to 2002, there has been a 53.1% growth in the sales of household appliances, each massive and small. The increase in PC possession according to capita in India between 1993 and 2000 turned into 604% in comparison to a global common of 181%. Unfortunately, economic growth and environmental safety signs are at odds with each other.

System Overviews

The complete industry is depended totally on a network current amongest creditors, buyers and recyclers, each including value, and creating jobs, at every factor within the chain. As the quantity of electronics waste has increases, a visible degree

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of specialty has emerged, with various waste processors focusing only on e-waste. Given the low level of primary asset required to start a gathering, take to pieces, categorization or recovery business, it is best way for small entrepreneurs to connect with the industry.

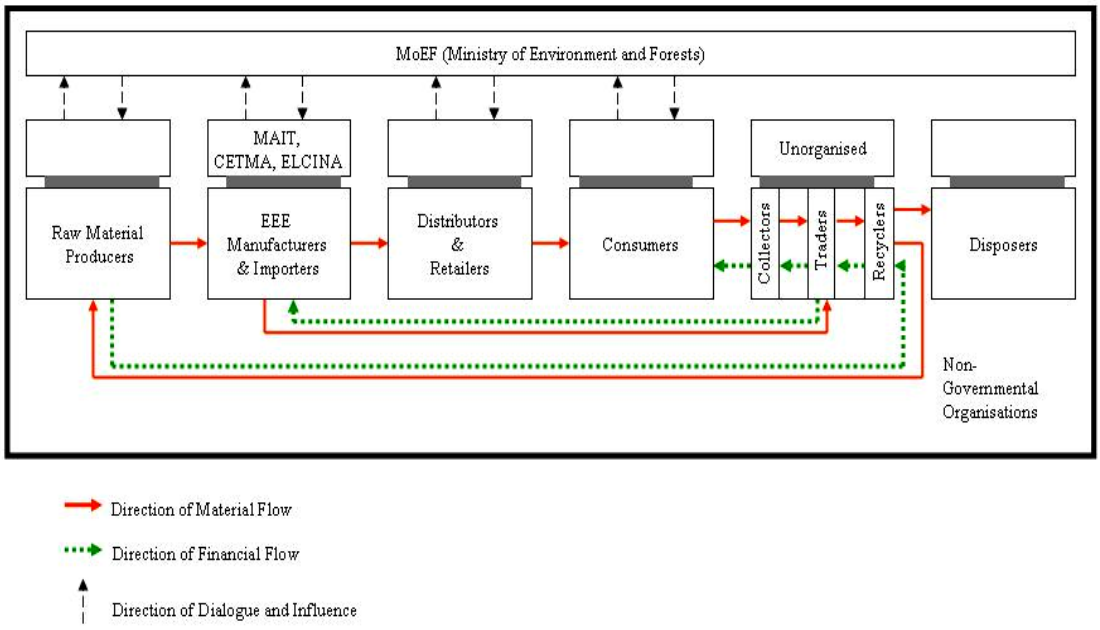

Figure 5: Flow of materials and finances in the Indian e-waste recycling

Comparison of the two systems

From the two case research above, it's far clean that the e- waste control structures in the countries are very different, primarily based on observations of each systems, a qualitative contrast is accomplished the use of four criteria:

- E –waste in line with capita
- Employment capability
- Occupational Hazards
- Emissions of Toxics

Table1: Evaluation results for the comparison criteria

Criterion	Switzerland		India	
	Level	Implication	Level	Implication
E-waste per Captia	High	Negative	Low	Positive
Employment Potential	Low	Negative	High	Positive
Occupational Hazard	Low	Positive	High	Negative
Emissions of Toxics	Low	Positive	High	Negative

An high rate in both issue consequences in a better annual increase of e-waste per year. As measured India with Switzerland shows a high price for per year waste with its more big use of home equipment and shorter product carrier lives, given the lower charge of repair and reuse.

Switzerland has a miles better annual accrual of e-waste per capita. Using the Employment capacity supplied by the system as one criterion to decide the social impact of the system, it can be seen that the Indian gadget generates some distance extra jobs than the Swiss system per tonne of e-waste processed. collected works, dissemble, categorization and separation and still steel restoration are carried out by hand in India. Therefore, the e waste recycling zone, albeit casual, employs many unskilled or semi professional employees.

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Relatively, e-waste management in Switzerland is well programmed, and utilize a ways fewer human beings. such as, the recycling device, which controls discarded categories appliances totaling over 34000 tonnes, engages 470 humans in all-together with collection, moving, recycling, management and controlling. The foremost purpose for this big difference inside the number of human beings employed is the availability of reasonably-priced manpower in India compared to the excessive labour prices in Switzerland.

However, when considered from the angle of Occupational Hazard, e-waste handlers in India are at a miles higher risk than in Switzerland. One cause for this is the low stage of awareness among workers regarding the hazards of the chemical substances and method they may be uncovered to and the minimal protection and safety measures they may be grateful to obtain. The other motive is the lack of formal tips as well as a lax enforcement of present environmental legal guidelines. The Emissions of Toxics into the surroundings is another thing to bear in mind. Due to the direct procedures used for materials recuperation, the level of hazardous such as dioxins and acids started has been initiated to be much higher in India than in Switzerland. responsible for the high levels of those externalities are outdoor processing techniques which include open on fire of cables, which is performed within the open not including any controls or precautions. The material drift in and out of the system is absolutely unmonitored at gift. In evaluation, the Swiss system imposes excessive protection and emission requirements and emphasizes the implementation of normal controls and monitoring at every degree of the cloth and financial flow thru the gadget.

CONLUSION

Electronic equipment is one in every of the most important acknowledged sources of heavy metals and organic pollution inside the waste circulate. Without effective series, reuse, and recycling structures, relatively toxic chemical compounds are located in digital appliances like, lead, beryllium, mercury, cadmium, chromium, brominated flame retardant, and many others will keep to infect soil and groundwater as well as pollute the air, posing a risk to flora and fauna and those. In India, domestic generation and imports are the two essential resources of e-waste. It is impossible to decide how an awful lot e-waste is generated in India and how much is imported. But the developing portions at a disastrous percentage and out of control disposal practices are alarming the state of affairs from an environmental factor of view. Reuse and recycling of electronic system is a useful alternative than disposal because it reduces the amount of toxic and hazardous substances which could enter the atmosphere by disposal. e-waste management is a brand new project for waste control in India and for its proper management; diverse measures for development in product design through the usage of secure and environmentally pleasant uncooked substances and maximum rising technologies had been advised. Adoption of all those measures will decrease the environmental pollution due to toxic ingredients found in digital products and help in accomplishing a smooth environment.

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