PART 5

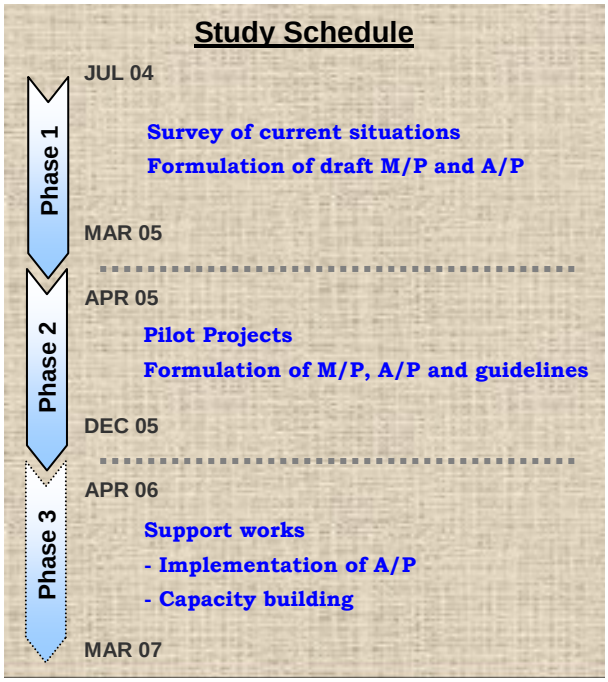
NEWSLETTERS

NEWSLETTER

THE STUDY ON NATIONAL WASTE MINIMIZATION IN MALAYSIA VOL. 1 / SEPTEMBER 2004

Outline of the Study

The Japan International Cooperation Agency (JICA) is cooperating with the Ministry of Housing and Local Government of Malaysia in the implementation of the Study on National Waste Minimization in Malaysia. Yachiyo Engineering Co., Ltd. and EX Corporation were selected as consultants of the Study Team. The Study Team has commenced the Study in July 2004 and it will be completed in March 2007.



The Objectives of the Study are;

1. To formulate the master plan, action plans and guidelines to promote waste minimization (3Rs: Reduce, Reuse, Recycle) in line with the drafted National Strategic Plan for Solid Waste Management in Malaysia
2. To strengthen the institutional capacity of the public sector on management of waste minimization

1st Seminar

1st Seminar for the Study on National Waste Minimization was held on 16th September, 2004 at Bilik Johor/Kedah of Putra World Trade Center in Kuala Lumpur. The audiences attended to the Seminar were from various sectors and organizations including federal government, local authorities, concessionaires, NGO/CBO, private companies, media and so on. Welcome speech and opening address were done by Mr. Akira Murata, Resident Representative, JICA Malaysia Office, and Ir. Fong Tian Yong, Deputy Director General II, MHLG respectively. The Study Team explained outline of the Study.

The presentation was done by another nine speakers.

- National waste recycling program (MHLG)
- Waste minimization program- Experience by local authorities (MP Pulau Pinang)
- Role of concessionaires in waste minimization program (Alam Flora/SWM)
- Involvement of NGOs and CBOs in waste minimization program in Malaysia (Buddhist Tzu-Chi Merit Society/DJROA/)

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Think before you throw

- Overview of policies on waste minimization in OECD countries (JICA Study Team)
- Japanese Experience in waste minimization and recycling (JICA Study Team)

<Tn. Hj. Zulkifli Zakaria, MP Pulau Pinang>

In Penang, 3 approaches are applied;

a) Direct approach: talks and recycling bins supply
b) Vendors approach: vendor system to ensure a sustainable and more systematic collection
c) Networking approach: vendors networking, public-private networking, and Penang Environmental Working Group

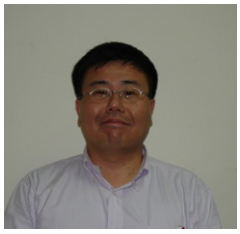
In these approaches, roles of municipal council, private sector and community are clarified. Now we are facing new challenge to collect household hazardous waste and E-waste.

The Seminar was successfully held and closed with vital and fruitful discussions among the speakers and audiences.

JICA Study Team

JICA Study Team is composed of 5 Japanese experts as follows;

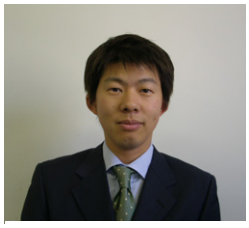
Mr. Noboru Saeki
Team Leader/Waste Minimization Plan



Mr. Kohshi Takahata
Material Flow and Market Research

Mr. Satoshi Sugimoto
Economic and Recycling Cost Analysis

Mr. Hisashi Yamauchi
Public Participation



Mr. Akihiro Shimomura
Coordinator/Institute

Coming soon

<Website>

Now we are preparing website of the Study, which contains presentation materials of the seminar, waste minimization activities in Malaysia and other countries including Japan.

<Introduction of waste minimization activities>

The Study Team is collecting information and compiling various activities of waste minimization in Malaysia. These activities are also introduces in the website.

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Think before you throw

NEWSLETTER

THE STUDY ON NATIONAL WASTE MINIMIZATION IN MALAYSIA VOL. 2 / MARCH 2005

JICA Study Team participated in "Hari Kitar Semula"

"Hari Kitar Semula (the National Recycling Day) was held at KLCC on 18 December 2004. In the exhibition booth, many key players of recycling introduced their activities. JICA Study Team also introduced the experience of recycling activities in Japan and activities related to solid waste management in Malaysia by JICA to the general public. Many participants were interested in the recycling process of styrofoam and home appliances in Japan. Segregation of household waste at sources in Japan was also introduced. JICA Study Team explained the importance of source separation to enhance recycling. As an example of source separation, segregation of kitchen waste for composting and recycling bins in a supermarket (styrofoam trays, milk containers and PET bottles) were introduced.

Segregation of Kitchen Waste for Composting In Japan

The 1st Workshop at INTAN

The Ministry of Housing and Local Government and JICA Study Team held the 1st workshop for the Study on National Waste Minimization at INTAN. Many stakeholders such as Federal government, local authorities, concessionaires, associations, private companies, NGOs and CBOs participated in the workshop. The Participants discussed about the following topics:

Topic 1: Definition of Key Terms and Indicators used in the Master Plan

Types of waste covered in the Master Plan / Goals, targets and indicators to be used in the Master Plan / Roles and responsibilities of stakeholders in the Master Plan

Topic 2: Evaluation of Current Status of National Recycling Programme

More education required in schools / Promote Networking between Gov., LA, Private, etc. (to share real-commercial information from industrial sector that uses recyclables) / Better monitoring & Enforcement through Gov. registration or reporting system

Topic 3: Model Local Authorities and Pilot Projects

Selection criteria / Target group, number, components of pilot projects

Model Local Authorities selected

Based on the discussion of the 1st workshop and 2nd technical working group meeting, Ministry of Housing and local government and JICA Study Team appointed the four (4) local authorities as model local authorities: 1) Majlis Perbandaran Pulau Pinang (P. Penang), 2) Majlis Daerah Kinta Selatan (Perak), 3) Majlis Perbandaran Subang Jaya (Selangor), and 4) Majlis Perbandaran Miri (Sarawak).

Model local authorities organize taskforce to formulate action plans on waste minimization together with JICA Study Team, and supervise and monitor pilot projects of "Establishment of Recycling Network" and "Source Separation of Municipal Waste". Three model local authorities and JICA Study Team held PCM (project cycle management) roundtable meetings to clarify the current issues of waste minimization among stakeholders. The objectives of the meeting are:

- To confirm list of stakeholders in waste minimization in each local authorities
- To obtain inputs from key stakeholders about issues pertaining to waste minimization in each local authorities
- To analyse causes and effects of key issues identified, and
- To recommend measures to achieve waste minimization objectives of each local authorities

< Majlis Perbandaran Pulau Pinang on 22 Feb. 2005>

< Majlis Perbandaran Subang Jaya on 25 Feb. 2005>

< Majlis Perbandaran Miri on 10 Mar. 2005>

Stakeholders such as local authorities, concessionaires, recyclers, institutions, private companies, NGOs, etc. participated in the roundtable meetings. Many problems were raised from them, for example lack of facilities, financial constraint, poor attitude, and so on. Based on the result of these PCM roundtable meetings, Model LAs are supposed to formulate local action plans to enhance waste minimization in their jurisdictions. The 1st draft action plan will be prepared until the end of March 2005 for Phase I.

Surveys on Material Flow

JICA Study Team carried out the following three surveys to identify recycling activities and material flow in Malaysia:

a. Waste Composition Survey: amount and composition of waste generated from households with identification of recyclable and currently recycled materials
b. Survey on Waste Generation and Recycling by Business Entities and Households: current status of waste management and recycling activities by different categories of business entities and households
c. Survey on Material Flow of Recyclables: flow of selected recyclable materials in Malaysia at each stage from generation, collection, trading, recycling and disposal

JICA Study Team will formulate the Waste Minimization Master Plan and Action Plan, referring the results of these surveys.

Sorting out and weighing of waste

Questionnaire survey to household

EXPERIENCE IN JAPAN – Recycling Networking -

< Chubu Recycling Campaign Public Meeting, Nagoya City >

Chubu Recycling Campaign Public Meeting was established in October, 1980. Major activities implemented by the Meeting are as follows:

- To establish recycling station system
- To develop “green consumers ” system, who are highly aware of importance of environment conservation
- To promote green purchasing (purchasing of environmentally friendly goods), etc

34 recycling stations (collection points) are established in Nagoya City and operated twice a month. Figure 1 shows the system in detail. Many players such as household, private company, local authority, public organization, media, etc., participate in the system. They have roles and responsibilities for operation of the recycle station system.

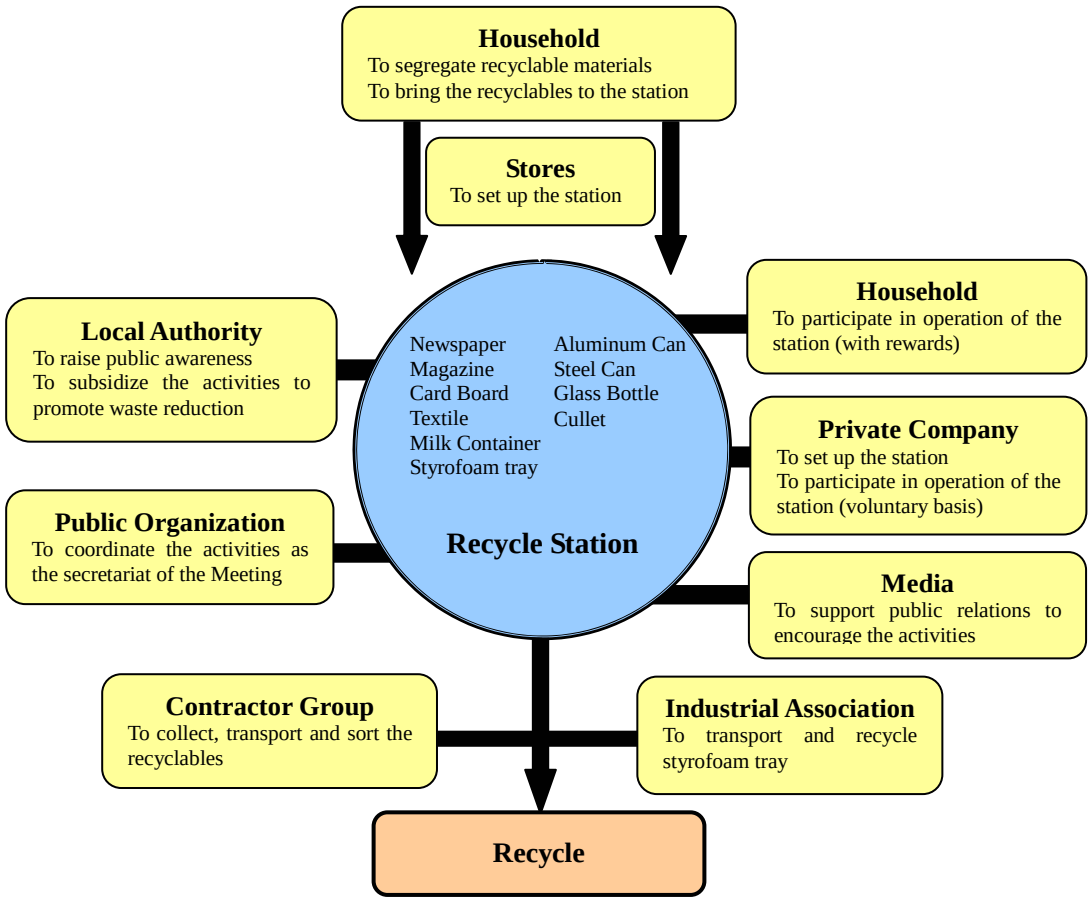

Figure 1 Recycling Station System in Nagoya City

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NEWSLETTER

THE STUDY ON NATIONAL WASTE MINIMIZATION IN MALAYSIA VOL. 3 / SEPTEMBER 2005

Guidelines for 3Rs activities in School

Schools provide good opportunities to educate children on the urgent need to preserve the environment, to inculcate the habit of reducing waster generation and to build up an environmentally conscious generation. Though 3Rs activities in schools have been conducted through their co-curriculum programme, it is apparent that these 3Rs activities are either insufficient or non-sustainable. The primary reason is that teachers do not have adequate capability and facilities to initiate and conduct such activities.

The 4th Technical Working Group meeting of the JICA Study Team on May 2005 recognised the need to formulate a clear and systematic set of guidelines to aid and guide school teachers in starting and maintaining a 3Rs programme in school. In line with this consensus, the JICA Study Team with cooperation of the Ministry of Housing and Local Government, Ministry of Education and specialist school teachers has prepared a set of guidelines to enhance 3Rs activities in schools.

Workshop for School 3Rs Guidelines

A workshop was held on 18th August 2005 at the Pan Pacific Hotel in Kuala Lumpur to present the draft "Guidelines for the Enhancement of 3Rs Activities in Schools" to the users, especially teachers, and to obtain feedback so that the guidelines can be further improved or fine-tuned. Participants include 7 specialist school teachers, representatives from MHLG, MOE and Local Authorities. Cooperation between MHLG and MOE

Group Discussion

Presentation of Group Findings

Generally, the participating specialist teachers found the Draft Guidelines, the "Plan-Do-Check-Act" approach to initiate 3Rs programmes in schools, categorisation of schools according to their prevailing level of awareness and participation in 3Rs activities and a checklist of activities that can be undertaken by each level of schools to be helpful, relevant and certainly needed to assist teachers, - in particular teachers with no experience or exposure in starting a 3Rs programme - to introduce, start, implement and sustain 3Rs programme in schools in a systematic manner. The Guidelines were also seen by the participating teachers as a useful tool to provide comprehensive information about the 3Rs to students.

Implementation of School 3Rs in Johor

< Briefing Session for School Teachers in MB Johor Bahru >

The Guidelines are currently being tested in Johor to verify the applicability of the "Guidelines for Enhancement of 3Rs Activities in Schools". Six schools (primary and secondary) have been selected in 3 LAs in Johor, namely, MB Johor Bahru, MP Muar and MD Pontian, to implement 3R activities using with the Guidelines. These schools were selected by the Johor State Education Department based on the list of criteria prepared for the Guidelines.

A briefing session was held at Hotel Good Hope in Skudai, Johor on 1st September 2005 to brief participants on the Guidelines and the use of the 3Rs Programmes and Action Plans designed specifically for the pilot study. Participants include 6 school teachers, representatives from the Johor State Education Department, District Education Office of the 3 LAs, MHLG, MOE (the Science and Mathematics Unit of the Schools Division) and Southern Waste. The school teachers were requested to use the Programmes and Action Plans as templates and to modify or add to them to suit their particular needs and circumstances

< Voice of Teachers >

Sekolah Kebangsaan Taman Pasir Putih

"*Our students are well entrenched in 3Rs activities either through the clubs (co-curriculum) or as part of the class activity (curriculum). We have a mission statement, 3Rs club, targets, an action plan, an ongoing 3Rs awareness programme and we actively practise the 3Rs in the classroom and school garden.*".....Puan Aminah Md Noh

Teachers participated in Workshop

SMK Sri Perhentian, Pontian

"So far, we haven't being conducting continuous activities. We wish to introduce 3Rs activity, but we don't know how to do it. We would like to take this opportunity to start." Cikgu Faeizah Mansor

< Schedule for the Project in School >

Taking into account the year-end school holiday from 12th November 2005 to 2nd January 2006, the pilot study period straddles a period of 3 months from 1st September to 11th November 2005 and from 3rd January to mid-January 2006. Participating schools are requested to conduct the pilot 3Rs programme for at least 6 weeks between September and October 2005.

School 3Rs in Japan

KIDS ISO 14000 PROGRAMME

The Kids' ISO 14000 Programme is a new environmental education program for children, based on ISO14000s, which is an international standard for environmental management (Plan-Do-See-Act (PDCA) cycle). The main purpose of the programme is to teach and train children how to manage environmental issues (such as waste management, energy saving, and water conservation) by themselves through the workbook and guidebook of this programme. The workbook for Kids' ISO 14000 has been distributed to the students of 5th grade of the elementary school. The rate of accomplishment is more than 80% in highly educated schools, and 60-70% in average schools.

< Promotion of "My-Bag" and Public Awareness by Earth Ehime Ecology (EEE) >

Source: www.artech.or.jp

Two junior high school students participated in the Kids ISO 14000 Programme and initiated Earth Ehime Ecology (EEE) activity in cooperation with the Women's Council, local government, school teachers and the community. Objectives of the initiative are 1) to reduce plastic bags by using "My-Bag", and 2) to raise public awareness on the environment. The students set the target as 60 % of using "My Bag". Before the start of the activity, the students carried out a questionnaire survey to know the current rate of using My Bag at their community. The rate was 33.5%. Initially, the students tried to convey the message through public-initiated environmental events. However, the rate of using "My Bag" was still 35.9 %. After that, they concluded that an incentive was required to motivate community members to use "My Bag". To understand the kind of incentive required to motivate response from the public, an interview survey was conducted at a supermarket.. Finally, based on feedback from the community, the students decided to distribute striking, colourful and functional bags. As a result, the rate of using "My Bag" increased to 81.8% and they were able to exceed their target.

The Kids' ISO 14000 Programme is now expanding internationally through UN organizations (UNU, UNEP, UNESCO) and the International Organization for Standardization (ISO).

(1) Australia

The first example of implementation outside Japan is Australia. Boeing Australia Ltd. collaborated with the ArTech Japan, and made an Australian version of this programme through the trial.

(2) Thailand

The governors of three provinces in Thailand have shown interest in the Kids ISO 14000 Programme. They started by translating the introductory workbook into Thai.

(3) Indonesia:

A non-profit organization in Indonesia has also shown interest in this programme. However, initiation of the programme is pending a request for funds.

*For more details of "Kids ISO 14000 Programme", you can find more information from the website of the Artech Japan (**http://www.artech.or.jp/english/kids/envedu/index.html**).*

Events from March to August 2005

2nd Seminar at INTAN on 17th March 2005

During Phase I of the Study, the JICA Study Team prepared a draft Master Plan and Action Plans of National Waste Minimization in Malaysia, and concurrently, conducted pilot projects using three model Local Authorities. In order to disseminate the information to the stakeholders, the 2nd Seminar was held to 1) introduce the draft Master Plan, 2) discuss target rate for waste minimization, 3) brief on findings of material flow survey , and 4) introduce federal and local action plans. The JICA Study Team explained waste minimization targets and goals, main policies in national waste minimization. Three model LAs (MP Pulau Pinang, MP Subang Jaya and MB Miri) also made a presentation on the progress of the local action plans within their own respective administrative area.

3rd Seminar at Armada Hotel at Hotel Armada on 16th June 2005

Starting June 2005, 3 pilot projects for source separation, establishment of recycling network and implementation of 3R activities in schools were conducted in three model Local Authorities (MP Pulau Pinang, MP Subang Jaya and MB Miri). This seminar was held to launch the pilot projects officially and to introduce the concept of source separation to Malaysia. The JICA Study Team has introduced source separation of solid waste and recycling in various countries and has conducted stakeholders' workshop to reinforce the source separation concept. The seminar also gave the recyclers and manufacturers a platform to explain the recycling process, current situation and issues of recycling in the country. At the seminar, the three model LAs introduced their pilot projects of source separation and recycling network. The JICA Study Team also introduced concept of 3R programme in schools.

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PART 6

RECORDS OF SEMINAR, WORKSHOP AND PCM ROUNDTABLE

6.1 1st Seminar at PWTC on 14 September 2004

6.2 1st Workshop at INTAN on 23 December 2004

6.3 2nd Seminar at INTAN on 17 March 2005

6.4 3rd Seminar at Hotel Armada on 16 June 2005

6.5 2nd Workshop at Vistana Hotel on 13 September 2005

6.6 3rd Workshop at Pan Pacific on 1 & 2 March 2006

6.7 PCM Roundtable for LAs Action Plan in MP Pulau Pinang

6.8 PCM Roundtable for LAs Action Plan in MP Subang Jaya

6.9 PCM Roundtable for LAs Action Plan in MP Miri

6.10 PCM Roundtable for LAs Action Plan in MD Kinta Selatan

6.11 Final Seminar at The Legend Hotel on 1 & 2 June 2006

6.1 1st Seminar at PWTC on 14 September 2004

SEMINAR ON THE STUDY OF NATIONAL WASTE MINIMIZATION IN MALAYSIA

Venue : Bilik Johor/Kedah, PWTC, Kuala Lumpur
Date : 16th September, 2004

0830 - 0900 Registration

0900 - 0930 Opening Ceremony
1. Welcome speech by Representative from JICA
2. Opening Address by Y.Bhg. Dato Mohamad b. Saib, Director General, Local Government Department Malaysia

0930 - 1000 Introduction to the Study on National Waste Minimisation in Malaysia
Mr. Noboru Saeki, Leader, JICA Study Team

1000 - 1030 Refreshment

SESSION 1 Chairman : Ir. Fong Tian Yong, Deputy Director General II, MHLG

1030 - 1110 National Waste Recycling Program
Mr. Huszian b Husin, Director, EHED, MHLG

1110 - 1150 Waste Minimisation Program – Experience by LAs
Tn. Hj. Zulkifli Zakaria, MPPP

1150 - 1230 Role of Concessionaires in Waste Minimisation Program
Alam Flora Sdn Bhd and Southern Waste Sdn Bhd

1230 - 1300 Q and A Session

1300 - 1400 Lunch

SESSION 2 Chairman : Y.M. Engku Azman bin Tuan Mat, Director PIU, MHLG

1400 - 1450 Involvement of NGOs and CBOs in Waste Minimisation Program in Malaysia
Buddhist Tzu-Chi Merit Society and RA

1450 - 1530 Overview of Policies on Waste Minimisation in OECD Countries
Mr. Kohshi Takahata, JICA Study Team

1530 - 1610 Japanese Experience in Waste Minimisation and Recycling.
Mr. Satoshi Sugimoto, JICA Study Team

1610 - 1640 Q and Answers Session

1640 - 1700 Closing followed by Refreshment

Questions & Answers - Minutes

< Session 1 >

Chairman	Ir. Fong Tian Yong, Deputy Director General, Local Government Department, MHLG
Speaker	Ms. Vene Amylinda Md Pilus(on behalf of Mr. Huszian bin Husin), MHLG Tn Hj Zulkifli bin Zakaria, MP Pulau Pinang Mr. Mohd Jamil Zainal Abidin, Alam Flora Sdn Bhd Mr. Ho De Leong, Southern Waste Management Sdn Bhd

Question No.1. *Mr. Noboru Saeki (Team Leader, JICA Study Team) to MP Pulau Pinang.*
On the matter of composting, what was the finding in Penang?

Answer No.1 Tn Hj Zulkifli bin Zakaria replied that the experience with composting was mainly through the UNDP-SERI project in particular the village project in Kampung Seronok. The project can be considered a success and the community is continuing with composting even after the project ended at the end of 2003.

Question No.2 *Ms. Hasmah Harun (JICA Study Team) to MHLG & Alam Flora*
After various programmes for increasing quantity of recyclables, what are observations regarding the quantity and composition of wastes disposed on landfills.

Answer No.2 The Chairman commented that there was no data available and it was clarified that the question referred to observation. Southern Waste replied that for e.g. at the Johor Bahru Transfer Station, less recyclables were observed to be in the waste stream. In Penang, MPPP observed that the proportion of green waste was still high and a considerable amount of wooden pallets were also observed. The quantity of other recyclables was low.

Question No.3 *Ms. Kamariah Mohd. Noor (Environment Idaman Sdn Bhd) to the panel.*
What is the formula used for calculating recycling rates?

Answer No.3 The Chairman explained that the rates were extracted from various reports that were prepared by the LA's, and the actual formula used is not available at the moment, nevertheless, the formula is available at MHLG for reference.

Tn Hj Zulkifli bin Zakaria added that MPPP estimated the recycling rate base on the assumption of the ratio of the known amount of collected-recyclables against the amount of waste received at the landfill sites (i.e. the total amount of waste collected by the council). However, the estimations does not consider the unknown amount of recyclables taken out in kerbside recycling, scavenging activities etc.

