

Contents

INTRODUCTION

INTRODUCTION - 1 BACKGROUND AND OBJECTIVES OF THE STUDY	1
INTRODUCTION - 2 SCOPE OF THE STUDY.....	2
INTRODUCTION - 3 ORGANIZATIONAL FRAMEWORK FOR IMPLEMENTATION OF THE STUDY.....	3

VOLUME I: CURRENT STATUS OF RECYCLING

1. CURRENT RECYCLING POLICIES AND MEASURES.....	5
1.1 General Background of the Philippines.....	5
1.2 Overview of Socio-economic Conditions.....	5
1.2.1 Population and Population Dynamics	5
1.2.2 Government.....	8
1.2.3 Economy	9
1.3 Laws and Regulations.....	16
1.3.1 The Ecological Solid Waste Management Act of 2000 (RA9003)	16
1.3.2 Executive Order 301 of 2004	19
1.3.3 DENR Administrative Orders to Regulate Recyclable Materials Containing Hazardous Substances	19
1.4 Activities of Relevant Government Departments and Agencies	22
1.4.1 National Solid Waste Management Commission (NSWMC).....	22
1.4.2 Department of Trade and Industry (DTI).....	23
1.4.3 All Government Departments, Offices and Agencies	24
1.4.4 ELPB	25
1.5 Current Policies and Measures	26
1.5.1 Economic Incentives	26
1.6 Other Recycling Initiatives by Relevant Stakeholders	30
1.6.1 Metro Manila.....	30

1.6.2	Marikina City	33
1.6.3	Quezon City	34
1.6.4	R & D of Relevant Technologies	35
1.6.5	Private Sector and Local Government (Industries, NGOs, LGU)	38
1.6.6	Metro Manila Federation of Environment Multi-Purpose Cooperative (MMFEMPC, LINIS- GANDA)	39
1.6.7	Zero Waste Recycling Movement (ZWRM)	41
1.6.8	Donors	41
2.	CURRENT RECYCLING ACTIVITIES IN THE PHILIPPINES	43
2.1	Survey Outline and Methodology	43
2.2	Survey on Recycling Stakeholders	47
2.2.1	Selection of the Samples	47
2.2.2	Surveys on Organizations	47
2.2.3	Surveys on Recycling Players / Stakeholders	49
2.3	Nationwide Macro Material Flow of Recyclable Materials	53
2.3.1	Waste Papers	53
2.3.2	Scrap Metal	58
2.3.3	Scrap Aluminum	62
2.3.4	Scrap Plastics	63
2.3.5	Used Glass Bottles	71
2.3.6	Used Electric/Electronic Home Appliances	75
2.4	Current Status of Recycling Industries	103
2.4.1	Paper and Pulp Industry	103
2.4.2	Steel Making Industry	109
2.4.3	Glass Bottle Industry	117
2.4.4	Aluminum Products Manufacturing Industry	118
2.4.5	Plastic Resin and Final Products Manufacturing Industry	121
2.4.6	Recycler of Used Electrical Home Appliances and PCs	125
2.4.7	External Condition of the Recycling Industry in the Philippines	126
2.5	Recycling Market and Pricing Mechanisms	130
2.5.1	Primary Collection	130
2.5.2	Prices at Scrap Dealers	134

2.5.3	Conditions of Supply and Demand of the Recyclable Wastes in the International Market.....	135
2.6	Material Flow of Recyclable Materials at Micro Scale	142
2.6.1	Waste Generation and Compositions	142
2.6.2	Business Entities	147
2.6.3	Waste Disposal Methods at Households	154
2.6.4	Material Flow at Micro Scale.....	161
2.6.5	Prices of Recyclable Materials.....	164
2.6.6	Problems Encountered and Recommendations.....	169
3.	ISSUES ON RECYCLING INDUSTRY DEVELOPMENT IN THE PHILIPPINES 173	
3.1	Issues on Current Distribution Mechanism of Recycling	173
3.1.1	Issues in Separation and Discarding of Recyclable Materials at Generation Sources	173
3.1.2	Issues in Collection and Distribution of Recyclable Materials.....	175
3.2	Issues on Current Recycling Industries.....	178
3.2.1	Waste/Scrap Papers and Paper Industry	178
3.2.2	Iron Scrap and Iron & Steel Industry	188
3.2.3	Scrap Aluminum and Aluminum Industry	194
3.2.4	Scrap Glass and Glass Manufacturers.....	204
3.2.5	Waste/Scrap Plastics and Plastic Industry.....	211
3.2.6	Used Electric/Electronic Home Appliances and Recycling Industry....	220

