



E-WASTE VOLUME II

E-waste Management Manual

UNITED NATIONS ENVIRONMENT PROGRAMME

Copyright © United Nations Environment Programme, 2007

This publication may be reproduced in whole or in part and in any form for educational or non-profit purposes without special permission from the copyright holder, provided acknowledgement of the source is made. UNEP would appreciate receiving a copy of any publication that uses this publication as a source.

No use of this publication may be made for resale or for any other commercial purpose whatsoever without prior permission in writing from the United Nations Environment Programme.

Disclaimer

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the United Nations Environment Programme concerning the legal status of any country, territory, city or area or of its authorities, or concerning delimitation of its frontiers or boundaries. Moreover, the views expressed do not necessarily represent the decision or the stated policy of the United Nations Environment Programme, nor does citing of trade names or commercial processes constitute endorsement.

E-waste

Volume II: E-waste Management Manual

Compiled by



UNEP

Division of Technology, Industry and Economics
International Environmental
Technology Centre

United Nations Environmental Programme
Division of Technology, Industry and Economics
International Environmental Technology Centre
Osaka/Shiga

Preface

Waste Electrical and Electronic Equipment (WEEE) or E-waste is one of the fastest growing waste streams in the world. In developed countries, it equals 1% of total solid waste on an average. The increasing “market penetration” in developing countries, “replacement market” in developed countries and “high obsolescence rate” make WEEE/E-waste one of the fastest waste streams. There is a pressing need to address e-waste management particularly in developing countries. The presence of valuable recyclable components attracts informal and unorganised sector. The unsafe and environmentally risky practices adopted by them poses great risks to health and environment.

For effective WEEE/E-waste management, we need to quantify and characterize this waste stream, identify major waste generators, and assess the risks involved. A scientific, safe and environmentally sound management system, including policies and technologies, needs to be developed and implemented.

International Environmental Technology Centre (IETC) of Division of Technology, Industry and Technology (DTIE) of UNEP is assisting member countries on ISWM. IETC is also focusing on WEEE/E-waste management as a part of ISWM. As an initial step, to build the capacity, IETC has produced two manuals on WEEE/E-waste to assist the member countries and their cities to develop the inventories and WEEE/E-waste management system.

The first manual was prepared as a guidelines document to support WEEE/E-waste inventories and assessment of risks involved. This second manual has been prepared as a guidance document to develop and implement WEEE/ E-waste management system. This manual should be used in conjunction with the first manual. This manual has been prepared based on data from secondary sources including publications from scientific journals, reports and web sites. A case study based approach has been adopted to provide examples of live situations so that it can be easily adapted to local conditions.

The manual was developed as a part of Norwegian Assistance on Integrated Solid Waste Management and in close cooperation with Secretariat of Basel Convention (SBC) and Sustainable Consumption and Production (SCP) branch of DTIE-UNEP. Mr. Amit Jain, an expert on WEEE/E-waste assisted IETC to prepare this manual.

This manual is aimed as a living document and practitioners and policy makers are highly encouraged to provide their feedback, which will be incorporated into next edition.

Table of Contents

| | |
|---|----|
| <i>Preface</i> | 2 |
| <i>Executive Summary</i> | 6 |
| <i>Acronyms</i> | 8 |
| Chapter 1: Introduction | 10 |
| 1.0 Introduction..... | 10 |
| 1.1 Objectives..... | 10 |
| 1.2 Scope | 10 |
| 1.3 Format..... | 10 |
| Chapter 2: Perspectives of WEEE/E-waste Management | 12 |
| 2.0 Introduction..... | 12 |
| 2.1 Mechanism of WEEE/ E-waste Trade..... | 12 |
| 2.2 WEEE/E-waste Life Cycle..... | 12 |
| 2.3 WEEE/ E-waste Material Flow Model | 13 |
| 2.4 Components of WEEE/E-waste Management..... | 14 |
| 2.5 WEEE/E-waste Management in Developing Countries | 17 |
| 2.6 Major Stakeholders | 20 |
| 2.7 Guidance Notes..... | 21 |
| Chapter 3: Current Practices of WEEE/E-waste Management | 23 |
| 3.0 Introduction..... | 23 |
| 3.1 National and Social Policies/ Laws/ Regulations/ Institutional Roles in Developed Countries | 23 |
| 3.1.1 Policies/ Laws/ Regulation..... | 23 |
| 3.1.2 Institutional Mechanism | 23 |
| 3.1.2.1 Collection Systems..... | 24 |
| 3.1.2.2 National Registry | 24 |
| 3.1.2.3 Logistics | 25 |
| 3.2 National and Social Policies/ Laws/ Regulations/ Economic/ Institutional Roles in Developing Countries..... | 25 |
| 3.3 Initiatives of Different Agencies..... | 27 |
| 3.3.1 Basel Convention..... | 27 |
| 3.3.2 G-8 3Rs Initiative | 31 |
| 3.3.3 STEP - Solving the E-waste Problem | 32 |
| 3.3.4 UNEP/ DTIE (IETC) | 34 |
| 3.3.5 GeSI: Global e-Sustainability Initiative..... | 34 |
| 3.3.6 Swiss State Secretariat for Economic Affairs (SECO)..... | 35 |
| 3.3.7 GTZ..... | 35 |
| 3.4 Guidance Notes..... | 35 |
| Chapter 4: Stages and Technologies for WEEE/E-waste Management..... | 38 |
| 4.0 Introduction..... | 38 |
| 4.1 Collection systems | 38 |
| 4.1.1 Collection Channels..... | 38 |
| 4.1.1.1 Retailer Take Back and Storage | 38 |
| 4.1.1.2 Producer Take Back and Storage..... | 38 |
| 4.1.1.3 Municipal Collection and Storage..... | 38 |
| 4.1.1.4 Other Collection Points | 38 |
| 4.1.2 Collection Infrastructure | 39 |
| 4.1.3 Guiding principles for design and formulation of technical specifications of WEEE/E-waste collection points | 39 |