Question No.4 *Mr. Chang Yii Tan (JICA Study Team) to MHLG*
With reference to the proposed recycling rate of 20 %, if there are less waste fractions going to the landfills, what is the implication of setting such a target?

Answer No.4 The Chairman replied that at present the Ministry only focused on 4 main types of wastes, i.e. paper, plastic, metal and glass. In actual fact, there are much more recyclables such as from industrial waste and construction waste

at are not reported to the Ministry. All these statistics can be included in determine the overall recycling rate.

Question No.5 *Ms. Kamariah Mohd. Noor (E-Idaman) to MHLG*
What was the participation rate in recycling activities?

Answer No.5 The Chairman replied that participation rates vary and at CBOs like residents associations, it is about 20 %. Such statistic is not available at present and this will be addressed by the JICA Study, and the information should be made known in due course.

Question No.6 *Mr. Daniel Lim (Dupont Malaysia Sdn Bhd) to MHLG*

It is noted that the percentage of plastics in waste is high, about 14 %.
What is the percentage of plastics recycled and what happens to the rest?

Answer No.6 The Chairman replied stating that majority of the plastics will end up in the landfills. Mr. Ho further added that at present, the price for plastic recyclables is very low and is not profitable to collect, store or transport, and hence most plastics are just dump at landfills.

Mr. Michael Foo from MPMA informed that the figure of 14% is disputable because this figure was determined base on the volume of plastic recyclable. However, the better way of estimating quantity of plastics should be weight instead of volume. Mr. Foo added that those plastics that end up in landfills are not desirable, i.e. either too dirty, contaminated etc. Majority of the "desirable" recyclables will have already been taken out by the kerbside recyclers.

Question No.7 *Tuan Haji Zulkifli bin Zakaria (MPPP) to Alam Flora*
Penang has received queries about recycling tyres and one of the technologies promoted is to process them into some kind of oil. MPPP would like to hear about technologies suitable for treating waste tyres.

Answer No.7 Alam Flora replied that they are at the moment storing the tyres but are looking into various technologies into recycling the rubber.

MHLG informed that a study had been carried out with DANIDA's assistance. There is a need to study further the viability including the use of a special cess and the imposition of import tax.

Question No.8 *Ms. Lim Poh Im (SERI)*

Ms. Lim commented that they are looking into new technology and information on composting, and SERI is open to any company wishing to submit their proposals and recommendations.

Regarding organic waste, SERI has proposed a new study that would involve hotels, hawkers, 700 houses and USM to be carried out with assistance of APO.

< Session 2 >

Chairman Y.M. Engku Azman bin Tuan Mat, MHLG
Speakers Mr. Tan Chee Wei, Buddhist Tzu-Chi Merit Society
Mrs. Tina Ramanujan, DJROA
Ms. Cecilia Thong Zon, BSDRA
Mr. Kohshi Takahata, JICA Study Team Member
Mr. Satoshi Sugimoto, JICA Study Team Member

Question No.1. *Mr. Tamaselvam a/l Vyapuri (Department of Environment) to Mr. Takahata*
a. What are the quality standards and regulations for RDF in Japan?
b. What is the situation with regard to illegal dumping of waste?

Answer No.1 a. Mr. Takahata replied that in Japan there several laws that come under different ministries e.g. Ministry of Agriculture, Fisheries and Forestry and the Ministry of Energy and Trade and Industry. There are controls for RDF that is to be used as organic fuel and sold to the public. If the fuel is given out free, they are not subject to the regulations. If RDF is used for production of steam e.g. in schools, then the emissions are subject to the Air Pollution Control Act.

b. With regard to illegal dumping, Mr. Takahata replied that despite strict control illegal dumping is still a problem in Japan. Mr. Sugimoto added that the cooperation of the Police is needed for surveillance and that there should be stiffer penalties for those caught dumping waste illegally.

Question No.2 *Mr. Soon Hun Yang (JICA Study Team Member) to Mr. Takahata*
The responsibility for recycling should rest with which party; the individual or the public? Which is likely to work better?

Answer No.2 Mr. Takahata replied that the most likely solution is 'shared responsibility'. For the manufacturing sector, tools e.g. Cleaner Production would be useful and this will be accompanied by public education and public awareness programmes.

Question No.3 *Mr. Chang Yii Tan (JICA Study Team) to CBOs*
What is the expenditure incurred compared to revenue obtained from sale of recyclables?

Answer No.3 DJROA replied that they collect only about RM3,000/year and some money is spent on items like weighing scales and tables while the remainder is saved for equipping the new collection centre.

Buddhist Tzu-Chi Merit Society added that staffs are not paid as they are volunteers. They collect about RM10,000/year and the whole amount is donate to charities.

Question No.4. *Mr. Theng Lee Chong (University Putra Malaysia) to MHLG*
In looking at recycling, has the matter of 'cross-media impact' been considered e.g. the relative impact on the environment from carrying out the recycling activities, i.e. pollution from vehicles, use of energy, etc.

Answer No.4 MHLG replied that 'cross-media impact' has not been considered.

Mr. Sugimoto added that of cause transportation cost and usage of fuel are major issues related to recycling. The only solution is to provide more collection centres and to streamline the collection system in order to minimise the cross-media impact.

Question No.5. *Mr. Leong Kin Choong (DJROA) to Mr. Sugimoto*
What is the role of CBOs in Japan?

Answer No.5 CBOs play an important role in waste minimisation in Japan but it is felt that school-based activities are very effective.


Seminar for
National Waste Minimization
in Malaysia


Seminar for
National Waste Mini
in Malaysia

6.2 1st Workshop at INTAN on 23 December 2004

1ST TRAINING WORKSHOP ON THE STUDY OF NATIONAL WASTE MINIMIZATION IN MALAYSIA

INTAN, KUALA LUMPUR
23rd.December,2004

Objectives :

- To achieve consensus on Terms & Definition and Indicators of Waste Minimisation for the preparation of Master Plan
- To discuss the selection criteria and to shortlist the Pilot Projects and Model Cities proposals.
- To review the current National Recycling Programme and recommend Improvement.

Programme:

08:30 - 09:00 Registration

09:00 - 09:15 Opening Speech by Ir. Fong Tian Yong
- Deputy Director General, Local Government Dept, MHLG

09:15 - 09:30 **Progress of the Study on the National Waste Minimisation and Introduction to the Workshop**
- Mr. N. Saeki (JICA Study Team Leader)

09:30 - 11:00 Workshop Session 1

Topic 1: Definition of Key Terms and Indicators In the Master Plan
- Facilitator: Mr. Sugimoto

Group Discussion (Participants are divided into smaller group for the detail discussion of the topic)

11:00 - 11:30 Tea Break

11:30 - 13:00 Workshop Session 2

Topic 2: Review of Current National Recycling Programme
- Facilitator: Mr. Takahata, Mrs Vene Amylinda

Group Discussion (Participants are divided into smaller group for the detail discussion of the topic)

13:00 - 14:00 Lunch

14:00 - 15:30 Workshop Session 3

Topic 3 : Selection Criteria for Model Cities and Introduction to the Pilot Project Content

- Facilitator: Mr. Yamauchi

Group discussion (Participants are divided into smaller groups for detail discussion the topic)

15:45 - 16:00 Tea Break

16:00 - 17:30 Group Presentations – *Chairman: Ir. Fong Tian Yong, MHLG*

17:30 - end -

Questions & Answers - Minutes

WORKSHOP SESSION 1
Speaker: Mr. Satoshi Sugimoto, JICA Study Team Leader

Question No.1. *En. Mohammad Dit, FMM*
Why are tyres not included in the targets and indicators?

Answer No.1 *Mr. Satoshi Sugimoto*
There is not enough data at the moment. At the moment this is only a proposal so the target wastes are open to discussion

Dr Nasir Hassan
Issue is important as a problematic as tyres may be considered as 'grey waste'. WMMP should be pragmatic and have immediate & long-term targets. This is info that most of us are concerned with and including tyres and C&D waste. Turning organic waste into compost is covered under our scope.

As per recycling rate there are 2 terms used; capture rate and participation rate.

Question No.2 *En. Mohammad Dit, FMM*
With regard to pulp & paper, this workshop is timely. There should be economic instruments designed. Surveys have been done e.g. tyres.

Answer No.2 The matter is noted.

WORKSHOP SESSION 2
Speaker Mr. Kohshi Takahata, JICA Study Team Member

No question.

WORKSHOP SESSION 3
Speaker Mr. Hisashi Yamauchi, JICA Study Team Member

No question.

GROUP PRESENTATIONS
Chair: Ir. Fong Tian Yong
Presenters **Group 1:** **Mr. Ng Han Kok, JICA Study Team**

Group 2: **Mr. Rudzaimier Malek, D. B. Kuching Utara**
Tuan Haji Zulkifli Zakaria, MPPP
Ms. Chew Ee lean, BSDRA

Group 3: **Ms. Lim Poh Im, SERI**

Comment No.1 *Mr. Huszian Husin*
The idea that recycling rate could be used as Performance Indicator for 'Yang Berhormat' (State/Parliamentary Representative) appears to be good to put forward for consideration.

Comment No.2 *Ms. Kamariah Mohd Noor, E-Idaman*
For Model LAs, less established LAs e.g. those with landfill problems should be considered.

Response No.2 *Mr. Fong Tian Yong, MHLG*
It is noted that Group 2 had suggested that less successful or LAs with waste problems be selected.

Comment No.3 *Ms. Saripah Yaacob, Alam Flora*
Propose LA with high generation rate to be selected so that can monitor before & after.

Have problem with one group's suggestion that "Solid waste is managed by LAs and not concessionaire" be one of selection criteria.
Inform that Concessionaire has done a lot in their service areas to promote recycling.

Response No.3 *Ms. Hasmah Harun, JICA Study Team*
Clarify that the criterion refers to the factor that the LA should be the lead organisation for solid waste management, only as far as selection of Model LAs is concerned.

Findings of Group Discussion

Topic1: Definition of Key Terms and Indicators in the Master Plan
< Group 1 >

Types of Waste	• All types of non-scheduled solid waste • Used Clothes • E-waste (electronic) • Batteries • Green waste/garden Waste • Used Toys (plastic) • Waste Tyres (considered as domestic waste) • End-of-life vehicles/old cars/ "kereta potong" • Used furniture • Household bulky item/e.g mattresses, fridges etc. • Food waste from commercial areas, restaurants etc. • Household "hazardous" waste i.e. fluorescence tubes, solvents, detergents
Targets	• Define target for each specific items, eg. paper, plastics, and others • Need to collect data on generation versus usage, then can only decide on target • Industry (private sector) & Ministry should work closely to define the targets. • How soon do we want to minimisation the targets? Immediate, short term or long term. But must consider urgency/ priority.

< Group 2 >

Types of Waste	• The 3 main categories/types of definitions are agreeable • Further definitions are required for the different types of waste such as; bulky waste, garden waste, waste from cleansing activities
Targets	• Indicators - Waste generation rate; waste disposal rate; recycling rate • To include recycling targets for plastic in general instead of PET bottles, garden waste and tires • Definition is required for recyclable items • Definition for recycling is limited to "material recycling"
Roles and Responsibilities of Stakeholders	(1) Federal Government For MSW & ISW • As " controlling agency" • Formulate Policies, Laws and Guidelines • Inter- Ministerial Coordination of key related Federal Agencies (DOE, MOH.MOE,MOF, etc) • Funding and set environmental funds to assist SMIs to go "green" (2) Local Government For MSW • KEY policy implementers • Execution of Federal Government's policies, laws and guidelines • Monitoring and enforcement • Reporting • Awareness • Recognition and award • Coordination among players For ISW • Should properly coordinate and monitor SWM • Reporting • Awareness (3) General Public

	For MSW & ISW • Proper handling of waste as directed by Local Govt. • Actively participate in 3R • Promotion of 3Rs in the neighbourhood • Willingness to contribute in terms of cash & kind for sustainable environment (4) Businesses For MSW & ISW • Implement "extended producers responsibilities" • Adopt good practices of 3R • Attain ISO 1400 accreditation (for SMIs try to understand the goals and target and minimise pollution (5) Concessionaires For MSW & ISW • Help promote 3R • KEY policy implementers • Execution of Federal Government's Policies, Laws and guidelines • Monitoring and enforcement • Reporting • Awareness • Recognition and award (6) SWM service contractors For MSW & ISW • Adopt good practices of 3R • Attain ISO 1400 accreditation (7) NGOs and CBOs For MSW • Help promote 3R • Implementers • Reporting • Awareness • Recognition and award (8) Institutions For MSW • Help promote 3R • Implementers • Reporting • Awareness • Recognition and award

< Group 3 >

Types of Waste	• Agree with the 3 main target wastes according to source • The WMMP should focus on consumers and post-consumer waste. • Need definition of household hazardous waste • Need definition of bulky waste (MSW, ISW & C&D) For municipal solid waste • Agree with the 3 main sub-groups • Notes that the following wastes are not included: - Agriculture wastes (e.g. Farm) - Green wastes
Targets	Minimisation • Should focus on plastics. • Noted that recyclable plastics is now available. • Government should provide incentives to facilitate plastic minimisation.

	Key Recyclables • Should include plastics & not just PET • Targets for production
Goal	Should include mention of production and its role in creating a Recycling-based Society.
Roles and Responsibilities of Stakeholders	(1) Federal Government • Enforcement (Strict) • Economic instruments • Capacity building (2) Local Government • Infrastructure • Enforcement (Strict) • Capacity building (3) General Public • Education in schools • Separation at source • Buy garbage bags - different sizes & costs (Disincentive) (4) Producers/Business • Cess • Recycling tax (5) Concessionaires • Study their role in WMMP (Consider public interest) • Proper plan for waste minimisation - Coordinate with LA

Topic 2: Review of Current National Recycling Programme
< Group 1 >

Objective	• MHLG should promote all LAs to have dedicated recycling unit to manage, monitor and control all recycling activities within their jurisdiction. • Should also involve the State Gov in recycling activities.
Targets	• To rank the recycling activities according to priority, urgency, etc. • Should define the various sectors and types of recyclables. • Should target all types of non-scheduled waste for recycling.
Activities	• Should increase Awareness Programme by encouraging LAs to be more involved in the promotions. • More education required in schools. Should allow private sectors to participate in education activities in schools. • Promote Networking between Gov./LA/Private etc. (to share real-commercial information from industrial sector that uses recyclables) • Better monitoring & Enforcement, perhaps through Gov. registration/ reporting system. • Give incentives to active recyclers. • Should implement “Carrot or the Stick” principle.
Data Management	• Data should be maintained and updated. Perhaps through Gov./LA registration and reporting system. • Set up MHLG and LA data collection & information centre. • Better monitoring to ensure all players submit accurate information about performance and activities. • Should have uniform reporting system i.e. for generators, collectors, recyclers, etc.
Performance Monitoring	• Should have a ranking of best performers. • Give incentives to best performers. • Give assistance or incentive to the recyclers of “low value” recyclable items. Create some sort of award / compensation mechanism.

Institutional Framework	• Registration or licensing mechanism • Better enforcement • Better monitoring • Better networking • Better dissemination of information • Better understanding of how the various recycling sectors work in order to appreciate their activities
Stakeholders	• Should increase public awareness on recycling not just for monetary values. • To reduce public empathy (selfishness) on participating in recycling activities for the benefit of others. • Should promote donation of recyclables to charitable organisations.

< Group 2 >

Objective	• Reduction of solid waste generation • Waste to be treated as resource
Targets	• Target of 22% by 2020 is acceptable for now. • Waste type to be defined and target for waste types is required.
Activities	Awareness Programme • Effective but needed further improvement. • Electronic media awareness program to be changed yearly. • Although awareness has increased, participation is still low because the "how to do recycling" is lacking and infrastructure for recycling is lacking. • Capture of recyclables for paper is good. Infrastructure Programme (1) Distribution of recycling bins • Maintain 3 bins but flexible • Current bins to be redesigned • Do pilot projects for bins evaluation • Additional bins for other waste (2) Construction of Collection centres • Containers instead of fixed centres • Centres must be on Govt. lands • Beefed up management of centres - have trained & dedicated staff. • Increase drop-off points • Introduce mobile collection centres (3) Provisions of recycling trucks • Dedicated recycling trucks for specific recyclables materials; have "jingles". • Trucks to have 3 coloured compartments (side loaders preferred) • Trucks to carry recycling messages
Data Management	From LAs • Mandatory to report • All players must be registered • Standardized and simplified format From other Stakeholders • Standardized reporting standard • Coordinating and monitoring
Performance Monitoring	• KPIs to be provided by MHGL to assist and monitor performance • Indicators to be standardised • Provide standardized Data Format • Related information to be directed to LAs for monitoring.
Institutional Framework	• Necessity to have law on 3R • Solid Waste Bill to be enacted to ensure recycling is effectively implemented. • Govt. to provide Direction and Guidance to be established.

	• LA to have dedicated Recycling Unit for 3Rs to be successful. • Commitment and support from LA management is required. • MHGL to assist in providing resources for smaller PBTs.
Stakeholders	• Roles of stakeholders to be defined • Coordination among stakeholders to be improved • List to be updated and made available • Enhanced networking amongst stakeholders • Incentives (not in cash) be given to active players • Free flow of information

< Group 3 >

Objective	NRP should continue with improvements.
Targets	• Target of 22% by 2020 is acceptable for now. • Waste type to be defined and target for waste types is required.
Activities	Awareness Programme • Massive media campaigns in simple language, on a continual basis • Audio-visual aids to facilitate awareness bldg. • Training materials-relevant & attractive (e.g. notes, CD) • Training of trainers • Volunteers: commitment and caring & sharing by champion. • Mobile information centres • Use of community leaders e.g. JKK • Reward system/recognition • School Curriculum Infrastructure Programme • MHLG Tri-colour bins: Continue but review location so that strategic. • Bins should only be placed after recipient has undergone training and agreed to be monitored. • Bin design: more attractive & place normal bins close by. • LAs to provide a piece of land/designate land for recyclable collection centres. • Study appropriate number of collection centres/population/household/ sources. • Equipment e.g. design proper collection centre, bins, baler, shredder. • Mobile machines e.g. baler, weighing scales. • National solid waste centre/museum/network centre • Reverse vending machine-study • Attractive signs for collection centres
Data Management	• Registration scheme for collectors/recyclers/operators with some form of recognition to encourage report to Authority. • Govt should use industry associations to encourage members to report. • Avoid double-counting of recyclable collection e.g. from collector & manufacturer.
Performance Monitoring	• Benchmark should be established • Indicators should be selected e.g. number of stakeholders registered • Model community/school-establish recycling rates e.g. quantity of waste/pupil
Institutional Framework	• Improve efficiency of staff & supervision. • Staff of relevant Authority to be properly selected & trained. • The leader of LA waste minimisation must be one with knowledge, at management level & have adequate resources.

Topic 3: Selection Criteria for Model Cities and Introduction to the Pilot Project Content

< Group 1 >

Selection Criteria MC2 for Model LAs	(1) Critical Criteria • 3Rs activities level led by LA • Willing to prepare waste minimisation A/P. • Willing to setup taskforce for A/P. • Willing to manage Pilot Project(s). Suggested the following critical criteria • Evaluate existing set up. • Must be able to sustain PP. (2) Supporting Criteria • Solid waste is managed by LA or concessionaire • Recycling unit in LA • Activity of CBOs and/or NGOs • Registered recyclers (based on MHLG data) • Report recycling data to MHLG? (NRP) • Pertaining to Local Agenda 21 (LA21)
Pilot Projects	(1) Components • Supporting project of National Recycling Program • Networking of stakeholders and data management • Source separation for residents/CBOs • Supporting program of stakeholders; i.e. NGOs, CBOs etc. • Environmental education/awareness of waste minimisation • Waste recycling/minimisation for industries • Campaign on waste minimisation at Mega-mart (2) Selection Criteria • Target groups • Component of pilot projects: • Target wastes • In line with National Recycling Program • Sustainability • Replicability • Capacity of implementing organisation • Cost Suggested the following selection criteria • Target waste should include used tyres, batteries (household) , e-waste, fluorescent tubes.

< Group 2 >

Selection Criteria MC2 for Model LAs	Critical Criteria • 3Rs activities level led by LA • Must be ready to prepare waste minimisation A/P. • Must form taskforce for A/P. • Must manage and sustain Pilot Project(s). Suggested the following critical criteria • LAS are willing to do voluntary work with NGOs and CBOs. • Solid waste is managed by LAs or Concessionaire. • Agents and recyclers are licensed by LA. Long term to be registered. • Report recycling data to MHGL • LA has adopted and implemented LA 21/ PPP /Healthy City, etc. • Infrastructure, networking and activities are already in place.

	• Choose a LA having critical solid waste management problem, ie landfill is almost full and public participation is low.
Pilot Projects	(1) Components • Supporting project of National Recycling Program • Networking of stakeholders and data management • Source separation for residents/CBOs • Supporting program of stakeholders; i.e. NGOs, CBOs etc. • Environmental education/awareness of waste minimisation • Waste recycling/minimisation for industries • Campaign on waste minimisation at Mega-mart • Composting (2) Selection Criteria • Target groups • Component of pilot projects: • Target wastes • In line with National Recycling Program • Sustainability • Replicability • Capacity of implementing organisation • Cost

< Group 3 >

Selection Criteria MC2 for Model LAs	(1) Critical Criteria • 3Rs activities level led by LA • Willing to prepare waste minimisation A/P. • Willing to setup taskforce for A/P. • Willing to manage Pilot Project(s). (2) Supporting Criteria • Solid waste is managed by LA. [and not the concessionaire] • Recycling unit in LA. • Synergy between LA and CBOs and/or NGOs. • Registered recyclers (based on MHLG data). • Report recycling data to MHLG? (NRP). • Pertaining to Local Agenda 21 (LA21).-KIV
Pilot Projects	(1) Components • Supporting project of National Recycling Program • Networking of stakeholders and data management • Source separation for residents/CBOs/NGOs • Supporting program of stakeholders; i.e. NGOs, CBOs etc. • Environmental education/ awareness of waste minimisation • Waste recycling/minimisation for industries • Campaign on waste minimisation at Mega-mart (2) Selection Criteria • Target groups • Component of pilot projects: • Target wastes • In line with National Recycling Program • Sustainability • Replicability • Capacity of implementing organisation • Cost Suggestion • Public (non-converted)-need change of mindset.

	• Must have full cooperation of the LAs. • Source separation-laws are needed. • Personal explanation & information materials. • More recyclable collection bins in housing estates (nearer). • Kerbside Collection of recyclables.

6.3 2nd Seminar at INTAN on 17 March 2005

2nd SEMINAR ON THE STUDY OF NATIONAL WASTE MINIMIZATION IN MALAYSIA

VENUE : DEWAN SRI BAIDURI, INTAN, KUALA LUMPUR
DATE : 17TH MARCH, 2005

OBJECTIVES :

- INTRODUCTION TO DRAFT MASTER PLAN AND DISCUSSION OF TARGET RATE FOR WASTE MINIMISATION
- BRIEFING ON SURVEY FINDINGS
- INTRODUCTION TO FEDERAL AND LOCAL ACTION PLANS

PROGRAMME:

0830 - 0900 Registration

0900 - 0930 Opening Ceremony
1. Welcome Speech by Mr. Akira Murata, JICA Resident Representative
2. Opening Address by *Puan Siti Salmah Bte Mohd Nor,* Deputy Secretary General (Development), MMHLG, Malaysia

0930 - 0950 Outline of Proposed Master Plan
Mr. Noboru Saeki, Leader, JICA Study Team

0950 - 1030 Refreshments

SESSION 1 Chairman: Y.M. Engku Azman bin Tuan Mat, Director PIU, MHLG

1030 - 1110 Waste Minimisation Targets and Goals
Mr. Kohshi Takahata, JICA Study Team

1110 - 1150 Main Policies in National Waste Minimisation
Mr. Satoshi Sugimoto, JICA Study Team

1150 - 1230 Waste Minimisation Action Plan (Federal Level)
Mr. Hisashi Yamauchi, JICA Study Team

1230 - 1300 Q and A Session

1300 - 1400 Lunch

SESSION 2 Chairman : Ir. Fong Tian Yong, Deputy Director General II, MHLG

1400 - 1600 Action Plans For Model LAs And Pilot Projects

- *MP Pulau Pinang*
- *MP Subang Jaya*
- *MP Miri*

1600 - 1630 Q and A Session

1630 - 1700 Closing followed by Refreshments

6.4 3rd Seminar at Hotel Armada on 16 June 2005

SEMINAR ON THE STUDY OF NATIONAL WASTE MINIMIZATION IN MALAYSIA

Venue : Laksamana BallRoom, Hotel Armada, Petaling Jaya, Kuala Lumpur
Date : 16th June, 2005

0830 – 0900 Registration

0900 – 0930 Opening Ceremony

1. Welcome speech by Mr. Akira Murata, JICA Resident Representative
2. Opening Address by Y.Bhg. Dato' Anwar Bin Abdul Rahman, Director General, Local Government Department, Ministry of Housing & Local Government, Malaysia

0930 - 0945 Introduction to the Study on National Waste Minimisation in Malaysia
Mr. Noboru Saeki, Leader, JICA Study Team

0945 - 1015 Refreshment

SESSION 1 Chairman : Ir. Fong Tian Yong, Deputy Director General II, MHLG

1015 – 1040 Japan's Experience of Source Separation and Recycling
Mr. Satoshi Sugimoto, JICA Study Team

1040 – 1155 Pilot Projects: Source Separation and Recycling Network in LAs

MP Pulau Pinang	*Tn. Hj. Zulkifli Zakaria, MPPP*
MP Subang Jaya	*Mr. Chang Yii Tan*
MB Miri	*Mr. Soon Hun Yang (Contractor)*

1155 – 1220 Guidelines for School Activities on 3R
Mr. Hisashi Yamauchi, JICA Study Team

1220 – 1240 Q and A Session

1240 – 1400 Lunch

SESSION 2 Chairman: Mr. Huszian Husin, Director of EHED, MHLG

1400 – 1420 Issues on Paper Recycling :*Central Malaya Paper Sdn Bhd*

1420 – 1440 Issues on Plastics Recycling :*LHT Plastics*

1440 – 1500 Issues on Glass Recycling : *KL Glass Sdn Bhd*

1500 – 1520 Community's/Women's Role/Activities on 3R
Y. Bhg. Datin Zaharah Alatas, Chairperson, Environment Commission, NCWO

1520 – 1540 Q and A Session

1540 – 1630 Closing followed by Refreshment

Questions & Answers - Minutes

< Session 1 >

Chairman Ir. Fong Tian Yong, Deputy Director General, Local Government Department, MHLG

Speaker Tn Hj Zulkifli bin Zakaria, MP Pulau Pinang

Question No.1 Mr.Rudzaimier b. Malek (DBKU) *to MPPP & MPSJ & Alam Flora*
Is there any conflict on the interest between this project and the concessionaires? Recyclables in MPPP and MPSJ are collected by concessionaires, and they calculate their bills/tariff according to the amount of wastes that been collected. If we do the source separation of waste, the amount of waste that are in the bins will be reduce and it will have some impact on concessionaires that collect the waste to be disposed in landfill.