VOLUME II: MASTER PLAN AND ACTION PLAN

1.	DEFINITION OF RECYCLING INDUSTRY IN THIS MASTER PLAN	223
2.	NECESSITY OF THE NATIONAL MASTER PLAN FOR RECYCLING INDUSTRY DEVELOPMENT IN THE PHILIPPINES	225
2.1	Urgency of Waste Minimization and Proper SWM in the Philippines	225
2.2	Big Potential of Resource Recovery, but Limited Utilization by Domestic Industries	225

2.3	Potential Socio-Economic Benefit of Recycling Industry Development.....	226
3.	GOALS OF THE MASTER PLAN FOR RECYCLING INDUSTRY DEVELOPMENT IN THE PHILIPPINES	227
4.	CURRENT STATUS AND ISSUES OF RECYCLING INDUSTRY IN THE PHILIPPINES	227
4.1	Stable Supply of Recyclable Materials from Domestic Sources in terms of Quantity and Quality	227
4.1.1	Limited Practice of SW Segregation at Sources	227
4.1.2	Insufficient Establishment of Segregated Waste Collection System.....	228
4.1.3	Outflow of Domestic Recyclable Materials to Overseas	228
4.1.4	Unconsolidated Information on the Quality and Quantity of Recyclable Materials Required by the Domestic Industry among the Recycling Players.....	228
4.2	Issues on Infrastructure for Recycling Industry Development	228
4.2.1	High Cost of Electricity	228
4.2.2	High Cost of Collection and Transportation of Recyclable Materials ..	229
4.2.3	Pollution Control Cost of the Recycling Industry.....	229
4.3	Sector-Wise Issues of Recycling Industry	229
5.	MASTER PLAN FOR DEVELOPMENT OF RECYCLING INDUSTRY IN THE PHILIPPINES.....	232
5.1	Policies and Programmes on Proper Distribution of Information on Domestic Recyclable Materials and Recycling Industries	232
5.1.1	Background and Necessity of the Policies	232
5.1.2	Formulation and Enforcement of Recycling Guidelines for Specific Recycling Players.....	233
5.1.3	Establishment of Nation-Wide Recycling Information System.....	238
5.2	Policies and Programmes on Establishment of Local-Based Recycling System	247
5.2.1	Background and Necessity of the Policies	247
5.2.2	Basic Procedure and Priority for Formulation of Local Recycling Plan.....	248

5.2.3	Provision of the Guidelines for Formulation of Provincial/Local Recycling Plan	248
5.2.4	Policy Support for Formulation and Implementation of Local Recycling Plan	256
5.2.5	Actions to be Taken by Stakeholders for Implementation of the Programme	257
5.2.6	Implementation Schedule of Establishment of Local-Based Recycling System.....	258
5.3	Policies and programmes for provision of Incentives (financial and non-financial) to promote recycling industries and other supporting activities	259
5.3.1	Background and Necessity of the Policies	259
5.3.2	Policies and Programmes for the economic incentives to recycling industries	259
5.3.3	Development of Non-Economic Incentives in relation to Recycling ...	264
5.4	Policies for Enhancement of Institutional Mechanism to Promote Recycling Industries in the Philippines	265
5.4.1	At Government Level - To Strengthen the Existing Institutional Frameworks.....	265
5.4.2	At Recycling Player Level - To Enhance the Existing Recycling System.....	266
5.4.3	At Base Level - To Increase the Recycling Practices by the Waste Generators	267
5.4.4	Roles of Stakeholders in the Promotion of Recycling in the Philippines.....	268
6.	ACTION PLAN ON RECYCLING INDUSTRY DEVELOPMENT BY SECTORS	272
6.1	Sector-by-Sector Priority of Recycling Industry Development.....	273
6.2	Paper & Pulp Industry	274
6.2.1	Current Status of Paper & Pulp Industry and Recycling.....	274
6.2.2	Current Issues of Promotion of Paper Recycling in the Philippines.....	280
6.2.3	Action Plan for the Development of Paper Recycling Industry.....	281
6.3	Iron & Steel/Non-Ferrous Metal Industry	283

