Mainstreaming the Informal Sector in E-Waste Management

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Introduction

The electrical and electronics industry is one of the world's largest and fastest growing manufacturing industries. Rapid growth, combined with rapid product obsolescence through short innovation cycles turns e-waste into the fastest growing waste stream worldwide. E-waste is characterized by two main attributes: It is hazardous, due to its content of toxic substances such as lead, cadmium, mercury, PCBs (polychlorinated biphenyls) etc., but at the same time it is valuable, due to the content of precious and strategic metals such as gold silver, platinum and copper. The extraction of these valuable items is especially critical in terms of environmental and health hazards during dismantling and wet processing. E-waste recycling by the informal sector with little or no control, using highly hazardous and polluting techniques is a reality in some of the densely populated cities of India like Delhi, Bangalore, Chennai, Kolkata, Mumbai etc. India is one of the pioneers among developing countries in exploring the avenues for the management of electronic waste. As early as 15th March 2004, the "Way Forward" was discussed at a national workshop organized by the Ministry of Environment and Forests (MoEF), Central Pollution Control Board (CPCB) and supported by GTZ. The workshop discussed the need for proper management of e-waste in the country. One of the first steps identified was to conduct an assessment at the national level, covering important e-waste processing centres. This study, accomplished in December 2007, showed that the potential annual e-waste generated on account of three components – Televisions, Computers and Mobile Phones – is approximately 380,000 Metric Tons generated in India in the year 2007 (GTZ-MAIT Assessment Study 2007). Out of this potential waste, only 144143 Metric Tons was available to be recycled because of the presence of considerable refurbishment and re-use market. Moreover, of this 144143 Metric Tons, only 19000 Metric Tons of e-waste was recycled in 2007. The rest lay stored in the warehouses of institutions or in the cupboards and drawers of households. The e-waste generated was projected to increase to 410,000 tonnes in 2008 and reach 4700,000 tonnes by 2011. The other major finding of the study was that 95% of the actual recycling is done in the informal sector using primitive and highly polluting backyard operations with low or non-existent risk awareness polluting ambient air, water and soil and affecting the health of workers. In 2007, formal

[1] **:** GTZ's Advisory Services in Environmental Management (ASEM) programme is the umbrella organisation for projects relating to industrial and urban environmental protection. It advises and supports the Ministry of Environment and Forests (MoEF) and the Ministry of Consumer Affairs (MoCA) in resolving current issues and implements projects with the aid of strategic alliances. Since 2008 ASEM is advising and supporting Ministry of Urban Development (MoUD) and the Ministry of Housing & Urban Poverty Alleviation (MoH&UPA). ASEM coordinates a network of institutions and experts from Germany and India.

recyclers handled a minor proportion, approximately 5% of the overall e-waste being recycled in India.

However, with rising quantities, awareness and interest from policy makers in the issue, the recycling scenario is changing with formal sector players entering the e-waste recycling sector. There is widespread expectation that these formal sector recyclers would be able to manage e-waste in an environmentally sound way using Best Available Technologies (BAT) leading to better environment and enhanced resource recovery. However, it is still not clear whether the advent of formal recycling would come at the expense of informal sector recycler. Experiences worldwide, however, show that there are mutual gains to be obtained through the trade of material between the informal and formal sector because of their comparative advantages. It is also clear that the social welfare is enhance by this interaction between the formal and informal sector by reduced pollution, better resource management and creation of green jobs in the recycling sector. The Government of India has emphasized the role of the informal sector in its policy statements. The National Environment Policy (NEP, 2006) mentions that there should be efforts to, “Give legal recognition to, and strengthen the informal sector systems of collection and recycling of various materials. In particular enhance their access to institutional finance and relevant technologies.” In March 2008, in a major step forward the Government of India notified Guidelines for the Environmentally Sound Management of Electronic Waste. The guidelines emphasized two salient points: Extended Producer Responsibility and Reduction of Hazardous Substances. The guidelines also mentioned the need for a dedicated legislative framework for Electronic Waste Management. Subsequent to the release of the guidelines, various stakeholders including the industry have expressed the need for a dedicated legislation for Electronic Waste. Recently the Government of India has constituted a committee to examine the merits of a proposed draft legislation which has been prepared by the relevant stakeholders under the coordinating efforts of MAIT, Toxics Link, Greenpeace and GTZ.