Answer No.1 Alam Flora replied that they are also doing collection and recycling. In the interim contract with government, it is mentioned that after they achieved privatization, Alam Flora need to achieve the target of 22% from the collected waste as recyclables. In addition, Alam Flora is also managing the landfill. If Alam Flora could reduce the waste that been disposed to the landfill, they will be able to save the landfill's cost. So, it is also important for them to do recycling.
For the management fee, the fee can be calculated in two ways; on the tonnage basis and premises basis. Alam Flora suggest that charges should be on per premise as it is more accurate.

Question No.2 *Dr. Liau (Regional Environmental Awareness of Cameron Highland) to MHLG*
In Cameron Highlands, most of the problem in practising recycling is lack of space especially in hotels, schools, and public blocks. Public blocks that do well in recycling are where they have enough space for storing recyclables. They use room which is not in use as store room for recycling. I would like to suggest to the government that government should provide space in these area especially in schools.

Answer No.2 Tn Hj Zulkifli bin Zakaria from MPPP responded that their biggest problem in Penang is lack of space. But frequency of collection is more important. They have work with apartments and schools that have very little space and big green bins for recycling are provided by MHLG which is 660L. Any collector who collects recyclables from the schools must know when to collect the recyclables. If recycling agents collect recyclables frequently, the schools will be free from the problem of space.

Ir. Fong added that MPPP has valid points. Solid waste bill that will be approved soon have some provision to require the high rise apartment to have some space for the recyclables storage.

Question No.3 *Dr. Liau (REACH) to MHLG*
Cameron Highland is a tourist area where there are many hotels. As usual the recycling activities are done by staff of hotels as the recyclables sold are an

incentive for the staff who do the recycling. As for hotel management, hotels that do recycling should be given points. Why are there no such system?

Answer No.3 Ir. Fong replied that this question should be taken note by the Tourism Ministry. He thinks it is good criteria to be introduced.

Question No.4 Ms. Gan Geok Yean (Resident association of Damansara Jaya (DJROA))

1. How can we make the producer responsible for the collection at source besides the concessionaire and LA?
2. For school education awareness, how can we get fund to do it?

Answer No.4 Tn Hj Zulkifli (MPPP) replied that so far as for Penang, all the schools have not asked for any fund from the government. The schools get fund by selling the recyclables, and the amount of fund is related to the volume of recyclables and price of the recyclables. Environment Cadet is given RM2000 per school by MPPP and MPSP to do anything regarding environment.

Ir. Fong mentioned that En. Ahmad Husni from EPU may answer to the question. However there is no direct answer at the moment and direct the RA to seek En. Ahmad Husni for the answer.

Mr. Soon commented for the first question, that the fundamental things that are missing in Malaysia are the legal basis. This should be done before other things take in like the corporate or social responsibilities that are demanded by the consumers. In long term basis, cooperate or social responsibilities can be included.

Ir. Fong added that EPU has published a policy called " ?" that is a regulation which spelled out fund.

Question No.5 *Mr. Liew (MBT) to MHLG*

In pilot projects, there are many incentives or rewarding systems or even free services given by recycling agents. I would like to suggest that all the incentives or rewarding system to be recorded for 'cost and benefit' analysis to be carried out after this study. As I understand the key word in this Study is sustainable, but after the pilot project, there may not be such incentives available. So we would like to know how much amount of incentives should be provided to make it sustainable.

Answer No.5 Ir. Fong responded that it is good suggestion and it should be recorded as mentioned by Mr. Liew.

Question No.6 *Mr.Saeki to MHLG*
Are there any pilot projects dealing with food wastes?

Answer No.6 Tn Hj Zulkifli replied that the place that JICA Study Team chosen for the Study also have another project running in the area which is handling food waste under Malaysian Association Productivity Organisation. MPPP would prefer to see if the pilot project for non-organic wastes is done successfully, they hope to proceed with organic wastes under the JICA study. Tn Hj Zulkifli mentioned that in Penang, SERI is implementing composting

program under UNDP and referred to Mr Khor to elaborate further on this matter.

Mr. Khor responded that for the past two years, UNDP and private companies working together with SERI have a composting programme introduced in "kampung". They practised recycling using fundamental tools such as plastic bins, holes, etc. This year, 80 households are doing the recycling activities until the bins cracked and broken. They want to bring it up to community level, so on the next stage, SERI will try bring it up to community level by providing bigger, better facilities for them. SERI will also introduce some micro-organism for them. SERI will cultivate and develop it themselves for these projects.

Question No.7 *Ir.Fong (MHLG) to MPPP*

1. On source separation workshop, how do you attract households to come to your workshop?
2. Who do you expect to come to the workshop?

Answer No.7 Mr. Khor replied that the workshop have been implemented in 2 stages. The first one is they go house to house to invite them. On preliminary question survey form from JICA has included the question that asked who is the one taking out the rubbish in the household i.e. father, mother, grandmother, relatives or the maid. So SERI will target them as the participant for the workshop. SERI mentioned that they do not expect it to be 100% participation but they will try to ask again for the second round. They also prepare some incentives i.e. collection bins. Participants can take the incentives if they come to join the workshop.

Last time, when SERI have public open talks, SERI provided 300 composting plastic bins for free. About 500 participants came to listen as they wanted to collect free composting bins.

Question No.8 *Pn. Kamariah Mohd. Noor (E-Idaman) to Mr. Saeki*

1. Mr. Saeki mentioned that recycling mechanism in this country would be unique in the world. I would like to know whether Mr. Saeki has come out with the process flow to show that the model is eco-business concept? From my point of view, the pilot projects that will be implemented in the study do not seem to reflect this model.

2. Mr. Saeki mentioned that plastic and glass recycling activities are limited and not so active. When we had first and second seminar, we agreed in principle that these are the items that we need to recycle. How do you promote these activities to have better recycling rate for plastics and glass? We need to look at these issues as we have to achieve a certain rate in our policy.

3. As for pilot project in MPPP, Mr. Zulkifli mentioned that the place for the pilot project is not a good choice. But I think it is suitable place.

4. For household waste collection, I suggest that collection of household waste should be done 2 times a week and 1 time is for recyclables in replacing the three times collection on the household waste which is the usual case.

Answer No.8 Mr. Saeki replied that they still do not have any conclusion as JICA Study Team are still studying on how to increase the recycling rate for plastic and glass. Anyway JICA Study Team are proceeding with the pilot projects and still contacting the recyclers for these. JICA Study Team found out that there exist certain demand on the raw materials of plastics and glass. JICA Study Team may find out the linkages for those recyclables. The final answer will be end of this year. The members had a meeting with Prof. Matsufuji, the chairman of the advisory committee of this study, in April 2005. As Prof Matsufuji attended a conference on 3Rs Initiatives in Japan, he suggested that the current recycling systems led by small scale recycling players in Malaysia can be a very good model to be introduced in other developing countries.

Mr. Sugimoto added that the recyclables such as old newspapers, aluminium cans, these kinds of valuable items have already been properly separated at source in Malaysia. What we have to consider now is how to extend such current source separation activities to other recyclables having only lower or no value such as plastics or glass.

6.5 2nd Training Workshop at Vistana Hotel on 13th September

2nd TRAINING WORKSHOP ON THE STUDY ON NATIONAL WASTE MINIMIZATION IN MALAYSIA

13th September 2005
Lumut 1, Level 1, Vistana Hotel, Kuala Lumpur

OBJECTIVES

- To share information, experience and lessons learned from the pilot projects.
- To discuss issues and other matters to be considered in the next stage of the pilot projects.

PPROGRAMME

08:30 – 09:00 Registration

09: 00- 09.30 Welcome Remarks
Mr. Yoshinobu Ikura, JICA Malaysia Office
Official Opening Speech
Ir. Fong Tian Yong, MHLG

09:30 – 09:45 Introduction
Hisashi Yamauchi, JICA Study Team

09:45 – 10:00 Progress & Issues on PP-I: Establishment of National Recycling Information System
Mr. Ng Han Kok

10:00 – 10:30 Morning Tea Break

10:30 – 12:00 Progress & Issues on PP-II: Local Recycling Network and Source Separation of MSW
MPPP: Tuan Haji Zulkifli Zakaria & Mr. Khor Hung Teik
MPSJ: Dr. Suryani Ismail & Mr. Chang Yii Tan
MBM: Ms. Lolita J. Nicholas & Mr. Soon Hun Yang

12:00 – 13:30 Lunch

Afternoon Session

13:30 – 15:30 Group Discussion
(Participants will be divided into 2 groups, and discuss both topics)

Topic 1: Source Separation of MSW and Recycling Network in LAs
Topic 2: SWM Data Management

15:30 – 16:00 Afternoon Tea Break

16:00 - 17:00 Presentation of Group Discussion Findings
Chairman: Ir. Fong Tian Yong, MHLG

17:00 End of Workshop Sessions

Findings of Group Discussion

Topic 1: Source Separation of MSW and Recycling Network in LAs

Point 1-1: Sustainability of Source Separation PPs

Do you think the following source separation pilot projects are sustainable?

<Group 1>

Issues & Problems	1. Financial constrains after project period 2. Commitments from top management 3. Control of recycling players / partners 4. Political issues 5. Participation from the public 6. Recognition from relevant authorities 7. Food wastes from hotels (main wastes) 8. Difficult to target the guests (hotels) – mobile 9. Issues on financial rewards (benefits). 10. Difficulty to implement separation in hotel rooms 11. Housekeeping has limited time to implement recycling 12. Feasibility of implementing recycling (awareness) 13. Players for the entire recycling chains broken (lack of incentives etc.)

<Goroup 2>

Issues & Problems	1. Inadequate commitment of stakeholders 2. Absence/inadequate commitment, pressure and funding at federal, state and local level to encourage and sustain WM in the community 3. Absence of a specific unit for recycling and confirmed positions for staff within LA 4. Absence of informal and formal leaders in govt and community - champions 5. Absence of documented guidelines in LAs to conduct the WM programs for residents 6. Incentives in kind 7. Make separation easier – 2 bags 8. Adhoc education and awareness campaigns 9. Absence of law or regulation

Point 1-2: Sustainability of Source Separation PPs

What is required for the introduction of sustainable source separation in Malaysia?

<Group 2>

Actions	Partners
1. Incentives / subsidies / supports at long run are still required	Gov.
2.Polluters pay principle (economic instruments)	Gov./Mfg
3. Introduce clear policy in the form of legislation, guidelines etc.	Gov./MHLG
4. Holistic approach	Hoteliers
5. ISO14000 (for hotels)	

<Group2>

Actions	Partners
1. Education and awareness of the entire spectrum of sustainable env. 2. Build up a core of champions 3. Incentives – but in what form? Deposit/refund, buy back 4. Formalise the SWM Bill 5. Top management commitment & set direction, timeline and target	LA, NGOs, CBOs, institutions

Point 1-3: Recycling Network in LAs

Issues & measures for an establishment of recycling network in LAs.

<Group1>

Issues & Problems	1. No formal database and communication 2. No reaching out by the local authorities 3. Confidentiality of the recyclers 4. Red-tape dealing with LAs	
Recommendations	**Actions**	**Partners**
	1. Registration / licensing of recyclers 2. Mechanism to facilitation / simplification	LA LA/State

<Group 2>

Issues & Problems	1. Absence of platform to facilitate communication 2. Inadequate communication/smart partnership at national, local and community level to exchange information	
Recommendations	**Actions**	**Partners**
	1. Communication platform 2. Periodic conference, seminar, workshop at national level	KPKT, LA

Topic 2: MSW Data Management

Point 2-1: Registration/ Licensing of Players in Federal and/or LAs level

<Group 1>

Issues & Problems	1. Confidentiality to release information by the recyclers 2. Lack of interests / low response to register (low awareness) 3. Coverage of publicity is limited 4. No collaboration among the stakeholders / Low reaching out by the LAs	
Recommendations	**Actions**	**Partners**
	1. Bigger / wide coverage (media), to be more informative 2. Collaboration with LAs to promote recycling 3. Enforcement / compulsory registration	Recyclers LA/Recycler MHLG/LA

<Group 2>

Issues & Problems	No law requiring registration/licensing	
Recommendations	**Actions**	**Partners**
	1. Work with other agencies in the absence of SW Act 2. Formalise vendors	MITI,DOE etc

Point 2-2: Recycling Network Unit (RNU) in LAs

<Group 1>

Issues & Problems	1. Dependence on concessionaire companies 2. Logistic problems in terms of manpower 3. Low commitments / Lack of view from the top management	
Recommendations	**Actions**	**Partners**
	1. Learn from model LAs 2.Reorganisation by JPA (on manpower issues), or contract workers (such as from NGOs) 3.Top management should be more committed at all levels 4. Action / Master Plan to ensure sustainable of RNU 5.Continuous training and sensitizing programmes 6. State government (EXCO) forms special committee for coordination and monitoring (Oversee the success)	Model LA JPA MHLG/ State/LA

<Group 2>

Issues & Problems	1. No fulltime position at LAs specifically for WM 2. The right person for the job ?	
Recommendations	**Actions**	**Partners**
	1. Change RNU name, eg WM Unit 2. Create fulltime positions at RNU	

Point 2-3: Information Management System

<Group 1>

Issues & Problems	1. No submission of information (reports) from many LAs 2. Administrative issues (transferring information, format etc) 3. The reports / forms are not submitted correctly	
Recommendations	**Actions**	**Partners**
	1. Workshops for LAs 2. Continuous efforts on communication and persuasions from MHLG Recycling unit to the LAs 3. Introduction of web-based user friendly system - Email (short term), E-system (long term) 4. Workshops and training for LAs	MHLG/ State/LA

<Group 2>

Issues & Problems	1. Inadequate software and hardware at LAs 2. Difficulty in data collection and reconciliation of data obtained from different sources 3. Definition of targets	
Recommendations	**Actions**	**Partners**
	1. Issue licensed software to LAs 2. Staff training	KPKT, LA

6.6 3rd Training Workshop at Pan Pacific on 1&2 March 2006

WORKSHOP ON GUIDELINES FOR SOURCE SEPARATION AND LAP

Venue: Pan Pacific Hotel, Kuala Lumpur
Date: 1 and 2 March, 2006

OBJECTIVES :

- To obtain feedback, recommendations and develop transfer of experience skills of the LA staff who participated in the pilot projects on the draft guidelines for;
  - Source Separation
  - Formulation of Local Action Plan (LAP-WM)
- To introduce the 3Rs Action Guide

PROGRAMME:

1ST MARCH 2005

0830 – 0900 Registration

0900 – 0920 Welcome Remarks by Mr. Yoshinobu Ikura, Deputy Resident Represrentative,
JICA Malaysia Office
Opening Speech by Y. Bhg. Dato' Hj. Anwar Hj. Abd. Rahman, Director General of MHLG

0920– 0940 Introduction
En. Engku Azman Tuan Mat, Director of MHLG

0940– 1000 Refreshments

1000– 1030 Introduction to Draft Guidelines for Source Separation
Mr. Hisashi Yamauchi, Deputy Team Leader of JICA Study Team

1030– 1100 Lessons Learnt from Source Separation Project in Model LAs (10 min. each)
MPPP: Tuan Haji Zulkifli Zakaria, Senior Assistant Environmental Health Officer
MPSJ: Dr. Suryani Ismail, Director
MBM: Mr. Sam Kai Keong, Senior Assistant, Environmental Health Officer

1100 – 1230 Workshop Session 1 – Applicability of Draft Guidelines on Source Separation
Group 1 – Leader: MPPP: Tuan Haji Zulkifli Zakaria
Facilitator: MHLG
Group 2 – Leader: MPSJ: Dr. Suryani Ismail
Facilitator: MHLG
Group 3 – Leader: MBM: Mr. Sam Kai Keong
Facilitator: MHLG

Suggested Discussion Topics
(1) Feedback on the guideline contents
(2) Sharing of experience on pilot project implementation
(3) Dissemination of the Guidelines to LAs
(4) Responsibilities of stakeholders

Note: Presenter (LA staff) should be appointed from attendants in each group.

1230 – 1400 Lunch

AFTERNOON SESSION

1400 – 1515 Workshop Session 1 - Continue Review of Draft Guidelines on Source Separation

1515– 1545 Preparation of Summary of Recommendations by Each Group

(Refreshments)

1600 – 1700 Presentation of Group Findings and Q and A

1700 – 1720 Introduction to Draft 3Rs Action Guide (3RAG)
Ms. Ryoko Watanabe, JICA Study Team

1720 – 1730 Closing Remarks for 1st Day

2ND MARCH 2005

0830 – 0900 Registration

0900 – 0910 Opening Remarks for 2nd Day
En. Engku Azman Tuan Mat, Director of MHLG

0910 – 0950 Introduction to Draft Guidelines for Formulation of LAP-WM
Mr. Hisashi Yamauchi, Deputy Leader of JICA Study Team

0950 – 1030 Experience in Formulation of LAP-WM
En. Theng Lee Chong, JICA Study Team
MDKS: En. Goh Seng Chee, Assistant Environmental Health Officer

1030 – 1100 Refreshments

1100 – 1230 Workshop Session 2 - Review of Draft Guidelines on LAP

Group 1 – Leader: MPPP Representative
Facilitator: MHLG
Group 2 – Leader: MPSJ Representative
Facilitator: MHLG
Group 3 – Leader: MBM Representative
Facilitator: MHLG

Suggested Discussion Topics
(1) Feedback on the guideline contents
(2) Sharing of experience on pilot project implementation
(3) Dissemination of the Guidelines to LAs
(4) Responsibilities of stakeholders
Note: Presenter (LA staff) should be appointed from attendants in each group.

1230 – 1400 Lunch

AFTERNOON SESSION

1400 – 1515 Workshop Session 2 - Continue Review of Draft Guidelines on LAP

1515 – 1545 Preparation of Summary of Recommendations by Each Group

(Refreshments)

1600 – 1645 Presentation of Group Findings and Q and A

1645 – 1700 Closing Remarks

Comments & Points Raised during Discussion
Guidelines for Formulation of LAP

Points Raised during Discussion
Getting Approval
• Get approval from LA Full Council • (Duration) KPKT to come up with implementation programme for LAP • Commitment; LA + State Authority • Obtaining "green light" from LA top management to start the process • Informing all the departments within the LA • State Government should be informed of the ongoing process **The Council's concerns:** • Budget • Manpower (mobilize internally) • Capability (how?) • Gap !! MHLG – State government - LAs **Proposal (paper)** • with technical inputs from MHLG (expertise from MHLG) • experience sharing with Model LAs (creating "peer pressure") • Options for budget (own or new allocation by MHLG) • Duration of approval : should not be long (depending on LA)
Who will be responsible ?
Waste Minimisation Unit • LA responsible for setting up Waste Minimisation Unit (WMU) with designated taskforce to run the activities of the unit, and parked under the Waste Management Dept. • Internal mobilization of manpower/ contract staff can be considered • Staff has to have motivation / clear vision • Staff requirements and budget for WMU should be prepared • WMU - Try to reduce new posts number by using existing positions (DBKK; Already WMU available) (DBKL; Basically monitoring, AFSB progressing) (DBKK; Administration system different, maybe easier than DBKL to develop LAP) **Role of KPKT** • KPKT to interface with relevant authorities to formalise position, scope of work and appointment. • Need to clarify relation of WMU in connection with SWM Unit. MPPP puts WMU under SWM Unit) **Others** • Multi-tasking Waste Minimisation Committee (Task Force) may look into both LAP and Source Separation as possible
Identification of Players
• Identify the players (pro-active) and close and continuous communication with them - Who? Depending on LA's intention (resident associations, recycling players, government agencies etc.) - Recycling traders/middlemen/agents are important - Prioritize and selective players (expected roles from them) • KPKT, MOE, DOE • NREB, State ministry and agencies • NGOs, CBOs, RAs, religious associations, educational institutions, collectors, recyclers, etc
Identify Current SWM and Recycling

Points Raised during Discussion

Baseline Information

- Population, households, housing units, business establishments (to get an estimate of total waste generation)
- Waste disposed at landfill

Source of Information

- Dept of Statistics
- Waste flow and composition survey
- Receivers, buy-back centres, traders, concessionaires, contractors, etc.
- Register all parties in the recycling system
- MPPP had advantage that they started 5 years ago by forming an environmental working group
- Numerous players involved in recycling so sometimes difficult to obtain data or double counting. Need to identify best way to obtain data without double counting.
- (DBKL; Difficult to get data because many buyers and agents come from outside KL)
- Difficulty to obtain accurate data
- LAP should provide the best possible data that they can get and GL should state that
- LAs should not be afraid to reveal actual recovery rates
- Weighbridges at landfills and transfer stations are important for data collection
- (DBKK; No concessionaire agreement so LA has to provide the data)
- Targets set may be revised and need not be too ambitious (That should be done by WMU)
- Targets should be set in careful discussion with LA management and should be linked with certain conditions

a) Self evaluation on available data (Figures)
- Update of old data
- Collect new data (by own capability, with technical support from expertise of MHLG)
- Protocols / manual for data collection such as waste composition, waste generation study are required by the council so that they can carry out the studies by themselves
- checklist of data and information required will be helpful to council

b) Knowledge on existing practice of players
- issues of "business confidentiality" − under Local Government Act the Council should be able to inspect and collect data from any premises (to be verified).

c) Knowledge on the existing issues / problems
- Transportation costs (not feasible for concessionaire companies)
- Shipping costs (Sabah and Sarawak)
- No collectors for certain recyclable materials (especially glass)
- Fluctuation of recyclable prices

Authorization of Plan

- To get authorization from LA management and State Gov. explain benefit from LAP such as savings at the landfill, etc.
- Need to decide whom to report to

Target

- Things to consider:
  # achievable
  # agreeable by the stakeholders
- Lump sum recycling rate for first 5 years.
- Long term target − recycling rate by category (After the system has been established)

Issues and Problems Faced by LAs

Points Raised during Discussion

- Licensing and registration
- Accuracy of information
- Double-counting
- Intimidation and threats to LA officers
- Market-driven & absence of regulation and incentives
- Implementation and enforcement
- Manpower
- Commitment and support from top management

Actions

Legislation

- **"by-law" in pg 24 to be replaced with "policy"** to include waste minimisation and recycling as a requirement for license application or renewal for BEs.
- Directive to all govt depts. within the LA jurisdiction to implement WM.
- most important to have a law (at least to amend the by-law), enforcement and monitoring

Economic Instruments

- Allocate annual budget to run activity of WM Unit.
- Partnership with BEs in publicity campaigns to promote WM.
- Economic instruments may be one of approaches
- Subsidies and incentive programs have to be carefully considered to serve the WM purpose
- MPPP experience was to avoid monetary incentives
- Subsidies in the start may help to increase awareness but should not be continuous
- The need to have incentive

Facilities and Coordination of Initiatives

- GL to suggest tools for use in promoting and enhancing awareness

Awareness

- Corporation of MOE, religious institutions, BEs
- Continuous / routine (not ad hoc)

Training

- Staff of WM Unit to be trained (by KPKT ?)
- Ongoing training and capacity building

Strengthening of Recycling Players

- "Recording system" on amounts and types is a problem because of non-unified terms
- Assure the players on the benefits of networking (such as free advertisement, publicity etc.)