| | | |
|--|--|-----|
| 4.2 | WEEE/ E-waste Treatment Systems | 46 |
| 4.2.1 | WEEE/ E-waste Treatment Technology | 46 |
| 4.2.1.1 | First Level WEEE/E-waste Treatment | 51 |
| 4.2.1.2 | Second Level WEEE/ E-waste Treatment | 53 |
| 4.2.1.2.1 | CRT treatment technology..... | 57 |
| 4.2.1.2.2 | Available Process Technology..... | 58 |
| 4.2.1.3 | 3 rd Level WEEE/ E-waste Treatment | 64 |
| 4.3 | Environmental Impacts of the first, second and third level WEEE/E-waste treatment system | 72 |
| 4.4 | Guidance Notes..... | 73 |
| Chapter 5: Financing Mechanism of WEEE/E-waste Management..... | | 78 |
| 5.0 | Introduction..... | 78 |
| 5.1 | Financing mechanism of WEEE/E-waste Management in Developed Countries..... | 78 |
| 5.1.1 | Financing Models..... | 78 |
| 5.1.2 | Fee Structure | 79 |
| 5.1.3 | Funding for Supply Chain | 80 |
| 5.1.4 | Financial Guarantee..... | 82 |
| 5.2 | Financing of WEEE/E-waste Management in Developing Countries | 88 |
| 5.3 | Analysis | 89 |
| 5.4 | Guidance Notes..... | 93 |
| Chapter 6: Case Study | | 96 |
| 6.0 | Introduction..... | 96 |
| 6.1 | Case Study: Proposed WEEE/E-waste treatment facility | 96 |
| 6.1.1 | WEEE/E-waste Scenario | 96 |
| 6.1.2 | WEEE/E-waste Treatment Technology | 97 |
| 6.1.2 | Risk Profiling | 99 |
| 6.1.3 | Financial Analysis | 102 |
| 6.2 | Conclusion..... | 103 |

Executive Summary

Recognizing the rapidly emerging and serious issue of Waste Electrical and Electronic Equipment (WEEE) or E-waste management, this manual on WEEE/ E-waste has been prepared as a guidance document to support development and implementation of WEEE/ E-waste management system. This manual has been prepared based on data from secondary sources including publications from scientific journals, reports and web sites.

The “perspective” of WEEE/E-waste and the mechanism of WEEE/E-waste trade varies across the continents and countries. These different perspectives and mechanisms along with a material flow model have been discussed to provide conceptual understanding of WEEE/E-waste. Components of WEEE/E-waste management and major stakeholders have discussed.

Review of current practices of WEEE/ E-waste in different countries provides an understanding of policies/ laws/ regulations and institutional framework for WEEE/ E-waste management. Institutional mechanisms for collection system and role of National Registry are aspects which will be useful in developing a roadmap for setting up institutions and policy/laws/regulations for WEEE/E-waste management chain. WEEE/E-waste management chain covers collection transportation and treatment including material recovery and disposal.

Technologies or technical interventions are vital for WEEE/E-waste management chain to maximize material recovery and minimize the risks. Technical interventions for collection and transportation of WEEE/E-waste are commonly known as treatment channels and infrastructure. Technical interventions for treatment of WEEE/E-waste are

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_10837