Understanding the existing system

It is a well known fact that most recycling activities in India are carried out in the informal or the unorganized sector and e-waste recycling is no exception. The informal sector has a historic role in waste management and recycling, partly because of the notion of waste being a fringe commodity, rather than being a waste. As a result, historically the fringe commodity was left to be handled by the fringes of society – the informal sector. With the widespread development of governments over the last few decades, waste management has fallen into the hands of local governments which have been overwhelmed by the quantities of waste generated in large cities. The existing informal sector has been contributing to reduce the burden of formal waste management agencies. Their widespread and active network and manual skills make recycling of e-waste a profitable business venture. The MAIT-GTZ e-waste assessment study mentioned above also revealed that 94% of the manufacturers included in the study did not have an IT disposal policy and were not aware of the current waste handling practices. Therefore, most of the e-waste was being disposed off to the scrap dealers who in turn sold the waste to the recyclers in the informal sector. The recycling in the informal sectors essentially involves dismantling and sometimes includes the extraction of precious metals.

Environmental and Health Implications

Environmental concerns due to the operations in the informal sector can be attributed to the emissions of dioxins, heavy metals such as lead, cadmium, mercury etc. Further concerns arise due to the sludge from processing leads to contamination of the water bodies and soil

due to brominated flame retardants (BFRs), spent fluids/chemicals, traces of poly chlorinated biphenyls (PCBs) etc. The other major challenges are the Occupational Health and Safety (OH&S) and Child Labour. The dismantling activities could also lead to the spread of toxic dust while open burning of wires and printed circuit boards result in emissions of dioxins & furans, lead, cadmium and mercury fumes. The contact with the chemicals used during the operations, improper ventilation and non usage of personal protection equipments leads to exposure to hazardous chemicals. Apart from the issues mentioned above, the workers in the informal sector are also exposed to other work place hazards leading to physical injuries, respiratory disorders, asthma, malnutrition, skin diseases, eye irritations etc. and in some cases long term incurable diseases. Most of the adverse effects on health can be attributed to:

1. Improper ventilation, no exhaust pipes in the working environment
2. No personal protection equipment is used
3. Child labour is employed
4. The fall out of the toxic materials in the environment also causes contamination of air water and soil leading to health effects

Socio-Economic Implications

The informal sector focuses on cherry picking of the precious components for metal recovery and the non-recoverable are disposed off in landfills. The study conducted in Bangalore on precious metal recovery by the informal sector states that the efficiency of the processes adopted by the sector is around 28-30% whereas the gold extraction efficiency is around 99.99% by the smelting companies in developed countries. The e-waste trade chain in India comprises of aggregators who purchase scrap from households and businesses, followed by segregators who dismantle the components manually and sell off to recyclers who process the waste further for extraction of precious metals. The waste aggregators and segregators form an intergral and important part of the e-waste trade chain as fas as the channelization and collection of e-waste are concerned. They are highly networked and skilled workers engaged in sale/ purchase and dismantling of e-waste. The aggregators and segregators also have skills to extend the product's life cycle by reusing the components. By extending the life of old electronics, they prevent pollution by saving the amount of energy required to make new products, reduce carbon footprints and enhance the penetration of IT and consumer durables among the economically disadvantaged people. Most of the workers are usually illiterate, and belong to rural immigrant families. Many commence their profession at the young age of five to eight years. Even after migrating to cities with the hope of improving their economic standards, they are still at a disadvantaged position as they are faced with issues such as competition among members, lack of minimum wages, lack of access to credit, lack of recognition by the authorities and lack of access to social protection schemes, that adds to their vulnerability.

Integrating the Activities of informal and Formal Recycling

In accordance of the mandate of the National Environmental Policy (NEP) 2006, there is a need to identify the activities and contributions of the informal sector and provide them with a legal status. In this process, the roles and responsibilities of the informal and formal sector in the recycling chain should be clearly specified ensuring socially acceptable, economically feasible and environmentally responsible workable models. The e-waste recycling sector is fast evolving with the entry of various recyclers in the formal sector. However, most such units are unable to gain access to e-waste due to the competition from informal collectors, scrap dealers and recyclers. This is largely due to the fact that the informal sector has a highly sophisticated collection network which, in addition to reaching bulk generators, can also collect from households through a door-to-door collection network. Also, the cost

structure of the formal recycling units does not allow them to pay comparable prices for the collection of material from the bulk generators.