Monitoring and Evaluation

- Indicators in Table 7.1 (pg 29) are not indicators, but lots of data.
- LAs need indicative benchmarks to measure or gauge their performance and achievement, e.g, kg/household
- WMU establishment is a pre-condition
- Outsourcing of monitoring may be required
- Simplified format is preferred (form or checklist is preferred).
- All indicators in one standard format (user can choose from the list of indicators)
- Frequency of monitoring is lacking
- Financial indicator should be added
- Boundary and detailed information of target area for the action should be clearly determined
- Reporting frequency (Table 7.2) can be merged together with the form / checklist mentioned

General Comments on the Guideline:

Points Raised during Discussion
• Brief background to the Guidelines. • **Definition of terms should be added.** • Financial aspects of formulation of LAP should be added in this guideline (page 1) • Clear definition on "Waste Minimisation", limited to mostly recycling, not reuse and reduce • The guideline should be prepared in a more user-friendly and easy to understand (referring to page 7 [all], page 9 on BATNEEC) • Short and compact guideline is preferred, the presentation of this guideline is not attractive • Role of federal and state government need to be explained in the guideline. • Attach case studies at Pilot Project areas. • Need professional editor for language and grammar • Not possible to review in detailed on the guideline within short period in workshop. • Full time review on the details of the guideline is necessary. <Specific Comments> • The word "National Recycling Rate" • Figure 1.1: revise format to make it a continuous process • Table 2.1: definitions of wastes should be in line with the definitions in Solid Waste Management Bill • 3.1.1 (page 7), the word "discarding" should be changed • Page 25, add in organisation chart for the RNU or taskforce • Page 11 (Table 4) – add in page number. • Appendix C should be Appendix 3 (in page 17)
CORE TEAM
• Pilot Project implementation encouraged working together between the participating LAs. They can be core team with MHLG. • MHLG coordination/support is needed • Recycling Convention of LAs on an annual basis proposed • Suitable members should participate in such activities • MHLG website may be used to disseminate LA activities • LA directories may be shared • AFSB already involved in bringing LAs together

Comments & Points Raised during Discussion
Guidelines for Source Separation

Step	Comments
Introduction	State Ministry should be included in the Figure 1; Implementation Structure and Role of Players.
	Why need SS? – increase amount of recyclables and minimise waste disposal
	Identification of funds for implementation
Step 1: Planning	Base line data
	• Required especially for performance monitoring • Applicable especially for bigger cities/towns • Now lacking in most councils • How to collect data efficiently? • Need to apply for funding and training for improving data • License the key players (e.g. recyclers, collectors, traders, etc.) • Pre-survey should include type of collection system the people prefer
	Criteria for selecting target groups (not check points) –
	• Ranking & prioritisation should be given • Need a basis for selection • To test various types of situation • Need to consult stakeholders – better ownership and participation
	Establishment of special unit
	• **A Proper Unit is Required!** • Full time staff is required • Establish specific unit to implement • Request MHLG to support staff application
	Stakeholders` Round Table Discussion
	• Lead by LA • To align all stakeholders & include the subject of benefits to all
	Separation & Collection Method
	• Alternatives of Separation Method: Let the LA to choose • Combination of methods • Campaign is effective, require less manpower on the long run • Depends on local conditions • Consultation with stakeholders again important • Whether quantity or participation more important?
	Networking
	• Compilation of networking partners • Conduct workshops • Registration and regulation of recycling agents – need to amend bylaws • Win – win situation to gain cooperation • Pro-active approach (e.g. using enforcement officers) to register stakeholders
Step 2:	Campaign

Step	Comments
Awareness and Public Announcement	• Awareness • LA to lead • **Need evaluation & monitoring** – (costly, only on project basis) • Work with Resident Association < Examples to be added> • Media – newspaper most effective • Celebrity / leaders to promote • Seminar / awareness • Calendar of events – together with assessment bill • Peer pressure – from political to public – to make source separation common practice • Environmental education in primary schools • Study / visit tour to recycling centres/plants • 3-R Award / competition for schools • 3-R innovative competition • "Club 25" – 25% recycling target • Train the trainers (teachers) • Campaigns – demonstration of proper sorting • Waste minimisation to be discussed at federal level committees (e.g. consultative meeting of PBT) • Mascots, motto and streamers should be prepared • Stickers may be provided to participating households
	Explanatory Meeting
	• LA should send official letters to each participant informing on the project and explanation meeting • Sub-champions should also actively invite participants with visits, in addition to the letters • Letters should indicate incentives (e.g. Door Gifts) will be provided at meeting
	Trainers' training
	• **Training kits should be prepared for the training for trainers** • Trainers training should include field trips
Step 3: Implementation and Monitoring	Implementation
	• Letter from LA to participants that the project will start and the who are the project implementers • Guidelines on Implementation need to be more detailed • Roles of each stakeholder in implementation should be specified clearly in the GL • Need to amplify on what, how and why data is collected • Equipment and human resource required • No collection if not sorted properly
	Monitoring
	• Continuous education on proper sorting and handling • To obtain regular feedback to and from stakeholders • Ministry to monitor PBT's performance
	Data Collection
	• Data collection for impact analysis- What do you get out of it? • Dissemination of data to community is also important • Data collection – crucial for monitoring
Others	Sustainability

Step	Comments
	• Increasing fuel cost – Subsidize recycling agents • Outsourcing – hire consultants, contractors to carry out specific tasks • Interest of PBT staff – crucial • KPKT to improve capacity to manage programme
	• Standardize the terms and terminology
Applicability	<DBKL> • May be applied but need to control collectors workers to measure success • AF may not be able to control all workers • Task Force to include DBKL and AF as well as others • Importance of LA champions training. <DBKK> • Applicable with modifications for local needs (need to consider economic factor) • Task Force and Champions available but motivation should be considered

6.7 PCM Roundtable for LAs Action Plan in MP Pulau Pinang

Project Cycle Management (PCM) Roundtable
at Majlis Perbandaran Pulau Pinang (MPPP)
Level 17, KOMTAR
22 February 2005

Minutes

1. Attendance

The roundtable was attended by 12 members of the Task Force formed by MPPP. The JICA Study Team (JST) was represented by five members.

2. Welcome Remarks

Mr. Ooi Chin Loo, Secretary of MPPP welcomed all attendees and thanked the Ministry of Housing & Local Government (MHLG) and JICA for selecting MPPP as one of the four Model LAs. He considered the waste minimisation project and MPPP's participation to be timely considering the initiatives carried out so far in connection with recycling. Mr. Ooi also stressed that it is important for projects to have the element of sustainability. The roundtable then agreed with the proposed PCM programme.

3. Introduction by Tuan Haji Zulkifli bin Zakaria, Task Force Leader

Tuan Haji Zulkifli bin Zakaria, the MPPP Task Force Leader for the Model LAs thanked MPPP top management for supporting the Urban Services Dept. in their recycling activities and their agreement for participation as MODEL LA. He also thanked MHLG and JICA for recognising MPPP's efforts, and to members of the task force for agreeing to participate in the formulation of a LAP-WM. He then invited task force members to introduce themselves. He then handed over the discussion to the Facilitator, Ms Hasmah Harun, JICA Local Team member.

4. Introduction to PCM

Puan Hasmah Harun, the facilitator began by introducing the representatives from the JICA Study Team (JST) that included experts Mr. H. Yamauchi and Mr. K. Takahata. She then proceeded to give a brief presentation on the background of the JICA Study on National Waste Minimisation. The slides include a description of what is required from the Task Force and the tentative schedule of implementation. Members were also reminded about the rules of the PCM outlined in the PCM Roundtable Programme.

5. Roundtable Discussion

The Task Force noted the three components that were to be produced from the PCM as follows:

i. Confirmation of stakeholders involved in waste minimisation in Penang Island.
ii. Issue/problems identification and their cause & effects
iii. Objectives setting and their ends & means

Guided by the PCM Rules, the Task Force engaged in good discussion on all the three components mentioned above. Mr Takahata organised the ideas on the board and both he and Mr. Yamauchi provided clarification when required, and suggestions for ensuring smooth discussion on relevant matters.

For the purpose of the Master Plan and LAP-WM, the definition of waste minimisation is taken to be as follows:

> "*Waste minimisation refers to the reduction of generation of waste at source and the reduction of waste disposed at landfills*"

< Stakeholders >

Stakeholders in waste minimisation in Penang Island listed by the task force are as follows:

- Penang State Government
- Local Government (MPPP)
- House Owners/Homemakers/Maids
- Housing Estates/Condominiums/Villages
- Recyclable Collectors/ Recycling Industries/Recycling Agents
- Food Outlets (Restaurants/hawkers)
- Hotels
- Markets
- Consumers/Community
- NGOs/CBOs
- Schools
- Industry/SMIs
- Building Contractors
- Workshops

< Core Problems >

The task force then went on to identify core issues/problems faced in Penang in connection with waste minimisation. It was noted that some of the items raised could be grouped so that eventually the task force agreed on nine (9) core problems, which have been summarised as follows (not in any order of importance):

1. Poor Attitude/Behaviour
2. MPPP's Low Capacity
3. Lack of Infrastructure/Networking
4. Political Interference
5. Lack of Laws & Enforcement
6. Low Willingness to Pay
7. Lack of Knowledge
8. Landfill Land Issues
9. Unpredictable Market Forces

< Cause & Effects of 3 Core Problems >

The task force agreed that core problems 1, 2 and 3 are the main problems faced in Penang Island. The roundtable discussion then focussed on identifying the cause & effects of each of the three main problems.

< Objectives of Waste Minimisation >

Based on the three main problems, the task force turned the problems into positive expressions referred to as their 'Objectives'. These are:

1. Improved Attitude/Behaviour
2. MPPP Has Adequate Capacity.
3. Improved Infrastructure & Networking

6. Other Findings of Roundtable Discussion

The findings agreed to during PCM discussion were briefly summarised by the facilitator. These findings and notes of the PCM Roundtable will be distributed as soon as possible.

During the course of discussion, the PCM roundtable took note that there are risks associated with the formulation of the Action Plan. These are mainly connected with the Federal Government's decision regarding federalisation of solid waste management, and subsequent privatisation of services and passing of the Solid Waste Management Bill by Parliament.

The following matters were also raised by the task force as requiring consideration by MHLG and other relevant agencies:

< Human Resources >

Adequate human resources are required for purposes of waste minimisation. In the past, MPPP had difficulty applying to the Public Services Department (PSD) for new posts, and when posts are approved PSD/Public Services Commission (PSC)'s recruitment process took a relatively long time. It was suggested that PSD officers be made more aware about the needs of waste management in line with government policies and expectations, and time required for recruitment exercise be improved. This may be enhanced by improving communication with MHLG.

< Organisational Framework for Waste Management at MHLG >

The task force noted that the organisational level responsible for waste management at MHLG is not commensurate with current needs and demands. While matters such as town & country planning, sewerage have their own department with a Director General, waste management is only attended to by a Division, and this division is manned by personnel seconded from the Ministry of Health. It was suggested that the Federal Government review the organisational framework to ensure that waste management can progress as envisaged.

< Communication >

In the past, breakdown in communication was observed on a number of occasions. This happened at different levels e.g. between MHLG and MPPP, and intra-departmental communications within MPPP. Such incidents have resulted in information not reaching intended recipients in a timely manner, or not at all. It was suggested that communication be improved in order to avoid unnecessary delays and inefficiencies.

< Collection Centres >

Design of selection centres as currently specified by MHLG consists of permanent concrete structures to be built in selected residential or commercial areas. MPPP's experience shows that such structures are neither suitable nor effective. This is because of the scarcity of land and its high land prices. In addition, the NIMBY syndrome has contributed to such structures not being fully utilised e.g. Island Park centre. For LAs like MPPP, mobile collection facilities may be the answer that addresses both the land and attitude issues.

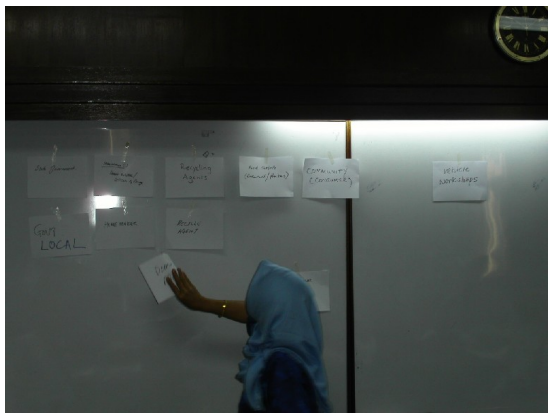
< Market-based Approach >

The task force pointed out that recyclable price fluctuations have both positive and negative impacts in recyclable market. When prices decline, there is a problem in accepting recyclables from consumers unless there is adequate storage capacity. Subsidies have been proposed as one of the ways to address this matter but it was generally agreed that market-based or economic instruments are required in order for this to work.

7. Closing

Mr. Ooi Chin Loo expressed confidence that MPPP and task force members would be able to work together to produce an Action Plan for Waste Minimisation for Penang Island. The PCM roundtable was adjourned at 12.30 p.m. with Mr. Ooi thanking all task force members, the MHLG and JICA.



6.8 PCM Roundtable for LAs Action Plan in MP Subang Jaya

Project Cycle Management (PCM) Roundtable
at Majlis Perbandaran Subang Jaya (MPSJ)
Level 2, Bilik Kenanga, MPSJ Building
24 February 2005

Minutes

1. Attendance

The roundtable was attended by representatives from 13 organisations of the Stakeholders identified by MPSJ. The JICA Study Team (JST) was represented by eight members while MHLG had one representative.

2. Welcome Remarks

Dr. Suriani Bt Ismail, the Director of the Health and Urban Service Department of MPSJ, welcomed all attendees to the first roundtable meeting between the stakeholders and players within the MPSJ area. She explained that the Ministry of Housing & Local Government (MHLG) had approached MPSJ to participate in the study conducted by the JST for MHLG on the National Waste Minimisation. The meeting held today is a component of the study program and called all attendees to provide their input and raise any concern issues. She continued with the introduction of every stakeholder present. The roundtable then agreed with the proposed PCM programme.

3. Introduction to PCM

Mr. Ng Han Kok, the facilitator began by introducing the representatives from the JICA Study Team (JST) that included Mr. N. Saeki, Mr. H. Yamauchi, Mr. S. Sugimoto, Mr. K. Takahata and Mr. A. Shimomura. He then proceeded to give a brief presentation on the background of the JICA Study on National Waste Minimisation which has now come to the final stage of Phase 1 and the First Draft of Action Plan must be submitted before Technical Working Group meeting on 8th March 2005. The slides include a description of what is required from the Task Force and the tentative schedule of implementation. Members were also informed about the objectives of PCM meeting and reminded about the rules of the PCM outlined in the PCM Roundtable Programme.

Dr. Suriani handed over the list of the stakeholders to JST before the roundtable commenced.

4. Roundtable Discussion

Mr. Han requested all participants to write down their issues and/or problems, cause & effects, ends & means related to recycling on the papers given. Mr. Yamauchi also clarified that the comments and/or problems can still be submitted throughout the discussion and solutions would also be identified afterwards.

The Task Force noted the two components that were to be produced from the PCM as follows:

i. Issue/Problems Identification and their Cause & Effects
ii. Objectives setting and their Ends & Means

Guided by the PCM Rules, the Task Force engaged in good discussion on all the two components mentioned above. Mr Takahata organised the ideas on the board and Mr. Han controlled the discussion so that it went well and smoothly.

<Core Problems>

The task force then went on to identify core issues/problems faced in Subang Jaya in connection with waste minimisation. It was noted that some of the items raised could be grouped so that eventually the task force agreed on five (5) core problems, which have been summarised as follows (not in any order of importance):

1. Lack of Awareness/Education
2. Lack of Facility/Networking
3. Lack of Financial Support/Incentive
4. Mass Media & Networking
5. Lack of Laws & Enforcement

<Cause & Effects of 3 Core Problems>

The task force agreed that core problems 1, 2 and 3 are the main problems faced in Subang Jaya Municipal Council. The roundtable discussion then focussed on identifying the cause & effects of each of the three main problems.

<Objectives of Waste Minimisation>

Based on the three main problems, the task force turned the problems into positive expressions referred to as their 'Objectives'. These are:

1. Improved Awareness/Education
2. Improved Facility/Networking
3. MPSJ has adequate financial support

5. Other Findings of Roundtable Discussion

The findings agreed to during PCM discussion were briefly summarised by the facilitator. These findings and notes of the PCM Roundtable will be distributed as soon as possible.

During the course of discussion, the PCM roundtable took note that MPSJ has still not finished with their Action Plan Draft due to the lack of time for preparation. It was advised that the draft should be submitted to JICA Study Team before 8th of March 2005.

Mr. Eadon from Pertubuhan Amal Seri Sinar (PASS) shared his experiences and views regarding the recycling activities being implemented by his non-profit organisation. Below are the details of what he shared:-

1. PASS is only set up (18 months old).
2. In 2004, PASS has donated RM60,000 to charity from the recycling activities conducted. And PASS needs support from MPSJ and Government.
3. PASS collects various types of recyclables i.e. furniture, electricals etc.
4. Currently, PASS is covering a few parts of Kuala Lumpur and hope to cover Subang Jaya soon.
5. The concept is so efficient and their 6-foot bins are hard to be stolen and safe.
6. They also advertise in the internet.

Professor Dr. Mohd Ali Hassan from UPM said that his department has some linkages with local and foreign companies collecting the organic waste at industrial scale.

Mr. Yusra from Rotocraft Sdn Bhd asked about the allocation of budget either per person or per LA but it has been clarified by Miss Azura from MHLG that the budget is allocated by DB, MP or MD.

Miss Erni from Alam Flora Sdn Bhd informed that most programs should pay incentive to public in order to get their participation.

6. Closing

Dr. Suriani thanked all the PCM participants, the MHLG and JICA on their active participations. The PCM roundtable was adjourned at 12.30 p.m.






6.9 PCM Roundtable for LAs Action Plan in MP Miri

Project Cycle Management (PCM) Roundtable
at Majlis Perbandaran Miri (MPM)
Level 2, Bilik Mesyuarat MPM, MPM Building
(0910-1140) 10 March 2005

Minutes

1. Attendance

The roundtable was attended by representatives from 22 organisations of the Stakeholders identified by MPM. The JICA Study Team (JST) was represented by three members while MHLG had one representative.

2. Welcome Remarks

Mr. Antonio Kahti Galis, the Municipal Secretary of MPM, welcomed all attendees to the PCM meeting between the stakeholders and players for the recycling program. He said MPM is lucky to have been selected as one of 4 Model LAs by the Ministry of Housing & Local Government (MHLG). The roundtable then agreed with the proposed PCM programme.

3. Introduction to PCM

Mr. K. Takahata, one of the representatives from the JICA Study Team (JST) began by briefly introducing the JICA Study Background on National Waste Minimisation. The slides include a description of what is required from the Task Force and the tentative schedule of implementation. Members were also reminded about the rules of the PCM outlined in the PCM Roundtable Programme.

4. Roundtable Discussion

Mr. Soon Hun Yang, one of JICA Study Team members facilitated the PCM meeting. He started off by saying that the selection of MPM as a Model LA is in line with MPM vision to be awarded as a Resort City in May 2005. He mentioned that the current amount of waste generated from Miri which goes to Subis Landfill is 130 tonnes/day. The Task Force noted the three components that were to be produced from the PCM as follows:

i. Confirmation of stakeholders involved in waste minimisation in Miri.
ii. Issue/Problems Identification and their Cause & Effects
iii. Objectives setting and their Ends & Means

Guided by the PCM Rules, the Task Force engaged in good discussion on all the three components mentioned above. Mr Takahata organised the ideas on the board and both he and Mr. Soon provided clarification when required, and suggestions for ensuring smooth discussion on relevant matters.

<Stakeholders>

Stakeholders who came to the PCM meeting introduced themselves to the roundtable meeting.

<Core Problems>

The task force then went on to identify core issues/problems faced in Miri in connection with waste minimisation. It was noted that some of the items raised could be grouped so that eventually the task force agreed on five (5) core problems, which have been summarised as follows (not in any order of importance):

1. Poor Attitude
2. Lack of Infrastructure
3. Lack of Regulations & Enforcement
4. Financial Constraint
5. Low Urgency of Recycling

<Cause & Effects of 3 Core Problems>

The task force agreed that core problems 1, 2 and 3 are the main problems faced in Miri. The roundtable discussion then focussed on identifying the cause & effects of each of the three main problems.

<Objectives of Waste Minimisation>

Based on the three main problems, the task force turned the problems into positive expressions referred to as their 'Objectives'. These are:

1. Improved Attitude
2. Improved Infrastructure
3. Improved Regulation & Enforcement

5. Other Findings of Roundtable Discussion

The findings agreed to during PCM discussion were briefly summarised by Mr. K. Takahata.

One participant raised up the issue that Miri needs to have a recycling plant in order to reduce the cost of sending recyclables to Peninsular Malaysia.

One of the issues raised by Ms. Norina from DOE Miri on the matter of regulations, the roundtable agreed that the regulations refer to those related to waste minimisation and may include usage of plastics.

6. Closing

Mr. K. Takahata summarized the findings of the PCM meeting and all shared ideas will be taken into account for the purpose of producing the Master Plan and Action Plan of the Study. The PCM roundtable was adjourned at 11.40 p.m. with Mr. K. Takahata thanking all participants for their ideas.

6.10 PCM Roundtable for LAs Action Plan in MD Kinta Selatan

Project Cycle Management (PCM) Roundtable
at Majlis Daerah Kinta Selatan (MDKS)
MDKS Kampar Administrative Complex Meeting Room
29 March 2005

Minutes

1. Attendance

The roundtable was attended by representatives from 18 organisations of the Stakeholders identified by MDKS Kampar (MDKS). The JICA Study Team (JST) was represented by three (3) members while MHLG had one representative.

2. Welcome Remarks

The PCM roundtable is chaired by En. Abdul Rahman Md San, a Council Member of MDKS. He extended the apologies from Encik Ayub Syadan bin Abdul Rani, the PPT Secretary of MDKS, who was unable to attend and chair the meeting.

In his opening remarks, En. Abdul Rahman welcomed all attendees to the roundtable meeting between the stakeholders and players within the MDKS area. He explained that the Ministry of Housing & Local Government (MHLG) had selected MDKS as a Model LA for the study conducted by the JST for MHLG on the National Waste Minimisation. Out of many District Councils (Majlis Daerah, MD) in Malaysia, MDKS was the only MD to be selected in addition to the selected Town Councils (Majlis Perbandaran, MP). Thus, En. Abdul Rahman stressed that it is important that MDKS and the locals to work together and give full support on for the programme, as a role model to the other MDs.

En. Abdul Rahman explained the purpose of the PCM and encourages all participants to discuss and provide their inputs and ideas to JST and raise any concern issues. This is crucial as these information will be use to make a realistic Action Plan tailor-made for MDKS. En. Abdul Rahman indicated that currently MDKS collects 24,000 tonnes of waste per year and only 5% of the wastes collected were recycled. The remaining waste were sent to the landfills. Thus he stressed that it is critical that recycling activities to be increased in order to reduce the amount of waste sent to landfills. One of the areas suggested is to increase the awareness of the Kinta Selatan people.

He continued with the introduction of every stakeholder present. The roundtable then agreed with the proposed PCM programme.

3. Introduction to PCM

The PCM was facilitated by Cik Hasmah Harun. She began by introducing the representatives from the MHLG and the JST. She then proceeded to give a brief presentation on the background of the JICA Study on National Waste Minimisation that has now come to the final stage of Phase 1 and the First Draft of Action Plan must be submitted before Technical Working Group meeting on 8th March 2005. The slides include a description of what is required from the Task Force and the schedule of implementation. However, since the datelines indicated have all passed, the work for MDKS will be based on new datelines and should be completed before Phase II commenced. Members were also informed about the objectives of PCM meeting and reminded about the rules of the PCM outlined in the PCM Roundtable Programme.

Before the PCM commenced the participants were asked to identify the stakeholders in their areas.

4. Roundtable Discussion

Cik Hasmah requested all participants to write down their issues and/or problems, cause & effects, ends & means related to recycling on the papers given.

The Task Force noted the two components that were to be produced from the PCM as follows:

i. Issue/Problems Identification and their Cause & Effects
ii. Objectives setting and their Ends & Means

Guided by the PCM Rules, the Task Force engaged in good discussion on all the two components mentioned above. Mr. Ng organised the ideas on the board and Cik Hasmah controlled the discussion so that it went well and smoothly.

<Core Problems>
The task force then went on to identify core issues/problems faced in Kinta Selatan in connection with waste minimisation. It was noted that some of the items raised could be grouped so that eventually the task force agreed on six (6) core problems, which have been summarised as follows (not in any order of importance):

1. Awareness/Attitude Problems
2. Lack of Infrastructure and Management Problems
3. Lack of Enforcement
4. Lack of Cooperation
5. Finance and Economics
6. Non-convenient

<Cause & Effects of 3 Core Problems>
The task force agreed that core problems 1, 2 and 3 are the main problems faced in Kinta Selatan District Council. The roundtable discussion then focussed on identifying the cause & effects of each of the three main problems.

