

## CHALLENGES AND FRAMEWORK OF LIFE CYCLE MANAGEMENT OF SMALL WEEE IN CHINA

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As the biggest ITC manufacturers and consumers in the world market, China's management strategy of WEEE (Waste Electric and Electronic Equipment) will definitely affect the global WEEE flows. The improper treatment activities by the informal sectors in China had led to some environmental damages and resources lost.

This study is trying to develop a systematic framework of sustainable management of small WEEE to identify the main challenges of WEEE management in China from the life cycle perspective. This framework, covering the whole life cycle of small WEEE from discard to final treatment, consists of such aspects as the definition, scope, classification, and material flow analysis, as well as the environmental risk assessment.

The Chinese government had established the WEEE management mechanism based on the EPR principle. The laws and regulations associated with WEEE constitute a policy system for promoting the sustainable management of e-waste in China and cover the entire life cycles of e-products, from design, production and use, to recycling and disposal. However, it only focuses on five large-sized product categories as TV set, air conditioner, refrigerator, wash machines and personal computers. The large quantity of small WEEE was not on the list of WEEE management.

Some important life cycle stages of WEEE like eco-design, use/reuse, recycling and final disposal was reviewed and analyzed based on the China's domestic WEEE flow. It is shown that eco-design of ITC products in China is just in the very young age. There is no available data and tools for EEE designers and manufacturers to implement eco-design. Reuse of EEE products and component is very common. It is also mixed with the recycling practices, which makes the WEEE flow pathway more complicated. There are no specific disposal facilities for the final residuals from WEEE treatment.

The eco-efficiency method and life cycle assessment tools are used to model and compare different strategies within the life span of small WEEE like retired mobile phone. The results show that the informal manual collection and components-reuse strategy is higher in eco-efficiency than the formal motor powered vehicle collection and disassembling strategy.

The main challenges of managing small WEEEs were identified as five aspects. 1) The discordant policies between environmental protection and resources reservation led to losing of some valuable and hazardous materials, as well as residuals in recycling. 2) Collection system is not linked with formal recycling sector, thus main small WEEE stream went to informal recyclers without pollution control facilities. 3) The formal recyclers can't make profitable business without WEEE fund, because they have to buy the small WEEE from the collectors by higher price. 4) Conflict of reusing and recycling. Reuse of parts or components of WEEE in China is quite popular and out of control. 5) WEEE fund implementation.

In conclusion, the sustainable management of small WEEE should integrate all life cycle stages and consider the efficiency of materials recovery and the environmental risk.