The process of integrating the informal sector with the formal sector is challenging. There have been a number of reports on the identification the clusters and evaluation of the processes used which reveal the need to formalize the activities. Most recyclers in the informal sector dismantle and sell the components to local recycling units. Some others venture in processing them for extraction of precious metals. Similarly, most of the formal sector e-waste recycling units in India are engaged in the dismantling of the used equipments and segregating the various waste streams. The plastics, steel, aluminium, glass etc. are recycled in India while the printed circuit boards are shredded and exported to other countries like Europe, Singapore, Australia, and even China for precious metal recovery.

The path to formalization of the informal sector units would require a number of stages. The first would be to identify the major clusters of activity within the informal sector. Once the clusters are identified, the next stage would be to federate the disparate members within the cluster and also identify the various processes within these groups. Such a process would also entail efforts to create awareness and build capacities among the groups of informal sector workers on environmentally sound processes highlighting their advantages and at the same time informing the groups of the environmental and health implications of their current practices. The awareness programmes should also provide an insight into the economics of recycling using efficient technologies for processing e-waste. The hands-on trainings on skills upgradation, process efficiency and do's and don'ts can be an important step towards formalization process. The informal sector, till now, has been extremely aware of the financial benefits which accrue due to the recycling of e-waste. However, in order to mainstream them, efforts are required to enhance their understanding of environmental and health issues associated with their activities. The integration of the activities of the informal and formal sectors would also require specific allocation of funds for environmental surveillance by the formalized informal sector units. The integration would also require building trust, relationship and identifying and strengthening the linkages between the two sectors for its holistic management. Further, the cost structure of the informal sector would change radically with the introduction of certain processes which were not a part of their value chain. This would require the support of the government in terms of provision of financial aid, easing access to credit and provision of financial incentives such as subsidies and introduction of insurance schemes. The formal recyclers could also support this integration process by building the capacity of informal sector associations as well as jointly developing the norms for trade of material between the two sectors.

Currently, the Government of India does not provide any incentives for environment friendly recycling of e-waste. A proposed instrument could be the introduction of incentives to those recyclers who comply with the environment and health norms and also promote marketing of such products through a certification mechanism. Further, the criteria for providing incentives could also be linked to the integration of the informal sector in the activities of the formal sector. The proposed models would also need awareness and strengthening of local capacities and regulatory authorities to change their mindset and adapt the partnerships between the informal-formal sectors. This would require legal recognition and allotting responsibilities to the formalized 'informal' associations for authorized collection from households and businesses.

Large enterprises and brands need to focus on the principles of Extended Producer Responsibility (EPR) and Restriction of Hazardous Substances (RoHS) to manage the supply chain and life cycle of their products. The implementation of RoHS would also lead to reduced occupational health hazards and environmental pollution both during production as well as final disposal of their product. The bulk consumers also need to implement an IT Disposal Policy to ensure safe disposal of their product and comply to their CSR objectives.

Issues and Challenges

The most important challenge for e-waste management in India is the establishment of collection channels which bring the waste from the generator to the recycler. Currently, most of the material which reaches the recyclers is recycled in a manner which flouts the environmental, health and safety norms. The mere establishment of recycling infrastructure that adheres to the environmental health and safety norms would not resolve the issues related to collection since these facilities would face competition from the existing network of informal waste handlers. Therefore models which explore collaboration between these competing entities need to be evolved. Such models would need a clear policy framework that clearly defines the roles and responsibilities of the various stakeholders. As a first step, this framework would create a level playing field for the different interests who are involved in e-waste management.

Further, there is need to evolve workable models which are suitable for the Indian conditions and are supported by the government. Since waste management is a public good which has clear societal benefits, the role of the government as a facilitator, mediator and incentive provider are as important as roles related to regulatory and monitoring functions in the functioning of these models. In the Indian context, because of the widespread informal sector, the role of the government takes precedence in order to increase outreach to masses of this sector and increase the acceptability and adaptability of new practices among them..

The integration of activities in the informal and formal sectors is essential to establish a viable recycling model for e-waste recycling. There is need to dovetail the activities of the informal sector with those of the formal recycling units to achieve the socially acceptable, economically feasible and environmentally responsible solutions for e-waste management in India. The various stakeholders involved in this integration process would also work under the mandate of the NEP to organize the informal sector and bring them into the mainstream of e-waste recycling activity while overcoming the problems related the environmental, health and safety hazards.

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