<Objectives of Waste Minimisation>
Based on the three main problems, the task force turned the problems into positive expressions referred to as their 'Objectives'. These are:

1. Improved Awareness/Attitude
2. Improved Infrastructure and Management
3. Improve Enforcement

5. Other Findings of Roundtable Discussion

The findings agreed to during PCM discussion were briefly summarised by the facilitator. These findings and notes of the PCM Roundtable will be distributed as soon as possible. During the course of discussion, the PCM roundtable took note that MDKS will soon commenced on the preparation of their Draft Action Plan. No dateline has been set for the submission.

6. Closing

En. Abdul Rahman thanked all the PCM participants, the MHLG and JST on their active participations. The PCM roundtable was adjourned at 1.00 p.m.

6.11 Final Seminar on National Waste Minimisation Study in Malaysia

Grand Ballroom, Level 9, Legend Hotel, Kuala Lumpur
1st – 2nd June 2006

1. Outline of the Seminar

The Final Seminar on the National Waste Minimisation Study in Malaysia was conducted on 1st and 2nd June 2006 at The Legend Hotel, Kuala Lumpur. It was organised jointly by the MHLG and JICA as a summarisation of the Study, and officiated by the Minister of Housing and Local Government.

The objectives of the Seminar were:

- To explain the scope of the Study that was undertaken;
- To introduce and present the output of the Study that include:
  a) The Master Plan on National Waste Minimisation
  b) The Action Plan on National Waste Minimisation
  c) Guidelines for Source Separation, Formulation of Local Action Plan (LAP), Enhancement of 3Rs activities in school and 3Rs Action Guide (3RAG)
- To decide on the direction and to consolidate the concepts on how to implement the 3Rs on a national basis.

A total of 270 people attended the 2-day Seminar, most of whom were representatives from the Federal Government, State Government, 81 LAs, concessionaires, private waste management-related companies and NGOs.

The Seminar commenced with the Speech of the Minister of Housing and Local Government, Dato'Seri Ong Ka Ting. A brief introduction of the National Strategic Plan and the Master Plan and Federal Action Plan on Waste Minimisation was presented by MHLG, followed by a presentation on the experience in Japan by the Japanese Experts, and lastly, the experiences of the Model LAs in their formulation of the Local Action Plan and conducting of Source Separation Programme.

In tandem with the presentation session, an exhibition was held to introduce recycling activities by nine private companies, including a display of "Furoshiki" by the Japanese side.

The first session started with the Panel Discussion that was moderated by Prof. Sakurai, Okinawa University. The panellists include representatives from MHLG, EPU, DOE, NGO, experts on solid waste management, and representative from MoE, Japan and the Study Team. During the panel discussion, possible obstacles and countermeasure were raised and discussed among the panellists and participants. Among them, four points were stressed and agreed to be very important for the successful implementation of the waste minimisation programme in Malaysia. The points were the enhancement of awareness and education on waste minimisation, participation of every players, formulation of partnership between the stakeholders, and establishment of mechanism to support people's passion.

Encik Engku Azman bin Tuan Matt, the Director of Solid Waste Management Unit, MHLG closed the seminar by providing a summarisation of the discussion. Closing remarks were made by the Prof. Matsufuji and Y. Bhg. Dato' Haji Anwar b. Haji Abd. Rahman, Director General, Local Government Department, MHLG.

On the whole, the seminar saw good participation from all the players and good partnership or networking between all the players and stakeholders.

2. Programme:

1st June 2006

8.00 – 9.00 am	Registration of participants and arrival of guest and VIPs
9.00 – 9.45 am	Opening Ceremony • Welcoming words by Y.M. Engku Azman bin Tuan Mat, Organising Chairman • Speech by Mr. Akira Murata, JICA Country Representative • Opening speech by Y.B. Dato' Seri Ong Ka Ting Minister of Housing and Local Government, MHLG
9.45 – 10.30 am	Refreshment
<Session 1> Chairperson: Y. Bhg. Datin Shamsiah bt Hj Dahaban, EPU	
10.30–11.00 am	Presentation 1: **Waste Minimisation in the Context of National Strategic Plan** Y.Bhg. Dato' Haji Anwar b. Haji Abd. Rahman, Director General, Department of Local Government, MHLG
11.00 –11.30 am	Presentation 2: **Japanese Experience in Developing Effective Waste Management Programme** Prof. Kunitoshi Sakurai, The President of Okinawa University, Japan
<Session 2> Chairperson: Tuan Haji Fadzil bin Mustafa, MHLG	
11.30 – 12.30pm	Presentation 3: **National Waste Minimisation Master Plan and Action Plan** Y.M. Engku Azman bin Tuan Mat, Director, Local Government Department, MHLG *Note: Commentary by Mr. Satoshi Sugimoto, JICA Study Team*
12.30 – 2.00 pm	Lunch
<Session 3> Chairperson: Y.M. Engku Azman bin Tuan Mat, MHLG	
2.00 – 2.30 pm	Presentation 4: **Public Awareness and Networking Programme** Ms. Vene Amylinda bt. Mohd Pilus, Assistant Director, Department of Local Government, MHLG *Note: Commentary by Mr. Hisashi Yamauchi, JICA Study Team*
2.30 – 3.00pm	Presentation 5: **3Rs Initiative and Implementing Waste Minimisation in Japan** Mr. Hiroaki Takiguchi, Ministry of the Environment, Japan
3.00 – 3.15 pm	Tea Break
<Session 4> Chairperson: Puan Rohani bt. Abd. Samad, MOE	
3.15 – 3.45 pm	Presentation 6: **Guidelines on 3Rs Activities at Schools** Ms. Hasmah bt. Harun, JICA Study Team *Note: Commentary by Mr. Hisakazu Hirai, Advisor, JICA*
3.45 - 4.45pm	Presentation 7: **Pilot Projects on 3Rs in School** 1) Ms. Lolita Jaime Nicholas, Majlis Bandaraya Miri (MBM) 2) En. Roslan bin Ahmad, Sekolah Kebangsaan Taman Pasir Putih, Pasir Gudang, Johor
4.45 - 5.00pm	Closing Remarks for 1st Day
7.30 – 10.00pm	Reception (Hosted by MHLG and JICA)

2nd June 2006

8.15 –8.30 pm Opening Remark of 2nd Day

<Session 5> YBhg. Dato' Muhammad Safian Bin Ismail, President of MP Kuantan

8.30 – 9.00 am Presentation 8:
Guidelines on Source Separation.
Mr. Hisashi Yamauchi, JICA Study Team

9.00 – 10.00 am Presentation 9:
Pilot Projects on Source Separation
1) Mr. Lim Leong Soon, Majlis Perbandaran Pulau Pinang (MPPP)
2) Ms Azura Bt Mohd Don, Majlis Perbandaran Subang Jaya (MPSJ)

10.00 – 10.15am Tea Break

<Session 6> Chairperson: Mr. Huszian b. Husin, MHLG

10.15 – 10.45 am Presentation 10:
Guidelines on Formulation of Local Action Plan
Mr. Satoshi Sugimoto, JICA Study Team

10.45 – 11.45 pm Presentation 11:
Pilot Projects on the Formulation of Local Action Plans
1) Tuan Haji Zulkifli b. Zakaria, Majlis Perbandaran Pulau Pinang (MPPP)
2) Ms. Masriza bt Lazarous, Majlis Daerah Kinta Selatan (MDKS)

11.45 - 12.00pm Presentation 12:
3Rs Action Guide
Ms. Wan Azura bt. Wan Mohd Nasir, Assistant Director, Local Government Department, MHLG

Note: Commentary by Ms Ryoko Watanabe, JICA Study Team

12.00 – 2.30 pm Lunch

<Session 7>Moderator: Prof. Kunitoshi Sakurai, Okinawa University, Japan

2.30 - 4.30 pm Panel Discussions
Implementing Waste Minimisation in Malaysia – Problems and Acceptance

Panel Members:
1) Y.M. Engku Azman bin Tuan Mat, MHLG, Malaysia
2) En. Ahmad Husni Husin, EPU, Malaysia
3) En. Lee Chong Min, DOE Malaysia
4) En. Nai Keng Hak, Buddhist Tzu-Chi Merit Society
5) Pn. Kamariah Bte Mohd Noor, Expert on SWM
6) Mr. Hisashi Yamauchi, JICA Study Team
7) Mr. Hiroaki Takiguchi, MOE, Japan

4.30 – 4.45 pm Closing Ceremony

1) Summary of the Seminar
Y.M. Engku Azman bin Tuan Mat, Organising Chairman
2) Closing Remarks by JICA Headquarter, Tokyo
Prof. Yasushi Matsufuji, Advisor, JICA
3) Closing Remarks by MHLG, Malaysia
Y. Bhg. Dato' Hj. Anwar b. Hj. Abd. Rahman, Director General, Local Government Department, MHLG

4.45 – 5.00pm Tea Break

3. Questions & Answers – Minutes

< SESSION 1 Q&A >

Question No. 1: Mr. Rajoo of MPSP *to Y. Bhg. Dato Haji Anwar*
What is the role of manufacturers in waste minimisation? For example tyre manufacturers like Bridgestone and Michelin? What do they do to the waste tyres?

Answer No. 1: Y.Bhg. Dato Haji Anwar
Some of the manufacturers in Switzerland take back PET bottles. The proposals put forth for the recycling of waste tyres in this country require subsidy from the Government.

Question No. 2: Mr. Brian of MB Technology *to Y. Bhg. Dato Haji Anwar*
Does the National Strategic Plan state the rates of recycling for municipal, industrial and commercial wastes?

Answer No. 2: Y.Bhg. Dato Haji Anwar
The rate of recycling for each sector is stated in the National Strategic Plan.

Question No. 3: Mr. Brian of MB Technology *to Prof. Sakurai*
Do the hotels in Japan normally compost their waste in regional facilities or own facilities? If it is done in regional facilities, what is the measure to get a uniform quality of compost?
Is the landfill tax in Japan determined by the Federal Government or Local Government?

Answer No. 3: Prof. Sakurai
Only food waste from hotels is composted and is carried out in their own facilities.
There is no national standard for landfill tax, only for industrial waste tax. The tax rate in a Prefecture normally follows the tax rate set by the first Prefecture. The tax rate is about 1000 Yen/tonne.

Question No. 4: Datin Sahara *to Y. Bhg. Dato Haji Anwar*
The Government of Japan is very conscious in promoting effective utility of resources. What is the reason for our Government not being able to do so? Are the Local Authorities not working hard enough?

Answer No. 4: Y.Bhg. Dato Haji Anwar
Our Government officials are working very hard but they are also working in different areas. They used to work very hard on public cleansing to clean up the cities but now the situation is different. "Waste minimisation" is relatively new in this country and now we should work harder in this area.
We have to pay more to close our dumping grounds in a proper manner now. It is just like paying interests to the problems that we have created. Therefore, we need to reduce our waste.The Ministry of Housing and Local Government is prepared to guide and support the Local Authorities in waste minimisation.

Prof. Sakurai:
We have a different situation in Japan. Japan has no land for landfill anymore. We are forced to move towards 3Rs and this is our motivation. This motivation is not as strong in the case of Malaysia.

< SESSION 2 Q&A >

Question No. 1: Mr. LH Tan of LHT Kitar Semula *to Y.M. Engku Azman*

How do you define the rate of recycling? Why is the rate of recycling in this country very low? I think the plastic recycling rate is very high and the rate as mentioned does not reflect the true figure. The paper recycling could be higher if the cartel for buying back paper is to be lifted.

Answer No. 1: Y.M. Engku Azman

The rate of recycling is accounted only for materials recovered from waste that is collected by formal waste collectors and registered recyclers. There are many informal recyclers who do not register with us or do not provide their information on amount of recyclables. The amount of recyclables recovered by these informal recyclers is not accounted for.

This is the limitation of our database currently. The reason why informal recyclers are not willing to register with us is to avoid being taxed.

MHLG will look into the cartel for buying back paper.

Question No. 2: Participant from Sabah *to Y.M. Engku Azman*

Does the waste generation of 22,000 Tonne/day include Sabah & Sarawak?

In Sabah, recycling is not successful because there are no takers and recyclers.

Answer No.2: Y.M. Engku Azman

The amount of waste generation includes Sabah & Sarawak.

There is no immediate solution for having takers for recyclables. It depends on the economic situation. More industries should be set up for reusing and processing of recyclables and should be headed by MITI.

Question No. 3: Datin Sahara *to Y.M. Engku Azman*

What is the role of NGOs in Solid Waste Management?

Have we spent enough on publicity for waste management?

We should impose punitive measures for indiscriminate disposal of waste.

Answer No. 3: Y.M. Engku Azman

The Technical Committee in the Ministry also takes into consideration the social aspect of Solid Waste Management. If more resources are allocated, we can have more publicity on waste minimisation.

< SESSION 3 Q&A>

Question No. 1: Mr. C. C. Cheah of Intraco *to Mr. Takiguchi*

Does the Extended Producer Responsibility (EPR) in Japan apply to producers for using recyclables as their raw materials?

Are these producers also responsible for the product end-of-life even with recyclable materials?

Answer No. 1: Mr. Takiguchi

EPR states the responsibility of producers. This principle is used mainly for the production process. So, there are no differences between the product that are made of raw material and that made of recycled materials. It depends on the producer's judgment.

Question No. 2: Mr. Brian of MB Technology *to Mr. Takiguchi*

Is "zero waste" defined in Japan?

Is waste-to-energy considered as a mean for achieving zero waste?

For group collection of recyclables, there is an incentive of 5-10 yen/kg for collected recyclables, does the Local Government or the Federal Government pay it?

Answer No. 2: Mr. Takiguchi

We don't have clear definition of "zero waste" and it is similar wording as waste minimization.

The priority on energy recovery should be made lower. Our first priority is waste reduction, reuse of products, material recycle, and energy recovery. After this process, we have less waste that will be disposed at the landfill. We cannot eliminate wastes, but we use the word "zero waste" as a concept of our policy.

As for incentives for group collection, some Local Governments provide the incentives for collection of recyclables. Federal Government has no such incentive. However, we are conducting campaign for these activities.

Question No. 3: Puan Kamariah of E-Idaman *to Mr. Yamauchi*

Important aspect to promote waste minimisation and 3Rs in Malaysia is not management alone, but also very fundamental matters, that is, laws and regulations. In this respect, the gap between Malaysia and Japan in Solid Waste Management is great. Without any regulation on recycling in Malaysia, how much can we achieve for material cycle society?

Answer No. 3: Mr. Takiguchi

Local conditions should be taken into consideration in the process. Malaysia does not need to follow Japan. Instead, Malaysia can learn from the experiences of Japan and speed up the process and close the gap by utilising the experience of the other countries.

< SESSION 4 Q&A >

Question No. 1: Datin Sahara queried: to *En. Roslan*

I found the school activities are quite wonderful. But, how are teachers going to sustain these activities? And what will happen after the current principal retires? Will the next principal be selected according to the capacity?

Answer No. 1: En. Roslan replied:

The teacher in charge is very committed to the recycling activities, and influencing other teachers, as environmental education needs to involve several subjects. So, I believe as long as these teachers are around, the programme will be sustained.

Comment: Hj Zul commented:

I would like to respond to the concern of Datin's. Everyone has similar concerns, too. A champion is born, and if she/he leaves or is transferred to another city, normally the project dies together.

I would like to share with you the experiences in a school in Pinang.

There is a champion teacher in a school in Pinang, who tried not to let the programme die What he did when he had to leave the school was to have a handing over ceremony to the next teachers. The third teacher also is waiting in line to take over the programme. Moreover, the school invites Majlis Perbandaran Pulau Pinang to witness the handing over ceremony. I would like to suggest anybody who wants to keep the programme alive to have this kind of ceremony.

< SESSION 5 Q&A >

Question No. 1: Mr. C.C. Cheah of Intraco (Suggestion)

I would like to share something relevant to this source separation activity. I have friend in Johor Bahru, they have done something very innovative, without knowing waste minimisation programme that is running here with JICA. The awareness on recycling there has been raised in past few years.

They designed the houses with concrete structure with four bins for recycling, so that the owner of the house can put the different recyclable items in bins, papers, plastics, metals, etc. from the inside of houses. And this is not accessible to the others. There is door outside for collectors to open and take items out. So, it is fully integrated into the houses. You don't need to place the bins on roadside, and not to let illegal collectors collect them.

It is estimated that it only cost additional RM600 for this structure. This may be something the Government can think of, to work with developer around there.

I also would like to mention that private companies are very interested and very excited waste minimisation, and doing some activities on their own.

Question No. 2: Datin Sahara of National Council of Women's Organisation to *Presenters*

Is it my job to tell the neighbours that they should or should not dispose recyclables into the garbage bin?

In the pilot project for MPSJ, why did the staff keep the papers and not then send for recycling?

In the pilot project for MPPP, there is nothing wrong for some houses that are not participating to bring out their recyclables because maybe they don't have any recyclables.

Answer No. 2: Mr. Yamauchi of the JST

As Datin mentioned, commitment and consciousness are very important, maybe from the top and also from the bottom, those are very important and will be key items to be addressed.

In case of Japan, we have the several laws for each recycling items. So, private sector should follow the laws, and in line with laws, there is a very specific instruction from the Local Authorities how to separate wastes at source. General public should follow these instructions. So, this kind of laws and instructions may be important for Malaysia, also.

In case of Japan, if there are some illegal disposal and surrounding residents will complain to the person who does it. So, it is very difficult to illegal discharge in Japan. This may be one of consciousness.

Puan Azura of MPSJ replied:

The staff took the papers in the office and sends somewhere else for recycling. We are still recycling, but the objective of the Pilot Project is "waste reduction", not "recycle". I feel that we have not achieved the objective. But we are recycling. The staffs do recycle, so awareness is there.

In terms of paper, we do try to reduce. We already had competition within the department, so staff brought papers from home or other place, and we counted the total of each department.

Before this, the highest amount get prize, but with JICA Project, it is not like that. The department that reduces the largest amount of used paper got the prizes. What we did was, in our office, we use emails a lot, so we don't use

newspaper internally much. But most of recyclables brought by staffs are from home, so it is very difficult for us to collect data.
But, I think that we can have target for recycling first, when we recycle we also can think about reducing. Maybe we can start from recycling first, and later on we can slowly to try to reduce.

Question No. 3: Puan Sharifah of Alam Flora *to Presenters*

The pilot project does not provide any financial figures. To sustain the programme in long term, we need commitment from many parties not only within the Local Authorities. The recyclers and collectors are very important and they are profit oriented. In the programme, when we see the amount of collected items and compared with the cost, this programme cannot be sustained. How do we ensure the pilot project is sustainable form the economic point of view?

When we see the waste management hierarchy, we should go reduce first. So if we look at 3Rs hierarchy, we should focus on "reduce". Now we are in reverse process, current hierarchy in Malaysia shows that landfill is maximum, reduce is minimum, we have to reverse the current pyramid.

Answer No. 3: Puan Azura of MPSJ

We had the private recyclers in our project at De Palma Apartment, they come and collect, and they don't really have any problem so far. We don't assist them in giving them funds, or whatever. They run by themselves. So, that's why we have to choose the best collectors, that can come and collect and give them incentive by themselves, and get data. We have good collectors in MPSJ. Maybe Alam Flora is one of the collectors, but they have some restraint in monitoring and funds. But we do have the other collectors. We cannot depend on one collector.

Reduce and reuse and recycling, this may be chicken and egg question. Because we are Malaysian, we know how we are trying to do awareness campaign, but not all are participating in these campaign. So, the first think we tried is, if we tried to reduce. But we try to cultivate people that we have to recycling. The way of thinking is not as same as Japan.
The first thing we have to do is make people not to throw, and we have to ask them to recycle.
Reduce is what we can teach our kids, don't use much. But can you ask our age? It is quite hard to train adult.
We can try what we can, first. We cannot set too high target. Malaysian attitude has to be changed gradually to be more responsible for the waste they produce.

4. Panel Discussion (Session 7)

Moderator: Prof. Kunitoshi Sakurai, Okinawa University, Japan
Panellists: Y. M. Engku Azman bin Tuan Mat, MHLG, Malaysia
En. Ahmad Husni Husin, EPU, Malaysia
En. Lee Chong Min , DOE, Malaysia
En. Nai Keng Hak, Buddhist Tzu-Chi Merit Society
Pn. Kamariah Bte Mohd Noor, Expert on SWM
Mr. Hisashi Yamauchi, JICA Study Team
Mr. Hiroaki Takiguchi, MoE, Japan

<Part 1: Presentation of the View of Panellists>

1st Speech by Panelist: Pn. Kamariah Bt Mohd Noor, Expert on SWM

Puan Kamariah presented the key strategic issues for waste minimisation in her personal view. In line with Master Plan strategies, she pointed out some issues and countermeasure to promote waste minimisation in Malaysia as follows:

- Source separation facilitate:
  Effective collection & transportation for recycling and proper treatment & disposal after collection
- Public Awareness & Education
- Changing Attitudes

She concluded that successful implementation depends on following:

- The Implementation Team – establishment of a multi representative team
- The National Campaign
- The Education Programme
- The Benchmarking

2nd Speech by Panelist: En. Nai Keng Hak, Buddhist Tzu Chi

As a grass roots recycling player, I would like to focus more on the awareness on recycling. As mentioned by chairman, Tzu chi is an international NGO there are branches over 36 countries. Recycling is only one of our activities. We cover 13 States in Malaysia. Most of our recycling is only temporally, such as once a month but some branches do it daily, where recycling points are located very near to residential area.

Because it is close to residential area, it can directly influence housewives and other volunteers to come and do it on a daily basis. In essence, they learn how to source separate just by participating in the activities. Through this direct involvement in the activities, participants learned recycling and environment a lot, sooner or later, recycling will be a part of our daily lives.

What we would like to emphasise here are five points.
1st point is personal practice, such as, use meal kit, rather than use the polystyrene box. We do practice "no meal kit, no makan."
2nd point is in-house practice. All volunteer of Tzu Chi get used to set their own source separation corner in their own house.
3rd point is more volunteers from younger age to join in.
4th point is more scientific knowledge to our volunteers. Even housewives know if you can recycle 50 kg of paper, we can save a tree of 20 years, if you can recycle small aluminium can, you can save quarto cans of petrol. These are knowledge given to the volunteers and they are more educated.
5th point is smart purchase.

Our founder said, under the blue sky, under the mother planet, we are same mankind. But by doing recycling, we are not only focusing on Malaysia, but also on whole planet. If we have children, what we are doing right now is for our next generation.
There is responsibility for all of us to do something to pay back to the nature.

Finally, we appreciate every stakeholder who contributes in this issue. And respect, gratitude, love, should be common practice of all mankind.

3rd Speech by Panellist: En. Ahmad Husni Husin, EPU

I would like to present our views on behalf of the EPU on propagate issues of waste minimisation in Malaysia.
I agree with what most of presenter mentioned that the lack of awareness is one of the main obstacles. But I also would like to add on the need to raise awareness among the general public, especially on issues of cost, economics of waste minimisation and waste management, such as how expensive and costly it is to manage and treat wastes which all of us generate.

Amount of cost presented by the 1st presenter was about RM7-10/tonne taking into account collection and disposal, but cost will be more in my mind, taking into account of high cost of treatment of wastes. Furthermore, the cost would be much higher than expectation of the public, especially, for higher level of services expected from the contractor, etc. Therefore, I believe the public must aware of the cost involved and needs to reduce the waste generation, unless they are prepared to pay for the cost based on the user responsibility.

The issue of lack of manpower was highlighted in the presentation. Local Authority level undertake waste minimisation programme in local level. I think steps need to be taken by the respected agency, MHLG. But this should not be hinder effort to promote waste minimisation.

I was impressed by the MPPP presentation, for example, they are facing shortage of manpower, but MPPP changed their mind to achieve success in generating awareness among the public, by outsourcing, utilisation of NGOs, CBOs. Of course I think they have not got quite enough revenue to promote waste minimisation, but still they can do it.

What is the way forward? How can we make this seminar more successful?
We may need a simple booklet for the Master plan to distribute to the public, so that they can understand the waste minimisation, and role of each player concept, etc. And I also think Action Guide should be prepared, and it should be as simple as possible.

Apart from the clear roles of stakeholders, such as concessionaires, private collectors, etc.. Local Government should also foster the partnership with NGOs, CBOs and other households to promote waste minimisation. The LAs should also be creative in making use of other resources, like in Penang, to undertake this waste minimisation programme.

Lastly, we may also need to adopt parallel approach to ensure effectiveness of the waste minimisation programme, both on the demand side, as well as supplier side and producers. We may also need to consider incentives, perhaps, to further encourage sound waste management, and waste minimisation programme.