6.3.1	Current Status of Iron & Steel/Non-Ferrous Metal Industry and Recycling.....	283
6.3.2	Aluminum Scraps and Aluminum Industry.....	289
6.4	Glass & Glass Products Industry	294
6.4.1	Current Status of Glass & Glass Products Industry and Recycling	294
6.4.2	Current Issues of Scrap Glass Recycling in the Philippines	298
6.4.3	Action Plan for the Development of Glass Recycling Industry.....	298
6.5	Plastic Industry.....	299
6.5.1	Current Status of Plastic Industry and Recycling	299
6.5.2	Current Issues of Plastic Scrap Recycling in the Philippines	308
6.5.3	Action Plan for the Development of Plastic Recycling Industry	308
6.6	Used Electric/Electronic Home Appliances and E-Waste Recycling	310
6.6.1	Used Electric/Electronic Home Appliances and Recycling Industry....	310
6.6.2	Collection, Recycling and Disposal of Used Electric/Electronic Appliances.....	312
6.6.3	Issues of Recycling Used Electric/Electronic Appliances	314
6.6.4	Action Plan for E-Waste Recycling	315

VOLUME III: GUIDELINES

1.	RECYCLING GUIDELINES FOR WASTE GENERATORS	317
1.1	Introduction	317
1.2	Target Recyclable Materials	318
1.3	Key Roles of Waste Generator	320
1.4	Proper Handling of Each Recyclable Material.....	321
1.5	Papers	321
1.6	Metals	322
1.7	Glass Containers	323
1.8	Plastics	325
1.9	Electric/electronic Home Appliances	327

2.	RECYCLING GUIDELINES FOR DEALERS OF RECYCLABLE MATERIALS	328
2.1	Introduction	328
2.2	Quality Standard for Acceptance of Recyclable Materials	329
2.2.1	Scrap Papers	329
2.2.2	Tin Can	332
2.2.3	Aluminum Can	333
2.2.4	Glass Bottles	334
2.2.5	Scrap Plastics	335
2.2.6	Used/Surplus Electrical and Electronic Home Appliances	339
2.3	Storage Standards for Recyclable Materials	340
2.3.1	Purpose of Storage Standards	340
2.3.2	Storage Standards	341
2.4	Data Management	341
2.4.1	Purpose of Data Management	341
2.4.2	Standard Practice	341
3.	TECHNICAL GUIDELINES FOR RECYCLING INDUSTRIES	343
3.1	Necessary Requirements for Recycling Facility	343
3.1.1	Facility for Waste Paper Recycling	343
3.1.2	Facility for Waste Metal (Scrap) Recycling	346
3.1.3	Waste Aluminum Cans Recycling Process	347
3.1.4	Required Facility and Main Equipments	348
3.1.5	Environmental Protection	348
3.1.6	Safety and Health Protections	348
3.1.7	Facility for Waste Glass Recycling	349
3.1.8	Waste Plastics Recycling Facility	351
3.1.9	Facility for Recycling Used Cell Phone	354
3.1.10	Facility for E-Wastes recycling	358
3.2	Technology Requirements in Recycling Industries	363
3.2.1	Technology Required in Recycling Waste Papers	363
3.2.2	Technology Requirements in Recycling Steel Scraps	365
3.2.3	Recycling Wastes Aluminum-Cans	369
3.2.4	Technology Requirements in Recycling Glass Bottles	375

3.2.5	Technology requirements in recycling waste plastics.....	378
3.2.6	Technology Requirement for PET Recycling.....	386
3.2.7	Requirement Technologies for E-Waste Recycling.....	387

