9.0 Discussion and conclusions

9.1 Legislation

9.1.1 Some international responses to E-waste

United States: In September 2003, California passed the “Electronic Waste Recycling Act of 2003” (SB20), USA’s first comprehensive electronics recycling law, establishing a funding system for the collection and recycling of certain electronic wastes.

European Union: On January 27, 2003, the EU parliament passed a directive that requires producers of electronics to take responsibility, financial and otherwise, for recovery and recycling of E-waste (Waste from Electrical and Electronic Equipment – WEEE).

Japan: Since April 2001, manufacturers have had to recycle appliances, televisions, refrigerators, and air conditioners. Under a new law, manufacturers would charge a recycling fee to consumers.

OECD: The OECD has developed international guidelines on the “environmentally sound management”(ESM) of used and scrap personal computers.

China: The Standing Committee of the 9th NPC promulgated a law in 2002, requiring compulsory retrieval of used industrial products.


Austria: Recycle-IT Austria (RITA) is an initiative to collect used computers from manufacturers and other companies, upgrade and repair the computers, and then sell them at reasonable prices to low-income households or schools.

9.1.2 Towards Legislation on E-waste in India

- City level assessment - Mumbai/MPCB/UNEP/IRGSSA
- Training & Capacity building - HAWA/GTZ
- Information Dissemination through work shops - SCP/KSPCB/HAWA-GTZ/Toxics links/other agencies
- CPCB has brought E-waste Guidelines during March 2008
- CPCB has also brought Technical Guidelines for Environmentally Sound Mercury Management in FL Sector
- Amended hazardous waste rules includes E-waste Sep. 2008
- Draft E-waste policy and rules are uploaded in the MoEF website for public comments before 26th June 2010.
With the above trends on legislation the country also needs a sustainable solution for E-waste recycling which can conform to the legislative framework. This is exactly what the present study has brought out.

The Generation and Inventorization of E-waste across the country has been discussed based on several published articles.

The most important outcome of the present study is survey findings which match with that of a developed country. In India we use more of power protection devices such as voltage stabilizer, uninterrupted power supply (UPS) and the quantum of E-waste generated in Bangalore city per head per annum is 19.75kg. Based on the data generated and also on published data, a unique attempt to arrive at resource potential of E-waste in India has been estimated and quantified with a stunning figure of Rs.2,711.394 cr.

The predominant informal sector engaged in backyard operations has been highlighted and there hazardous recycling operations especially in Bangalore for metals recovery is shown with pictures. The recovery resources inefficient, environmentally polluting, causing damage to their own health need to be stopped immediately with alternative economic arrangements. The strength of informal sector in collection from individual homes can be properly formalized.

Under the existing condition in India the design and development of state of art E-waste recycling facility which requires low capital investment, environment compliant resource efficient have been dealt with. The resources of metals, especially the precious metals gold with the unique apparent gold recovery followed by recovery by smelting have been studied. The E-waste plastics recycling is also studied in a separate chapter which is another unique feature already existing in India. The CRT Glass to Glass recycling in close loop has also been presented. The target bench mark of 99% recycling is easily achievable.

The pilot plant studies to evaluate eco-efficiency by maximizing the recycling efficiency, the power, water consumption and man hour requirements have been presented. The final non recyclable landfill components have been evaluated. The present study also evaluated the CO$_2$ emission reduction by E-waste recycling.
The study concludes that E-waste is a valuable resource for mankind and not to be panicked for its hazards. The E-waste recycling can be economically viable, environmentally sustainable and socially important, if proper care is taken by educating and training of employees in E-waste recycling.

9.1.3. Future scope for research

In a constantly changing the electronics world with miniaturization, improved performance capabilities it is necessary to continue the research on a periodical basis. The most important area of research would be design for environment, design for recycling, restriction of hazardous substances in future electronics. Indigenous development of smelting operations which can ensure that precious metals, noble metals and rare metals are retained within the country.