4th Speech by Mr. Lee Chong Min, River Division, DOE

Before I elaborate further on the problem and acceptance on implementing waste minimisation in Malaysia, I wish to take this opportunity to put forward DOE's perspectives.
As far as the municipal solid wastes, all domestic wastes, or non-hazardous waste management are concerned, DOE does not involved directly. Municipal solid waste management is under the jurisdiction of Local Governments. However, the implementation of the environmental quality, prescribed premises, environmental quality act, 1978 are only applicable for the construction of municipal solid waste disposal facilities.

Facilities such as incinerator, composting plant, recovery recycling plants and landfill came under control of DOE. So far, many of those facilities are yet to be in full operation. This operation has been well monitored by DOE. And we are pleased with them for the operation at this moment.

For the information of this forum, according to the record that DOE has, there are 246 municipal solid waste landfill facilities in this country. The number can be more, if we would take into account those illegally operated. However, out of these 246 sites, 83 of them have been stopped their operation and 163 sites are still in operation. And out of 163 operating sites, only 9 of them are considered to be sanitary. Remaining 154 sites are considered to be problematic dumpsite, with environmental problems such as odour, leachate, open burning, and flies problem. About 47 sites, situated above water points, can be considered striking our water resources. Of course, it is planed to safely close all these potential time bomb to our environment as agreed by the cabinet meeting on municipal solid waste and environment. But it definitely will take time, and requires huge amount of money. We may require as much as 2.5 billion in current value if we will safely close all these landfill facilities. This is the price we have to pay, for not to be doing well in our municipal solid waste management.

We have to respect our wastes. We cannot keep on generating more and more wastes, and we cannot keep on opening up more and more dumpsites. We may face so called Nagoya crisis in the near future, but I don' know whether we can have a similar Nagoya success story in Malaysia.

The smelly water incident in February 2006 has waken us up, the time has come for Malaysia to think seriously about managing our own solid wastes and just not finger point whenever there is environmental issue, resulted from insufficient management of wastes. Keeping and maintaining a healthy and clean environmental is duty of every respected citizen in Malaysia, unless you do not love this country anymore. There is a saying that charity begins at home, and so does domestic waste management. I think that 3Rs concept in waste minimisation is very beneficial and has proven records for successful implementation. Then why are we facing problem and acceptance here in Malaysia? These are some of my observations.

Firstly, most of the recycling project focuses mainly on awareness and education. Malaysia's level of awareness and education is now high enough. What we are facing is our own attitude and behavioural problem. We ourselves seldom walk our talk this is the hardest hurdle to cross in waste minimisation. There is lack of commitment in all level, begin with political administrative communal or individual. We have yet to internalise the concept of waste minimisation to the concept of 3Rs, that is, Reduce, Reuse, Recycling, and there is one more R, that is, Recovery as Prof. has mentioned earlier.

Secondly, encourage recycling is still very lacking.
There is no proper collection mechanism of household recyclable materials. There is no collection at the doorstep, recyclable item has to be sent away to nearby recycling centre, and sometimes it is far away.

Thirdly, there is lacking of effective waste management systems and also regulatory control of municipal solid waste disposal and recycling. No effort can be more effective than stick. Malaysia generally pays more attention to the stick and seldom appreciates the carrot, as far as waste disposal concerns.
Fourthly, investment in solid waste management has been very slow as well, mostly limited to procurement of collection tax and landfill development. Maybe we have entered the year of disposal.

We are living in the age of disposability, that is, use once and throw it away, in the name of convenient, modern living, and effluent life style. Even contact glasses are also disposable. Mr. Chairman, I see a need for a big shift of paradigm in waste management, that is, minimisation.
Ladies and Gentleman, our mother Earth can sustain everybody's need but not everybody's greed. To waste is greed and to minimise is need.

<Part 2: Discussion on Obstacles and Countermeasures in Implementation Stage of the Programme>

Chairman:
I would like to ask basic questions to the panellists. What are the main problems and obstacles we are going to face in implementation stage of the Master Plan and the Action Plan?
And later, I would also like to ask them to show their idea and proposals to overcome those obstacles.
Engku Azman:
The title we are going to discuss today is problem in implementing waste management in Malaysia. When I was graduated, I has never thought of being involved in waste management. But now sometime I quite feel very bad to the others, those who don't manage waste properly. Maybe this is the awareness and education process that I found, which is very informal.
Likewise, I believe one of important aspects as mentioned in the Master Plan is awareness. How to create awareness?

Awareness is discussed a lot in the Master Plan, and I think all in the Plan are good, we will implement. But Awareness is not only something should happen in individual level, nation itself also has to undergo awareness process, and realisation of the importance of the waste minimisation. And to certain extent, from my experience, to me, it is very positive development in terms of the realisation of the importance of waste minimisation programme. Some of what is happening in our Ministry in this particular moment are highlighted in the Minister's speech.

So awareness and maybe stick as mentioned by Mr. Hussin, we agree, but again, in the Ministry we believe very much in awareness have to be forever important tools, whenever necessary, we try to use the stick, or the laws, or regulations, or whatever will come on later.

Again, awareness is very much related to attitude. And maybe, after we found difficulty in change attitude through campaign, or so on, maybe we have to have specific and stronger laws that really require certain group of people that find difficulty to carry out waste minimisation.

There is one more point I would like to mention. As we proceed further solid waste management, I think we can conclude or summarise that solid waste minimisation is the important aspect that we have to consider in all area such as choosing of technologies, deciding on landfill, etc. The government, in terms of waste hierarchy in the planning and development, has accepted waste minimisation. So, on behalf of Ministry, that is our view at this moment. Although we feel very much that we need this awareness programme, especially with assistance, cooperation and support from organisation such as Buddhist Tzu Chi and other organisation that are doing very actively without Ministry's instruction.

So that is my first comments in terms of the importance of waste management, awareness is the way forward in Malaysia. Although of course other factor we have to make available for example infrastructure, and cost implication and so on we have to also consider.

Chairman:
Mr. Engku Azman pointed out the importance and difficulty to raise and maintain awareness. Awareness is very basic, and how to achieve that is very important.
Yamauchi san, you may want to clarify the obstacles and problems we are sure in near future in the stage of implementation of the Master Plan and Action Plan, based on your study results.

Mr. Yamauchi:
I also still want to emphasise one thing. As Mr. Takiguchi and Prof. Sakurai mentioned, In Japan we have many laws, but here in Malaysia, there are no laws at the moment. On the other hand, you have the Vision 2020, Malaysia is going to be a developed country by the year of

2020. So, I think you have the responsibility to the global environment. In this point, you should start waste minimisation. This is the world trend.

Without laws, there is limitation, I know that, but how we proceed with these actions? What we recommend is, to organise Waste Minimisation Promotion Committee. Every player will join in and sit together to discuss and exchange ideas and by doing so, this movement will be more widely spread. I believe for that, because it is happening in Japan.
So, I would like to point out just one thing, establishment of Waste Minimisation Promotion Committee. Thank you.

Chairman:
Mr. Yamauchi indicated one of the major obstacles, that is, lack of waste information station. These obstacles were also pointed out by Pn. Kamariah to overcome these difficulties. Mr. Yamauchi pointed out the necessity of formulation of waste minimisation promotion committee.

Takigushi san, maybe you would like to comment, based on the Japanese experiences, what kind of obstacles can happen here in Malaysia, in the stage of implementation of the Master Plan and the Action Plan?

Mr. Takiguchi:
I would like to stress three points on waste minimisation in Malaysia.
The 1st point is cost. Mr. Hussin and Mr. Engku Azman referred the importance of cost, I agree on that. The problem is that the cost of environmental impact is not internalised, sometimes internalised into solid waste management. From the past experiences, Japanese learnt that the remediation cost is much more expensive than prevention cost. In this case, prevention means waste minimisation. That is the thing we learnt from the past experiences.

The 2nd point is the responsibility. I emphasised extended producer's responsibility yesterday, and today, I would like to stress consumer responsibility. Consumers are required to participate in waste minimisation, because only consumers can separate their wastes, and change their wastes into resources. So, I think the consumer's responsibility is as high as producer's responsibility. That is the 2nd point.

The 3rd point is importance of data collection. In the Master Plan, the target is set to recycling rate 22 % by 2020, I think it is very aggressive target. Malaysia needs to follow up to take steps to achieve this target. Malaysia needs to monitor the progress.

Mdm. Kamariah:
It's good that we have done pilot projects. We have tested this. I'm sure that we can do it.

Only problem we have now is as mentioned previously, we do need, I think Local Authorities will agree with me, but we do need fundamental basic laws to assist them, to back up, give them support to do waste minimisation programme and recycling programme. I think it's the key. If we do not have basic laws and regulations, I don't think we can do it successfully, and be able to maintain and sustain the programme.

Now we also talked about resources like manpower.
In the case of MPPP, they don't really have enough manpower to do, but they can do it.
And in smaller council, for example Kerian, they are small, but they have started it. They are possible to do it, because you are looking at local areas, scenario and local situation. What is very important is to look at your waste stream. The amount of wastes you generate in your own LA, and composition of waste you have.

So, I don't see any major problem but what we need now is laws and regulations to be in place. At least they have something to tell people that yes, we have laws, and we need to do it.

We need everyone be involved in it.
As for money part, if you have small money, you start small programme.

Going back to basic, source separation I think is important, we have to start. Source separation is not just for recycling but it is also a way to manage wastes properly, because you cannot dispose all the waste at the landfill. It is not the right way.

Chairman:
Thank you. I'm very happy to have her as a person with the long working experience in waste management. There are no major obstacles, but we need legal basis to work on. Now I would like to invite Mr. Hussin.

En. Hussin:
I would like to add a bit on issue of awareness.
As we all know that awareness should come by means of education among the Malaysian.
But fortunately or unfortunately, now here in Malaysia, level of awareness has been improved because of crisis that we have recently, pollution of water from the dumpsite of landfill.
In any case, awareness is not only issues among the general public, but also for political masters so that they are fully aware of the seriousness of issues on solid waste management.

The other issue that I would like to raise is establishment of waste minimisation unit in local authority level. I don't know whether this unit is going to work just in the scope of waste minimisation, or perhaps later on it will also be expanded to play the role as regulator at the local level. There is a need to regulate the activities of contractor's and concessionaire's who is undertaking solid waste management in a more integrated manner, not just to tackle waste minimisation, but whole chain in waste stream from collection and right up to disposal.

Chairman:
Now I'd like to invite Mr. Nai for his comment about the possible obstacle.

Mr. Nai:
In personal view, our main problem is whether we have got the will to do that. What I have seen in the 2-days conference, from the top to the bottom, we all have the will, the decision to do. If there is will, if there is confident, there is tolerance and encourage, nothing in this world cannot be succeeded.

I am very happy to see people like Puan Kamariah, Engku, Tuan Haji, they are so familiar face to meet. We hope that in future, as an NGO, we have communication with all the LAs.
As NGOs, we have faced very small small problems but they are very small compared to the big problems that we have discussed.

Mr. Lee:
I believe we must treat wastes properly. We cannot keep on generating, and keep on opening up more dumpsite. And we are fortunate here that we already have Master Plan and Action Plan for Federal and Local Authorities, and we have the guidelines ready.
We have even tested all the action plans, and found to be successful, so we are ready to implement all those documentation we have done. But how are we going to work on this? This is the hardest task.
We have to be really committed. And hopefully we will have proper financial resources, capital human resources, and ready for us to take this Master Plan and Local Action Plan on waste minimisation. Hopefully with this, we will have better environmental.

Chairman:
I have asked all the panellists to express their opinions about possible obstacles in process of implementation of the waste minimisation Master Plan. Many of them showed their opinions, not only the possible problems but also the countermeasure.

But I would like to add once again, about possible measures to overcome these problems, recognising the existence of many problems. What do we propose assure successful implementation of the Waste Minimisation Master Plan?

I had a chance to work here in Malaysia, 20 years ago with MHLG on the Master Plan, ABC Plan. Since then, I had a little chance to come to Malaysia again, so I'm not familiar with the present situation in Malaysia. So I may ask basic questions.

The problems I see here and the basic questions I have is that, "Are Local Authorities motivated for the implementation of those Master Plan and Action Plan?" I see many Local Authorities here and they showed their motivation and passion, but the passion cannot be sustained. You need a mechanism and a structure that will support your passion. That is, for example registration.

You have passion and technical details, guidelines, etc. But to facilitate the technical know-how, you need a structure by which you can sustain your activities.

I think that you have already read today's newspaper, which said the Minister of Housing and Local Government said in a press conference yesterday, that within 2 months, they would finalise drafting of the National Solid Waste Management Law. I think this law will determine the structure of waste management in Malaysia. It is very important for us to confirm that this structure would promote 3Rs or this structure is consistent with the hierarchy of solid waste management.

Because you have passion, you have technical notebook, so you need legal basis to assist you. In that sense, I think it is very important for all of you to check the compatibility of waste management master plan with coming Solid Waste Management Act. If it is compatible, it's OK, you can get firm basis that you can work with. But if you identify any discrepancies between master plan and the coming SWM Act, then you have to rectify so that your effort would be improved.

As I have already mentioned, I was not familiar with the actual situation in Malaysia. If you are convinced with the compatibility of the MP and SWM Act, then it's OK, but if not, please check it, or let's do that job. That is one of my basic comments.

<Part 3: Q&A Session >

Mr. Peter Ho of PUSB
With reference to the newspaper article today, the Solid Waste Bill will be drafted within 2 months time. I think it is a bit ridiculous because there are no consultations with the people from the public and private sectors. Public consultation should be carried out before finalising the law.

I think what the chairman said is true. The consultation process is not there, so it will be nothing to do with the programmes or actions you have promoted and are proposing in the Master Plan and Action Plan. The consultation with the people such as the public, and private sector who are the main players is important. Of course the government sets the policy, programme and strategies, but local authorities, private companies, will do the action. That to me, is the main obstacles to success the 3Rs.

Datin Sahara of National Council of Women's Organisation
Why are most of the NGOs are not involved in the formulation of Solid Waste Management and this waste minimisation study? They are being left out in the summary of waste minimisation report.
Ms. Tan Lee Lee of Housing and Local Government Unit, Penang State Government:
The measurement of success of waste minimisation plan has to be clearly defined, whether in terms of waste minimisation or containing the gross of waste at the certain level.
For example, the volume of recyclables increases while the percentage of recycling reduces (because the waste generation increases).
In the case of Pinang, we are pretty successful with recycling. According to the presentation by Tuan Haji, the rate was 12 % in 2005, but actually we achieved 15% in 2004, and the rate went down.
One of the reasons is some statistics from the recycling agency that was available in 2004, but no longer came in 2005 for particular reasons. The other reason was absolute gross corresponding to increase in volume of waste. So, even though recycling volume increased, but in terms of percentage, it came down, because the volume of wastes increased.

The other thing I would like to raise here is the regulatory framework. We have been pretty successful in recycling in Penang State, because we have very strong support from Chief Minister, and State Exco and Local Governments, and we also have very committed NGOs in Penang who are helping with driving the recycling campaign. However, there is a lack of regulatory framework. At Ministry level, Ministry is very good at financial support and publicity. But publicity and awareness have also very much been carried out in State level. So, what we really need at Federal level are the laws and regulatory framework, incentive and disincentive to industry and so forth.

Panel member: Engku Azman:

I think from the start, I didn't mention anything about laws. But it is what we are asking for the past many years and it has been drafted years over years, and we hope that it will be ready in 2 months, or near future.

But we also have other laws existing, for example, enforcement of organisation set up, enforcement of illegal dumping, and so on. Laws, for sure, is something that we are anticipating, and people in solid waste business and waste minimisation, are very much hoping for coming up laws and detailed regulations which further define in more detail what we should do.

In Malaysia, there is a set of procedure of going through the laws, setting drafting of the laws, but as far as I'm concerned, over the years, this particular bill was improved as time go on. For example, when it was drafted 5 or 6 years ago, recycling was not the thing of importance in Malaysia, but as we progress, we became aware of many other things that have been developed as time comes. There is a government officer who is working very closely with NGOs, stakeholders. We had these opportunities to identify that, and presently it is there.

As far as ministry is concerned, the present bill will address the present issues that we have heard from all the players. Even in normal procedure we have parliament, so we have opportunity for the parliamentary to ask representatives from the public for the comments.

In terms of cooperation with NGOs, I think over the years we will improve further, of course it depends on our human recourses but we will work on it.

Actually, it is one of our action plans, enforcing partnership with NGOs and CBOs. We had seven workshops and seminars to formulate these Master Plan and Action Plan. We tried our best to call as much representative from NGOs and industries, especially the partner who

normally contributed and are playing very active role. However, we don't have complete information, so you can provide us information in other discussion we will call in the future.

As for measurement, it's true that we don't have measurement of success in terms of figures. When we talked about data, not only on waste minimisation, but whole waste management, we don't have enough data. When we talked about landfill, I heard from representatives that we have different number, and JICA Study team has different number. Actually we need good framework regulations and we hope that coming bill give power to authority to regulate all the information.
In this respect, we are very much waiting for the bill, we hope to improve further collection of figures and using data constructively for our programme.

Ms. Hasmah:
We need to tell public what we are doing. The Study Team has drafted leaflet for the Master Plan for the Federal Action Plan and for the Local Action Plan for the model Local Authority. Please MHLG as soon as possible, the study report is approved and endorsed, and make sure the leaflet will be published and distributed.

Mr. Peter Ho:
I would like to respond to Mr. Engku Azman. If the law comes up to say the solid waste management will be privatised and everything will be under private sector, then what will be the role of the Local Authorities? Will they promote 3Rs or waste minimisation because it is no longer their duties?
There will be practical problems which are indirectly connected to what the laws has to say. Some of these we may not know, we may not go through, and some may need some ideas from the other people.

Chairman:
When I worked in WHO, I had been working very intensively on the issue of privatisation, including contracting out and concession. How to get a successful privatisation was my topic, and I advised many countries on this topic.

In the case for Malaysia, privatisation of solid waste management services goes very slowly. When we had initial plan, it was supposed to be privatised waste management within 6 months, but 10 years later, it is still in process. So, it will be necessary for us to assess carefully the impact of this privatisation process of this 3Rs initiative. I don't know the detail of the privatisation policy, but in the case of concessions, LAs will not have direct responsibility on solid waste management. In that case, their motivation will become weaker for LAs. How to deal with that?

If the payment to the private sector is done based on weight, the more waste the private sector collects, the more profit they make. It is not so easy for us to motivate them for waste reduction. That is quite common all over the world. In these 2 days seminar, we haven't discussed it, what kind of privatisation Malaysia is going to have, and it will affect a lot the result of the Waste Minimisation Master Plan. To get better results, we have to take into account of that.
At least, if we are very careful with that, the success will be quite promising.

En. Nor Mohammed:
Economical instrument should be adopted to promote recycling. A depository system (i.e. pay higher price when buying an item and get a rebate upon returning the unwanted material) should be introduced to bring value to the waste, so that many people to start to push it.

<Closing Remarks by Chairman>

Now through discussion, we have identified many useful ideas. We hope that the JICA Study Team will incorporate these ideas into the Final Report of the Study.

Now it is the time for us to start putting the Action Plan in place. Let's check periodically the progress and exchange experiences among us, so that remarkable progress will be made by the year 2020. By doing so, you can become a good showcase not only in Malaysia, but also in the world. Thank you for the cooperation.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Seri Ong Ka Ting
and Local Government Malaysia
2nd June 2006
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Officiated by:
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IN MALAYSIA
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PART 7

SURVEYS PROCEDURE AND RESULTS

7.1 Survey on Waste Generation/Composition and Questionnaire of Households in Major Cities

1. The Objectives of the Survey

- To estimate the amount and composition of waste generated from households with identification of recyclable and currently recycled materials
- To identify and understand the existing storage and collection manner of waste and recyclables from households.

2. Study Areas

In order to meet the survey objective, a fieldwork was carried out from 26 September 2004 to 4 November 2004. The fieldwork involved the actual collection, weighing and sorting of waste samples, followed by direct interviewing with the selected household.

In this survey, the survey areas were selected according to the income level of the house, which is assumed here to be manifested through their house.

Table 1-1 Survey Area

Area	Type of House	Income level
Bangsar	Bungalow	High
Subang Jaya	Condominium	High
Bangsar	Apartment	Medium
Subang Jaya	Terrace	Medium
Kampung Haji Abdullah Hukum	Squatters	Low
San Peng, Kuala Lumpur	Flats	Low

3. Results

The surveys were carried out for 8 days continuously, and at the end the total number of sample collected were 100.

From the surveys, we have found that the overall major components of the wastes generated are as follows:

Table 1-2 Major Components of the Waste Generated

Categories		High income	Medium income	Low income	Average
Combustible					
1	Food waste	40.47	48.62	55.02	48.04
2	Bones	1.69	0.52	1.57	1.26
3	Mix paper	16.34	20.09	14.84	17.09
4	Plastics (F)	4.46	5.33	6.25	5.35
5	Plastics (R)	3.53	4.18	3.47	3.73
6	Polystyrene	0.41	0.85	0.47	0.58
7	Textile	0.92	0.92	3.70	1.85
8	Rubber & Leather	4.75	0.25	0.47	1.82
9	Wood	0.09	0.34	0.23	0.22
10	Yard waste	14.20	5.40	0.15	6.58
11	Diapers	6.36	2.06	6.75	5.06
Sub-total for combustible		93.19	88.53	92.90	91.57
Incombustible					
12	Glass	3.40	4.33	3.41	3.71
13	Ferrous	1.25	1.81	1.76	1.61
14	Non-ferrous	0.01	0.05	0.00	0.02
15	Aluminium	0.52	0.47	0.13	0.37
16	Batteries*	0.00	0.04	0.06	0.03
17	Electrical & Electronics	0.08	0.02	0.43	0.18
18	Others	1.57	4.75	1.32	2.55
Sub-total for Incombustible		6.81	11.47	7.11	8.47
Total		100.00	100.00	100.00	100.00

Food waste constitute the highest amount in all three income categories i.e. 55.02% for low income areas, 48.62% for medium income areas and 40.47% for high income area and this finding was similar to those carried out previously.

The average food waste from the three different income areas was 48.04%. Beside the food wastes, bones were also sorted from the waste samples and the results show that the average amount of bones in the wastes is 1.26%.

In addition, the overall average combustible waste generated was 91.57% and non-combustible waste was 8.47%. The percentage of combustible to non-combustible wastes was found quite similar at different income areas, i.e. 93.19% combustible and 6.81% of non-combustible wastes for high income areas, 88.53% combustible and 11.47% of non-combustible wastes for medium income areas, 92.90% combustible and 8.47% of non-combustible wastes for high income areas

In terms of recyclable materials, it was found that in overall about 31.86% of major recyclable materials were disposed of from the households, this includes mainly mixed papers, mixed plastics, glass, ferrous metals, non-ferrous metals including some aluminium. Some other special wastes recorded were waste batteries (0.03%) and electronic wastes (0.18%).

However, it should be noted that some recyclable materials were being retained in the households instead of disposing it into the waste bins, especially the old newspapers and aluminium cans etc.

The waste generation rates from households were also determined in this study in terms of per capita rate. It was found that the per capita rates from households in this study ranged from 0.26 to 0.58kg/capita/day with an average of 0.45 kg/capita/day. It should be noted that this generation rate is taking consideration of only wastes that were being disposed of from the households, excluding some recyclable materials that were being retained in the households. When taking into account the retained recyclable materials (14.1%), the average per capita generation rate has increased to about 0.53kg/capita/day.

This survey also found out that big portions of the recyclable materials were not being separated and disposed of into the waste bins (53.10%). Besides, more common practice of disposing the recyclable materials is to sell or give the materials to the door-to-door collectors (16.6%). Only small portions of the recyclable materials were being sent to the recycling centres (6.10%).

In this survey, 12 food waste samples were sent for laboratory analysis in order to determine the moisture contents. The results show that the moisture contents ranged from 58.25% to 69.70% with an average of 64.82%.

In summary, this survey provides important results that were generated primarily from various categories of households in Kuala Lumpur and nearby areas. The findings obtained in this survey serves as basic and important data for planning and designing an effective solid waste management system. However, it should be noted that even though this survey was done focusing on different income areas and types of households (condominium, apartment, terrace, squatters, flats and bungalow), the results from other areas of the country may be different due to the differences in terms of standard of living, lifestyle as well as other local conditions.