VOLUME IV: CASE STUDIES

1.	CASE STUDY I	401
1.1	Outline of Case Study I (Recyclables Collection).....	401
1.2	Recyclables Collection in Gawad Kalinga Pinagsama.....	402
1.2.1	Current Conditions and Issues	402
1.2.2	Needs Assessment	404
1.2.3	Recyclables Collection Plan.....	404
1.2.4	Achievement	407
1.3	Recyclables Collection in UP Bliss.....	409
1.3.1	Current Conditions and Issues	409
1.3.2	Needs Assessment	412
1.3.3	Recyclables Collection Plan.....	413
1.3.4	Achievement	414
1.4	Recyclables Collection in Benpres Building	418
1.4.1	Current Conditions and Issues	418
1.4.2	Needs Assessment	420
1.4.3	Recyclables Collection Plan.....	421
1.4.4	Achievement	422
1.5	Recyclables Collection in Commission on Human Rights of the Philippines	425
1.5.1	Current Conditions and Issues	425
1.5.2	Needs Assessment	427
1.5.3	Recyclables Collection Plan.....	427
1.5.4	Achievement	429
1.6	Recyclable Collection in New Era High School	433
1.6.1	Current Conditions and Issues	433
1.6.2	Needs Assessment	434
1.6.3	Recyclables Collection Plan.....	435

1.6.4	Achievement	436
1.7	Recyclables Collection in SM Sta. Mesa Food Court	440
1.7.1	Current Conditions and Issues	440
1.7.2	Needs Assessment	442
1.7.3	Recyclables Collection Plan.....	442
1.7.4	Achievement	444
2.	CASE STUDY II.....	449
2.1	Cellular Phone Waste Collection.....	449
2.1.1	Executive Summary	449
2.2	Framework and Context.....	450
2.2.1	Background and Rationale	450
2.3	Case Study Goals and Objectives.....	452
2.3.1	Stakeholders Involved.....	452
2.3.2	Scope and Duration	453
2.4	Methods and Strategies	454
2.4.1	Research and Data Gathering.....	455
2.4.2	Consultation with Stakeholders.....	456
2.4.3	Drafting of the Memorandum of Understanding	456
2.4.4	Design and Construction of Collection Bins.....	456
2.4.5	Design of Information, Education and Communication (IEC) Materials.....	458
2.4.6	Launching and Campaign Proper.....	462
2.4.7	Monitoring and Collection	463
2.5	Outcomes and Analyses	464
2.5.1	Collection Data and Results	464
2.5.2	Rates, Values and Costs.....	471
2.6	Conclusions and Recommendations.....	472
2.6.1	Achievements and Lessons Learned	472
2.6.2	Project Continuity	473
2.6.3	Recommendations and Future Challenges	473
2.6.4	Expanding Publicity Efforts.....	474

3.	CASE STUDY III.....	475
3.1	Background of the Case Study III (Mobile Plastic Collection And Recycling)	475
3.1.1	Project Objectives	475
3.1.2	Project Concept	475
3.1.3	Specifications of the Melting Oven.....	476
3.1.4	Process Description for the Melting Oven	476
3.1.5	Products manufactured from the Melting Oven.....	476
3.1.6	Target Plastics	477
3.1.7	Plastic Bag Recycling	478
3.1.8	Foam Polystyrene Recycling.....	478
3.1.9	Operational Framework	478
3.1.10	Site Selection Criteria	479
3.1.11	Profile of Pilot Areas.....	481
3.2	Operational Procedure	483
3.3	MOA with Barangays	484
3.3.1	Role of Barangays	484
3.3.2	Role of PPIA	485
3.4	MOA with Schools.....	485
3.5	Information, Education and Campaign.....	485
3.5.1	Flyers Promoting the Recycling Guidelines	485
3.5.2	Orientation Meetings with Barangay Eco-aides	486
3.5.3	Tour of Plastic Recycling Plants	487
3.5.4	Radio Plugging for the Pilot Project	488
3.5.5	Point-Reward System.....	488
3.6	Dispatch and Collection Status	488
3.7	Changes in Political Leadership.....	490
3.7.1	Quezon City	491
3.7.2	Caloocan City.....	491
3.7.3	Valenzuela City	491
3.8	Factors Affecting the Success of the Project.....	491
3.9	Conclusion	492
3.10	Project Sustainability.....	493