Summarised Results and Data:

Table 1: Sampling locations and number of samples collected

No.	Location	No. samples	Category
1	Bangsar (Bungalow)	10	High income
2	Subang (Condominium)	15	High income
3	Subang Jaya (Terrace)	25	Medium income
4	Bangsar (Apartment)	20	Medium income
5	Kg. Abdullah Hukum (Squatter)	10	Low income
6	San Peng (Flat)	20	Low income
	Total	100	

Table 2: Waste Compositions of High Income Areas

Study Area		Bungalows Bangsar	Condominium Subang	Average
		Unit in %		
Organic				
1	Food waste	36.30	44.64	40.47
2	Bones	0.17	3.21	1.69
3	Mix paper	14.45	18.22	16.34
4	Plastics (F)	4.53	4.38	4.46
5	Plastics (R)	3.95	3.10	3.53
6	Polystyrene	0.42	0.39	0.41
7	Textile	0.53	1.30	0.92
8	Rubber & Leather	7.82	1.68	4.75
9	Wood	0.08	0.10	0.09
10	Yard waste	28.14	0.26	14.20
11	Diapers	0.15	12.56	6.36
	Sub-total (Organic)	96.55	89.83	93.19
Inorganic				
12	Glass	1.76	5.04	3.40
13	Ferrous	1.17	1.32	1.25
14	Non-ferrous	0.00	0.01	0.01
15	Aluminium	0.51	0.52	0.52
16	Batteries	0.00	0.00	0.00
17	Electrical & Electronics	0.00	0.16	0.08
18	Others	0.01	3.13	1.57
	Sub-total (Inorganic)	3.45	10.17	6.81
TOTAL		100	100	100

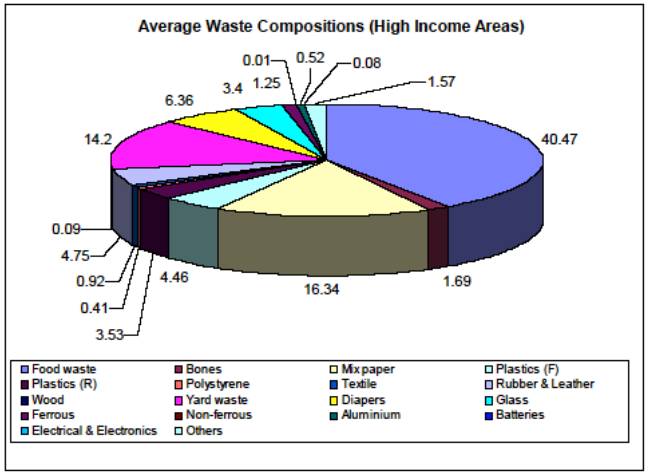


Figure 1: Average Waste Composition for High Income Areas

Table 3: Waste Composition for Medium Income Group

Study Area		Menara Bangsar Apartment	Subang Jaya Terrace Houses	Average
		Unit in %		
Organic				
1	Food waste	45.03	52.21	48.62
2	Bones	0.24	0.80	0.52
3	Mix paper	26.00	14.18	20.09
4	Plastics (F)	6.08	4.58	5.33
5	Plastics (R)	4.29	4.07	4.18
6	Polystyrene	0.76	0.93	0.85
7	Textile	0.97	0.87	0.92
8	Rubber & Leather	0.22	0.27	0.25
9	Wood	0.44	0.23	0.34
10	Yard waste	2.76	8.03	5.40
11	Diapers	3.46	0.66	2.06
	Sub-total (Organic)	90.24	86.82	88.53
Inorganic				
12	Glass	6.48	2.18	4.33
13	Ferrous	1.97	1.65	1.81
14	Non-ferrous	0.03	0.06	0.05
15	Aluminium	0.67	0.27	0.47
16	Batteries	0.06	0.02	0.04
17	Electrical & Electronics	0.00	0.04	0.02
18	Others	0.54	8.95	4.75
	Sub-total (Inorganic)	9.76	13.18	11.47
TOTAL		100	100	100

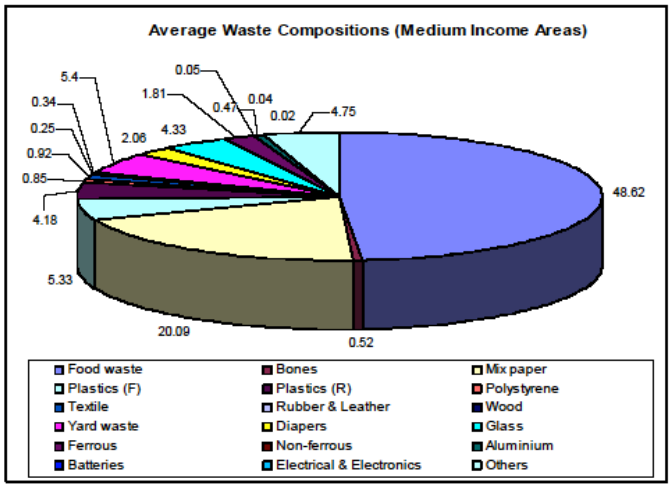


Figure 2: Average Waste Composition for Medium Income Areas

Table 4: Waste Composition for Low Income Residential Area

Study Area		Squatters Hj. Abd. Hukum	San Peng Flats	Average
		Unit in %		
Organic				
1	Food waste	53.79	56.25	55.02
2	Bones	2.23	0.91	1.57
3	Mix paper	15.77	13.91	14.84
4	Plastics (F)	6.63	5.87	6.25
5	Plastics (R)	3.21	3.72	3.47
6	Polystyrene	0.61	0.32	0.47
7	Textile	0.58	6.81	3.70
8	Rubber & Leather	0.14	0.79	0.47
9	Wood	0.20	0.25	0.23
10	Yard waste	0.08	0.22	0.15
11	Diapers	10.01	3.48	6.75
	Sub-total (organic)	93.25	92.54	92.90
Inorganic				
12	Glass	4.67	2.15	3.41
13	Ferrous	1.96	1.55	1.76
14	Non-ferrous	0.00	0.00	0.00
15	Aluminium	0.04	0.21	0.13
16	Batteries	0.03	0.09	0.06
17	Electrical & Electronics	0.04	0.81	0.43
18	Others	0.00	2.64	1.32
	Sub-total (inorganic)	6.75	7.46	7.11
Total		100	100	100

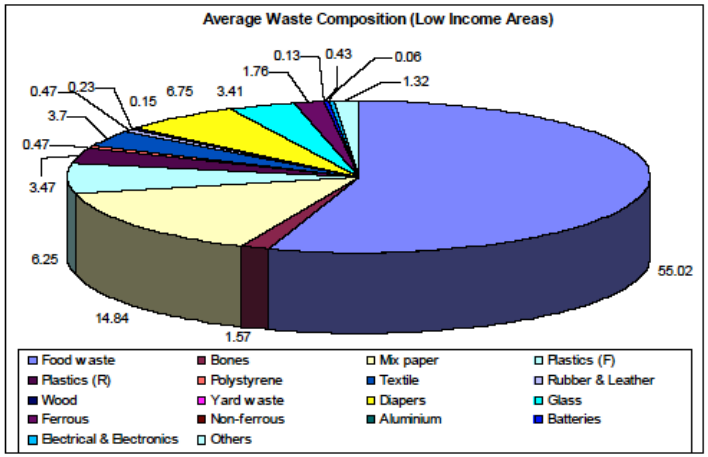


Figure 3: Average Waste Composition for Low Income Areas

Table 5: Overall Waste Compositions for the Study

	Categories	High income	Medium income	Low income	Average
		Unit in %			
	Organic				
1	Food waste	40.47	48.62	55.02	48.04
2	Bones	1.69	0.52	1.57	1.26
3	waste papers	16.34	20.09	14.84	17.09
4	Plastics (F)	4.46	5.33	6.25	5.35
5	Plastics (R)	3.53	4.18	3.47	3.73
6	Polystyrene	0.41	0.85	0.47	0.58
7	Textile	0.92	0.92	3.70	1.85
8	Rubber & Leather	4.75	0.25	0.47	1.82
9	Wood	0.09	0.34	0.23	0.22
10	Yard waste	14.20	5.40	0.15	6.58
11	Diapers	6.36	2.06	6.75	5.06
	Sub-total for organic	93.19	88.53	92.90	91.57
	Inorganic				
12	Glass	3.40	4.33	3.41	3.71
13	Ferrous	1.25	1.81	1.76	1.61
14	Non-ferrous	0.01	0.05	0.00	0.02
15	Aluminium	0.52	0.47	0.13	0.37
16	Batteries*	0.00	0.04	0.06	0.03
17	Electrical & Electronics	0.08	0.02	0.43	0.18
18	Others	1.57	4.75	1.32	2.55
	Sub-total for inorganic	6.81	11.47	7.11	8.47
	TOTAL	100	100	100	100

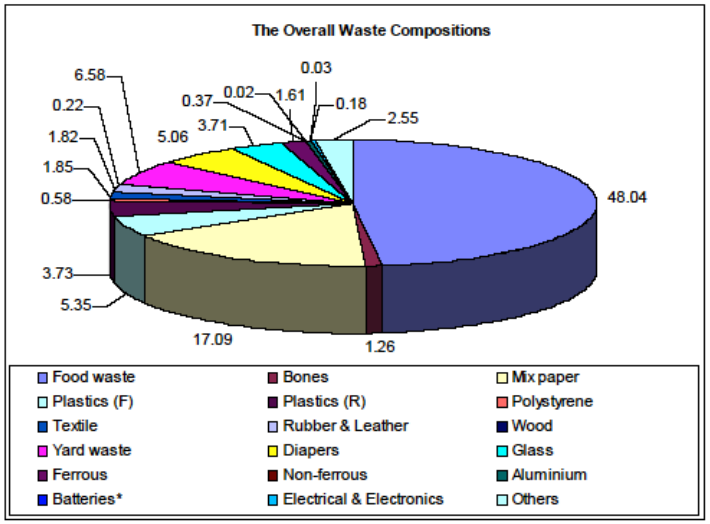


Figure 4: The Overall Average Waste Composition for the Study

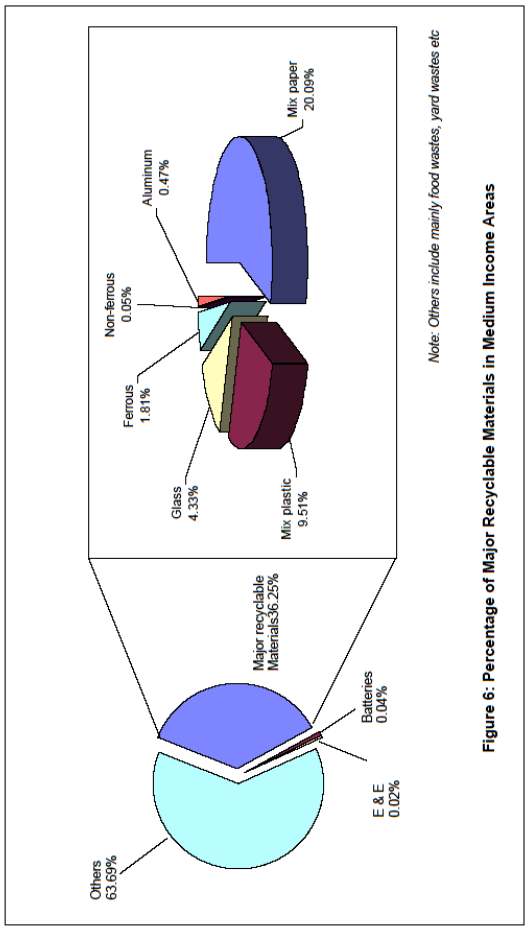


Figure 6: Percentage of Major Recyclable Materials in Medium Income Areas

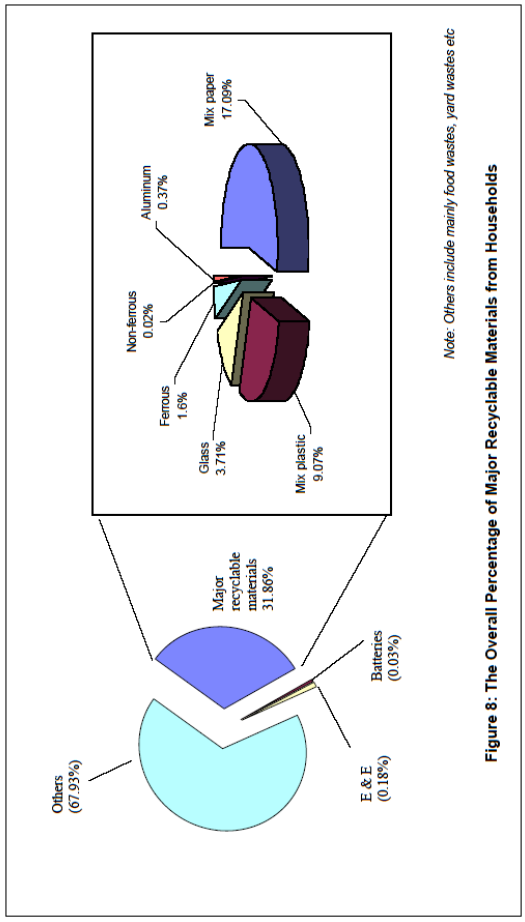


Figure 8: The Overall Percentage of Major Recyclable Materials from Households

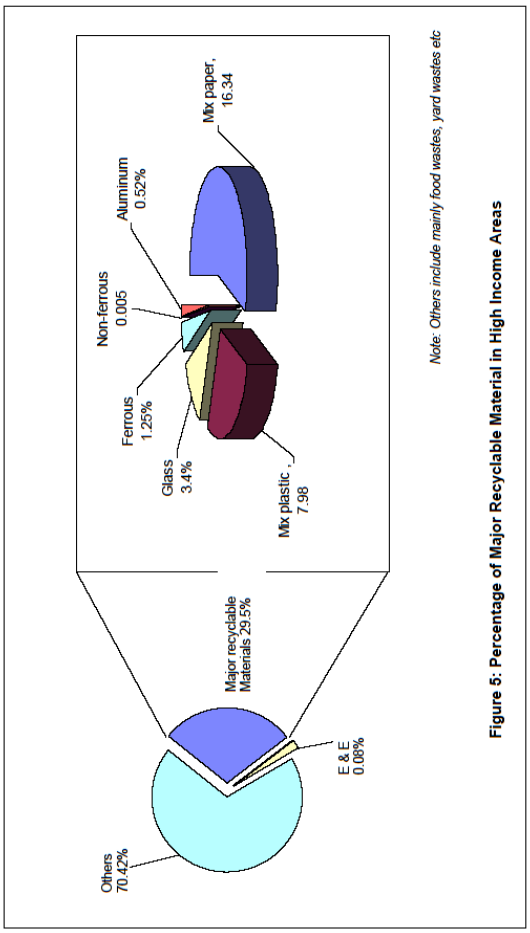


Figure 5: Percentage of Major Recyclable Material in High Income Areas

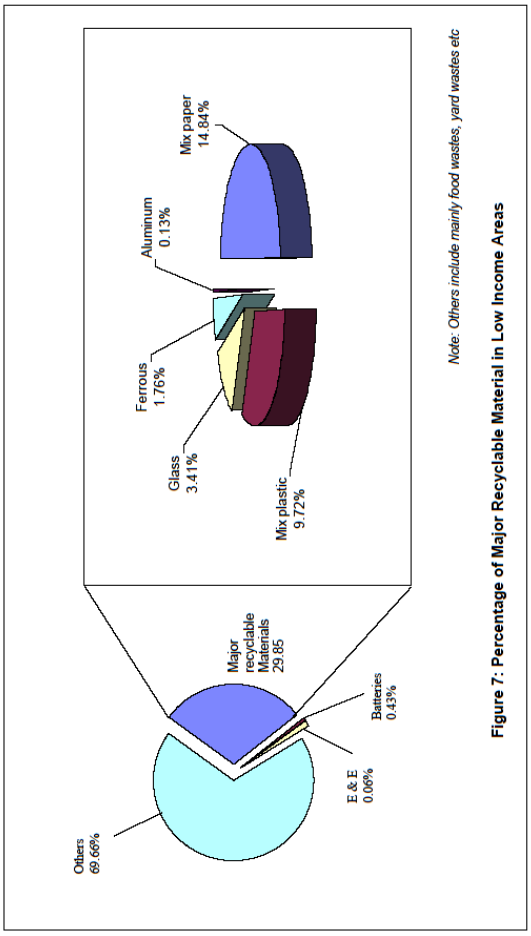


Figure 7: Percentage of Major Recyclable Material in Low Income Areas

Table 6: Moisture Contents of Food Waste Samples

No	Sampling areas	Moisture content (%)	Average (%)
1	Bangsar Bungalow	61.1	58.25
		55.4	
2	Kg. Abdullah Hukum Squatters	71.4	69.70
		68.0	
3	Subang Jaya Terrace	76.6	68.05
		59.5	
4	Menara Bangsar Apartment	55.6	60.10
		64.6	
5	Sri Bayu Subang Condominium	70.5	64.15
		57.8	
6	San Peng Flat	64.0	68.65
		73.3	
AVERAGE			64.82

Table 7: Total Waste as Discarded in 8 days

	Total Wastes as Discarded in 8 Days (kg)						Average (kg)
	A	B	C	D	E	F	
Food wastes	97.72	112.22	104.45	275.13	74.23	110.87	129.10
Bones	0.47	8.06	0.56	4.23	3.08	1.80	3.03
Mixed papers	38.89	45.81	60.32	74.74	21.76	27.42	44.82
Plastics (F)	12.18	11.01	14.11	24.11	9.15	11.57	13.69
Plastics (R)	10.63	7.80	9.96	21.46	4.43	7.33	10.27
Foam Polystyrene	1.14	0.97	1.76	4.90	0.835	0.64	1.71
Textile	1.44	3.28	2.24	4.56	0.80	13.42	4.29
Rubber & Leather	21.05	4.22	0.50	1.40	0.20	1.56	4.82
Wood	0.22	0.25	1.02	1.21	0.28	0.49	0.58
Yard wastes	75.75	0.65	6.40	42.33	0.106	0.44	20.95
Diapers	0.40	31.57	8.02	3.46	13.81	6.86	10.69
Glass	4.75	12.67	15.04	11.50	6.45	4.24	9.11
Ferrous	3.15	3.32	4.58	8.72	2.70	3.06	4.26
Non-ferrous	-	0.02	0.06	0.31	-	0	0.07
Aluminium	1.36	1.31	1.56	1.43	0.06	0.41	1.02
Batteries	-	-	0.14	0.13	0.04	0.18	0.08
E&E Wastes	-	0.39	-	0.22	0.06	1.60	0.38
Others	0.02	7.86	1.26	47.14	-	5.21	10.25
Total	269.17	251.41	231.98	526.98	137.99	197.10	269.11
No. of Household	10	15	20	25	10	20	16.67
Kg/household/day	3.36	2.10	1.45	2.63	1.72	1.23	2.08
Average no of capita/household*	5.9	4.4	2.5	5.2	5.4	4.7	4.68
Kg/capita/day	0.57	0.48	0.58	0.51	0.32	0.26	0.45
Average Waste Generation Rate (Per Capita Rate) = 0.45 kg/cap/day							

** Note: A - Bangsar Bungalow; B - Sri Bayu Condo; C - Menara Bangsar Apartment; D - Subang Jaya Terrace; E - Kg. Abd. Hukum Squatters; F - San Peng Flats*

Average numbers of capita/household were derived from dividing the total number of capita in the households by the total households surveyed.

Table 8: Main Categories of Wastes Generated (on Weight Basis)

	Average Waste As Discarded		
	kg/8-day	kg/H'hold/day	kg/person/day
Food Waste	129.10	0.96	0.21
Papers	44.82	0.34	0.07
Plastics (F)	13.69	0.10	0.02
Plastics (R)	10.27	0.08	0.02
Yard wastes	20.95	0.16	0.03
Diapers	10.69	0.08	0.02

Table 9: Main Categories of Wastes Generated (on Volume Basis)

	Waste Density (kg/m^3)	Average Waste As Discarded		
		m^3/8-day	m^3/H'hold/day	m^3/person/day
Food Waste	290.7	0.44410	0.00330	0.00072
Papers	89.0	0.50360	0.00382	0.00079
Plastics (F)	65.3	0.20965	0.00153	0.00031
Plastics (R)	40.0	0.25675	0.00200	0.00050
Yard wastes	100.9	0.20763	0.00159	0.00030
Diapers	350.0	0.03563	0.00027	0.00007

Table 10: Main Categories of Wastes Generated (on Volume Basis)

	Waste Density (kg/m^3)	Average waste as Discarded	
		m^3/cap/day	m^3/cap/year
Mixed waste (as disposed at landfill)	207.57	0.002	0.79

Table 11: Total Waste Generation Rates Per Capita Per Day (Taken into Account the Recyclable Materials Retained at Home)

	Average Waste As Discarded * (kg/cap/day)	Average waste Retained ** (kg/capita/day)	Total waste generation Rate (kg/cap/day)	Waste Separated at Source (%)
1. Bangsar Bungalow	0.57	0.07	0.64	10.9
2. Sri Bayu Condo	0.48	0.08	0.56	14.3
3. Bangsar Apartment	0.58	0.11	0.69	15.9
4. S. Jaya Terrace	0.51	0.13	0.64	20.3
5. Kg. Hj. Abd. Hukum	0.32	0.06	0.38	15.8
6. San Peng Flat	0.26	0.02	0.28	7.1
Average	0.45	0.08	0.53	14.1

*Note: * Results obtained from the actual field surveys*
*** Estimations were made based on the figures given in questionnaires surveyed*

7.2 Survey on Recycling of Business Entities and Households

1. The Objective of the Survey

The main objective of the survey is to investigate the current status of waste management and recycling activities by different categories of business entities and households in the country.

2. Survey Areas

The survey was divided into two parts. In the first part, face-to-face interview was carried out and in the second part, the questionnaires were sent by mails. The face-to-face interview was carried out at five (5) main cities in Peninsular Malaysia and these cities were already determined and selected by the JICA Study Team. They are as follows:

1) Shah Alam, Selangor
2) Kuantan, Pahang
3) Georgetown, Pulau Pinang
4) Johor Bahru, Johor
5) Kuala Terengganu, Terengganu

The mailing survey was carried out on similar areas and some additional questionnaires were also mailed to manufacturers that are located in Perak, Melaka, Kedah, Kelantan etc. The summary of the survey areas is shown in Table 2-1.

Table 2-1 Summary of Survey Areas

No	Type of Survey	Survey Areas
1	Face-to-face Interviews	• Shah Alam, Selangor • Kuantan, Pahang • Georgetown, Pulau Pinang • Johor Bahru, Johor • Kuala Terengganu, Terengganu
2	Mailing Surveys	• Selangor - Shah Alam, Klang, Petaling Jaya, Subang Jaya etc. • Pahang - Kuantan, Pekan, Temerloh etc. • Pulau Pinang - Georgetown, Seberang Prai etc. • Johor - Johor Bahru, Skudai, Senai, Kulai etc. • Terengganu - Kuala Terengganu, Kemaman etc. • Melaka - Alor Gajah, Bukit Rambai, Air Keroh • Perak - Ipoh • Kedah - Alor Setar, Sungai Petani, Jitra, Kulim • Kelantan - Kota Bahru

3. Outline of the Survey Methodology

The survey covered two (2) categories, first is the business entity (manufacturers, commercial companies, offices, construction companies and service companies) and secondly the households (high, medium and low income houses). The detailed target groups for each category and some examples are shown in Table 2-2. Generally, the survey was carried out in two ways, i.e. face-to-face interview, and mailing surveys. The

mailing survey was further divided into two, first is by ordinary mails and second is by hand delivery to the targeted respondents.

Table 2-2 Examples of Target Categories

No.	Categories	Example of Targeted Respondent
1	Manufacturers	Electronic industry, furniture industry, food industry, plastic industry etc.
2	Commercial companies	Supermarket, hypermarket, shop lots (e.g. book shop, optical shop), restaurant etc.
3	Offices	Any offices mainly located at high-rise office buildings
4	Construction companies	Developers, civil engineering company, renovation company etc.
5	Service companies	Bank, hotel, institution, saloon, insurance company etc.
6	Households	High income - Bungalow, condominium Medium income - Terrace, apartment Low income - squatter, flat

4. Results

This survey presents information on the amounts and composition of waste generated from households and different business entities including offices, commercial and service companies, construction companies and manufacturers. The common types of waste generated, the quantity as well as the common way of disposal were investigated.

Overall, the results of the survey can be summarized in Table 2-3.

Table 2-3 Summary of the Survey

No	Sources	Estimated Generation Rate			
		Amount	Unit	Amount	Unit
1	Households	37.5	Kg/household/month	1.25	Kg/household/day
2	Commercial and Service Companies	133.1	Kg/company/month	4.43	Kg/company/day
3	Offices	51.8	Kg/office/month	1.73	Kg/office/day
4	Construction Companies	4,309.9	Tonnes/company /month	143.66	Tonnes/company /day
5	Manufacturers	521.0	Tonnes/m'facturer/month	17.37	Tonnes/ m'facturer /day

Note: Estimations were based on the following numbers of samples surveyed:
1) Households – 609 samples 2) Commercial and Service Companies – 162 samples
3) Offices – 74 samples 4) Construction Companies – 88 samples 5) Manufacturers – 224 samples

Table 2-4 summarises the detailed results for each business entity and household including the common methods of disposal for each category of waste.

Table 2-4 Summary of the Entire Survey on Households and Business Entities

Source	Waste Categories and Amount Generated

Household

Type	Quantity (kg/day)	Two Major Methods of Collection / Disposal	
		1	2
Old newspapers	0.39	Gave/Sold to door-to-door buyer	Municipal Waste Collection
Waste magazines	0.10	Gave/Sold to door-to-door buyer	Municipal Waste Collection
Other papers	0.12	Gave/Sold to door-to-door buyer	Municipal Waste Collection
Aluminium cans	0.02	Municipal Waste Collection	Gave/Sold to door-to-door buyer
Steel cans	0.03	Municipal Waste Collection	Gave/Sold to door-to-door buyer
PET bottles	0.01	Municipal Waste Collection	Gave/Sold to door-to-door buyer
Other plastic bottles	0.03	Municipal Waste Collection	Bring to recycling centers
Other plastics	0.02	Municipal Waste Collection	Bring to recycling centers
Glass bottles	0.10	Municipal Waste Collection	Gave/Sold to door-to-door buyer
Other glass	0.01	Municipal Waste Collection	Bring to recycling centers
Kitchen wastes	0.42	Municipal Waste Collection	Animal Feed
Garden wastes	-	Municipal Waste Collection	Buried
Others	0.01	Depending	Depending
Total	1.26	-	-

Office

Type	Quantity (kg/day)	Two Major Methods of Collection / Disposal	
		1	2
Old newspapers	0.71	Sold / given free to recyclers / collectors	Collected by waste municipal collectors
Waste magazines	0.09	Sold / given free to recyclers / collectors	Collected by waste municipal collectors
Other papers	0.64	Sold / given free to recyclers / collectors	Collected by waste municipal collectors
Aluminium cans	0.08	Collected by waste municipal collectors	Sold / given free to recyclers / collectors
Steel cans	0.02	Collected by waste municipal collectors	Given free to recyclers / collectors
PET bottles	0.02	Collected by waste municipal collectors	Given free to recyclers / collectors
Kitchen wastes	0.06	Collected by waste municipal collectors	Given free to recyclers / collectors
Others	0.11	Depending	Depending
Total	1.73	-	-

Source	Waste Categories and Amount Generated

Commercial/Service

Type	Quantity (kg/day)	Two Major Methods of Collection / Disposal	
		1	2
Old Newspapers	0.73	Sold / given free to recyclers / collectors	Collected by waste municipal collectors
Waste Magazines	0.22	Sold / given free to recyclers / collectors	Others
Other Papers	1.81	Sold / given free to recyclers / collectors	Collected by waste municipal collectors
Aluminium Cans	0.06	Collected by waste municipal collectors	Sold / given free to recyclers / collectors
Steel cans	0.22	Collected by waste municipal collectors	Sold / given free to recyclers / collectors
PET bottles	0.25	Collected by waste municipal collectors	Sold / given free to recyclers / collectors
Kitchen wastes	0.52	Collected by waste municipal collectors	Others
Others	0.62	Depending	Depending
Total	4.43	-	-

Construction

Type	Quantity (kg/day)	Two Major Methods of Collection / Disposal	
		1	2
Excess soil	41.26	Reuse for backfilling	Sent to Landfill
Concrete	3.65	Reuse for backfilling	Sent to Landfill
Asphalt-concrete	0.36	Sent to Landfill	Reuse for backfilling
Wood	0.53	Collected by waste collector	Sent to Landfill
Slurry / Sludge	96.51	Sent to Landfill	Dumped to vacant land
Mixed waste	0.50	Sent to Landfill	Collected by waste collector
Ferrous metals	0.34	Sold to recycler / buyers	Collected by waste collector
N-Ferrous metals	0.42	Sold to recycler / buyers	Collected by waste collector
Waste plastics	0.05	Collected by waste collector	Sold to recycler / buyers
Waste papers	0.03	Sold to recycler / buyers	Collected by waste collector
Asbestos	0.01	Dumped to vacant land	Others
Others	0.003	Depending	Depending
Total	143.66	-	-

Manufacturers

Type	On-site			Off-site	
	Reuse/ Recycle	Treatment	Storage / Disposal	Recycling	Collection/ Treatment / Disposal
Wastes from Process Sources (Average = 521.03 tonnes/ manufacturer / month)	3.8% (19.80 tonnes /month)	2.2% (11.46 tonnes /month)	2.4% (12.50 tonnes /month)	27.9% (145.37 tonnes /month)	63.7% (331.90 tonnes /month)
Wastes from Non-process Sources (Average = 420.14 kg/ manufacturer / month)	0.2% (0.84kg/ month)	1.0% (4.20kg /month)	0.6% (2.52kg /month)	15.1% (63.44kg /month)	83.0% (348.72kg /month)

Summarised Results/ Data:

Table 1: Summary of Study Areas

No	Type of Survey	Study Areas
1	Face-to-face Interviews	• Shah Alam, Selangor • Kuantan, Pahang • Georgetown, Pulau Pinang • Johor Bahru, Johor • Kuala Terengganu, Terengganu
2	Mailing Surveys	• Selangor - Shah Alam, Klang, Petaling Jaya, Subang Jaya etc. • Pahang - Kuantan, Pekan, Temerloh etc. • Pulau Pinang - Georgetown, Seberang Prai etc. • Johor - Johor Bahru, Skudai, Senai, Kulai etc. • Terengganu - Kuala Terengganu, Kemaman etc. • Melaka - Alor Gajah, Bukit Rambai, Air Keroh • Perak - Ipoh • Kedah - Alor Setar, Sungai Petani, Jitra, Kulim • Kelantan - Kota Bahru

Table 2: Examples of Target Categories

No	Categories	Example of Targeted Respondent
1	Manufacturers	Electronic industry, furniture industry, food industry, plastic industry etc.
2	Commercial companies	Supermarket, hypermarket, shop lots (e.g. book shop, optical shop), restaurant etc.
3	Offices	Any offices mainly located at high-rise office buildings
4	Construction companies	Developers, civil engineering company, renovation company etc.
5	Service companies	Bank, hotel, institution, saloon, insurance company etc.
6	Households	High income - Bungalow, condominium Medium income - Terrace, apartment Low income - squatter, flat

Table 3: Questionnaires Sent by Mails

No	Hand Delivery		Ordinary Mails	
	Targets	Number	Targets	Number
1	Households	950	Households	1,045
2	Offices	250	Manufacturers	1,000
3	Commercial	250	Construction	250
4	Services	250	-	-
Sub-Total		1,700		2,295
TOTAL		3,995		

Note: All mails were sent on 5/11/04 and deadline for return of questionnaire is 15/12/04

Table 4: Distributions of the Returned Questionnaires (Interviews & Mails)

	Interview	Mailing			Total Returned Questionnaires
		Sent	Returned	%	
A) Business Entities					
Offices	59	250	15	6.0	74
Commercial and Services	121	500	41	8.2	162
Construction Companies	69	250	19	7.6	88
Manufacturers	192	1,000	35	3.5	227
SUB-TOTAL	441	2,000	110	5.5	551
B) Households					
Households	201	1,995	408	20.5	609
GRAND TOTAL	642	3,995	518	13.0	1,160

Table 5: Distributions of the Questionnaires by Areas

	KL / Selangor	Penang	Johor	Kuantan	Kuala T'ganu	TOTAL
Offices	31	5	10	5	8	59
Commercial and Services	71	10	18	10	12	121
Construction Companies	45	5	9	5	5	69
Manufacturers	100	20	32	21	19	192
Households	102	20	40	20	19	201
TOTAL	349	60	109	61	63	642
Questionnaires returned by mails						518
Total questionnaires returned (interviews and mailing)						1,160

A) HOUSEHOLDS

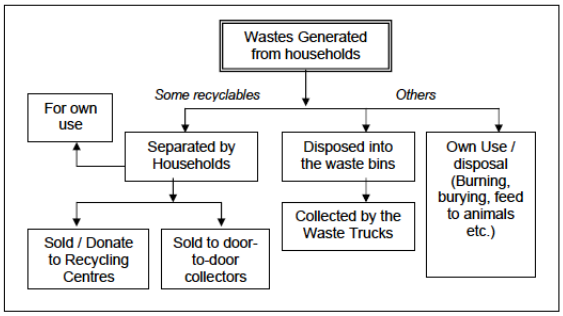


Figure 1: Summary of the Handling of Waste Generated from Households

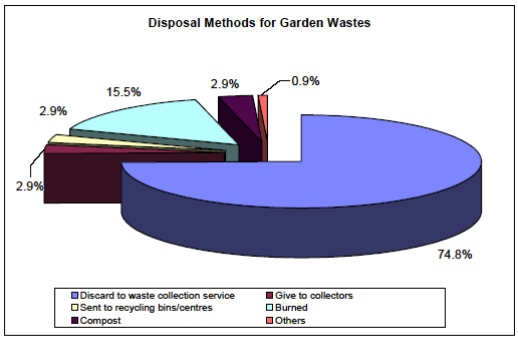


Figure 3: Disposal Methods of Garden Wastes

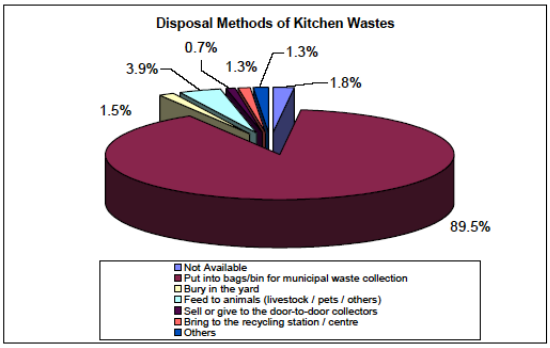


Figure 2: Disposal Methods of Kitchen Wastes

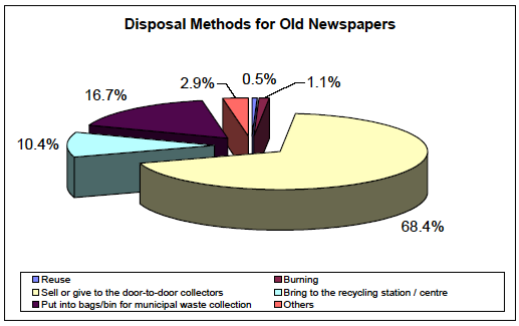


Figure 4: Disposal Methods of Old Newspapers

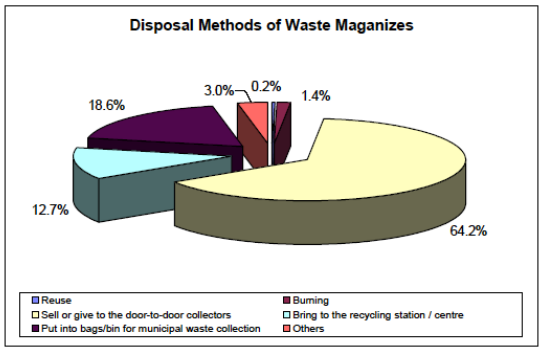


Figure 5: Disposal Methods of Waste Magazines

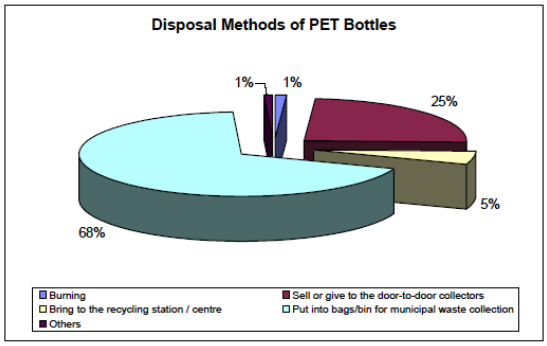


Figure 7: Disposal Methods of PET Bottles

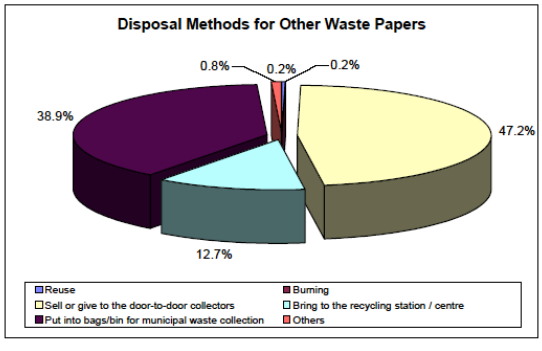


Figure 6: Disposal Methods of Other Waste Papers

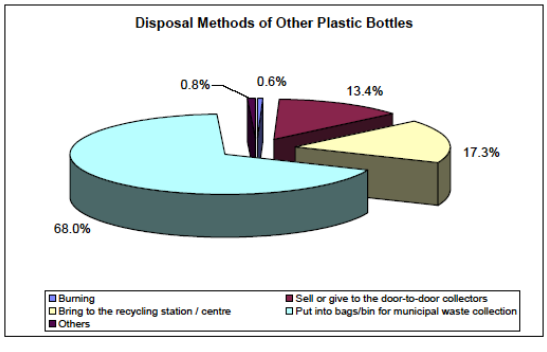


Figure 8: Disposal Methods of Other Plastic Bottles

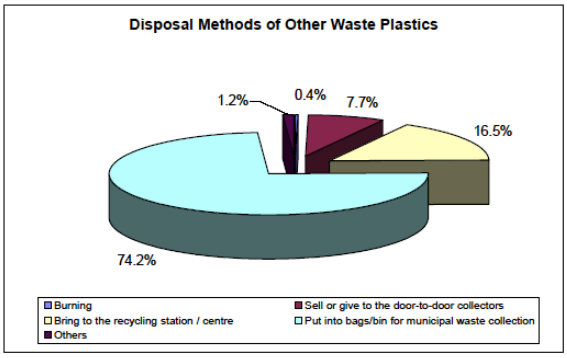


Figure 9: Disposal Methods of Other Waste Plastics

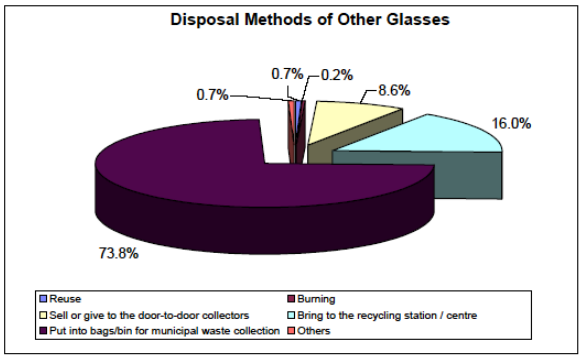


Figure 11: Disposal Methods of Other Glasses

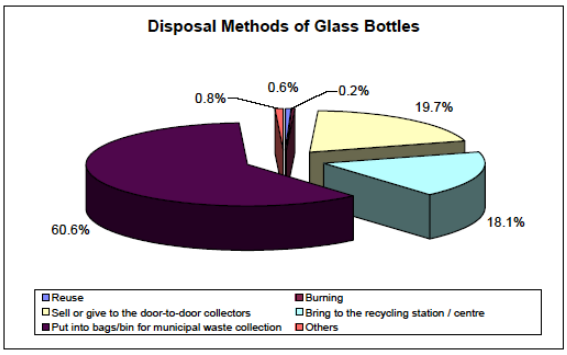


Figure 10: Disposal Methods of Glass Bottles

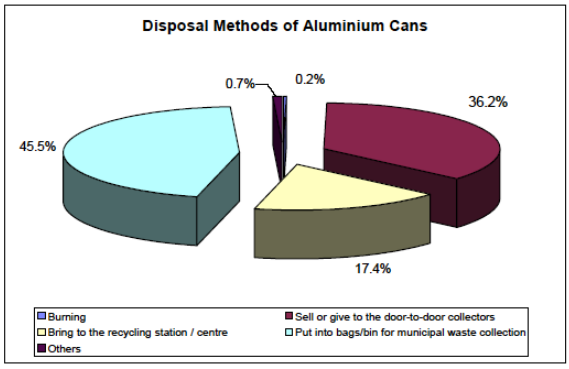


Figure 12: Disposal Methods of Aluminium Cans

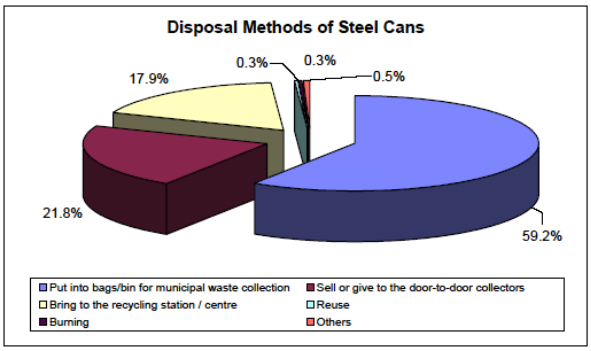


Figure 13: Disposal Methods of Steel Cans

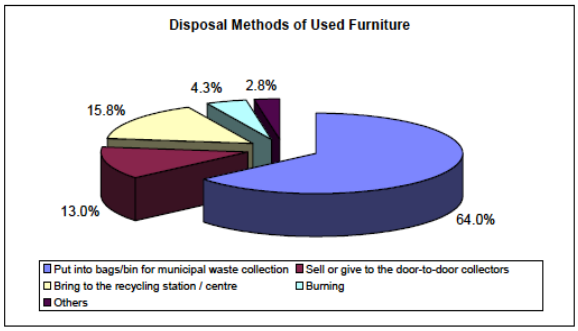


Figure 15: Disposal Methods of Used Furniture

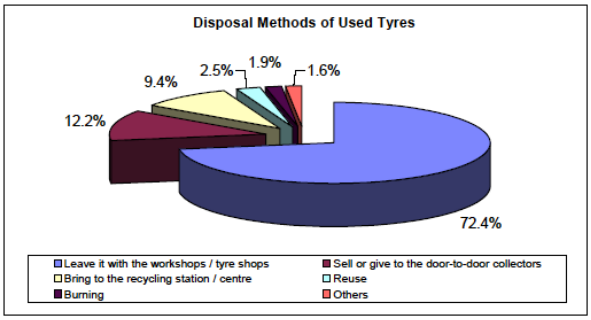


Figure 14: Disposal Methods of Used Tyres

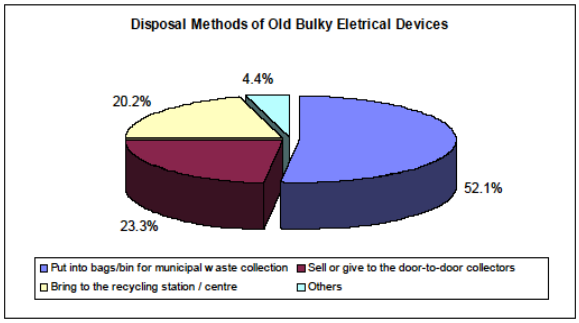


Figure 16: Disposal Methods of Old Bulky Electrical Devices

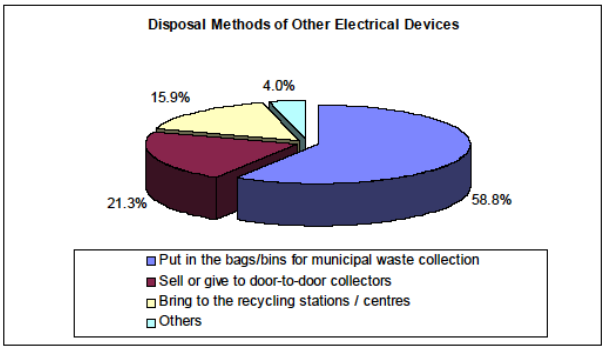
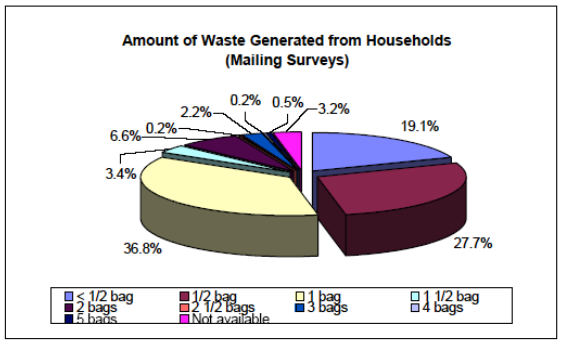


Figure 17: Disposal Methods of Other Electrical Devices



Note: Estimated bag size = 5kg rice bag

Figure 19: Amount of Waste Generated from Households (Mailing Surveys)

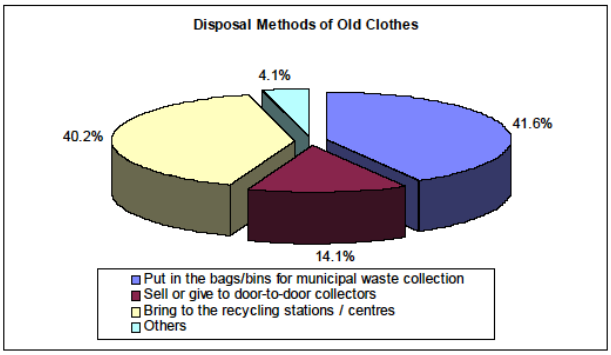


Figure 18: Disposal Methods of Old Clothes

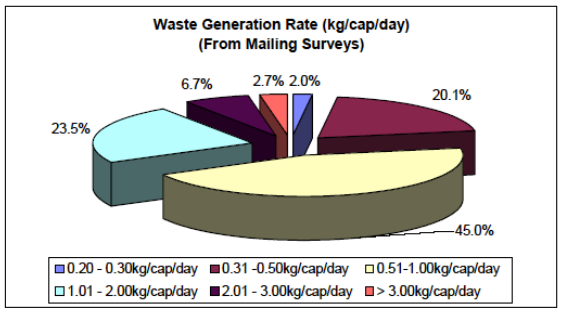


Figure 20: Waste Generation Rate (kg/cap/day)

Table 6: Amount of Waste Generated from Households

No	Waste Materials	Total (kg)	Average (kg/H'hold/week)	Average (kg/H'hold/day)
1	Old newspapers	553.0	2.74	0.39
2	Waste magazines	137.1	0.68	0.10
3	Other papers	172.1	0.85	0.12
4	Aluminium cans	28.4	0.14	0.02
5	Steel cans	39.5	0.20	0.03
6	PET bottles	12.4	0.06	0.01
7	Other plastic bottles	37.5	0.19	0.03
8	Other plastics	3.13	0.15	0.02
9	Glass bottles	145.1	0.72	0.10
10	Other glass	13.5	0.07	0.01
11	Kitchen wastes	589.2	2.92	0.42
12	Others	13.6	0.07	0.01
Total			8.79	1.26
Per Capita Generation Rate (kg)			-	0.25

Note: Total number of samples surveyed = 202; average number of people per household = 5

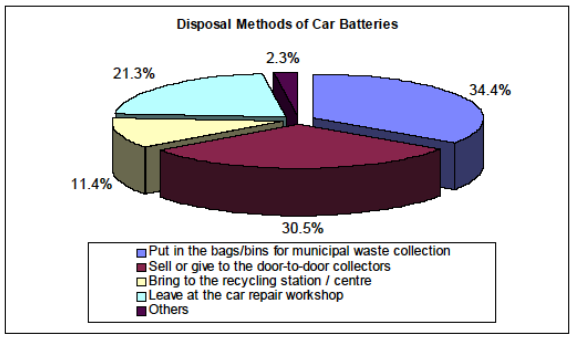


Figure 22: Disposal Methods of Car Batteries by Households

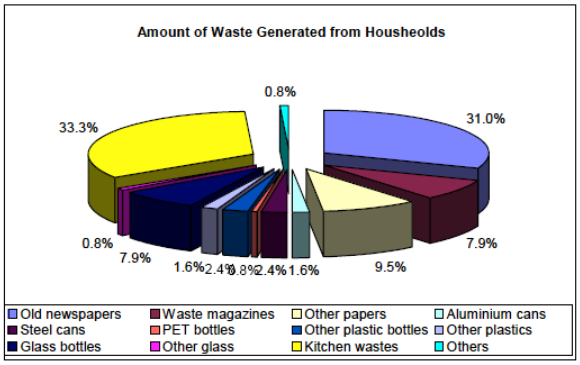


Figure 21: Amount of Waste Generated from Households

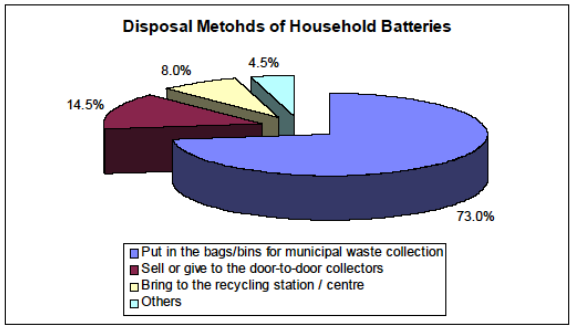


Figure 23: Disposal Methods of Dry Cell Batteries by Households

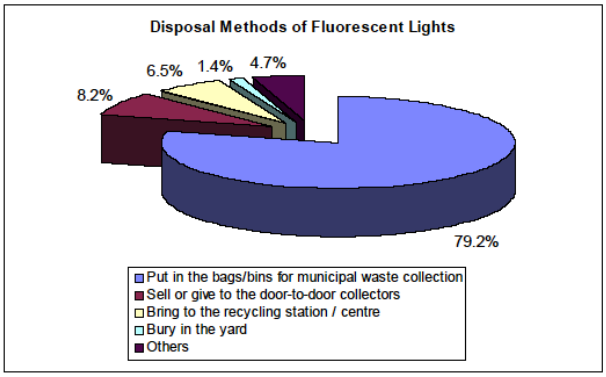


Figure 24: Disposal Methods of Fluorescent Lights by Households

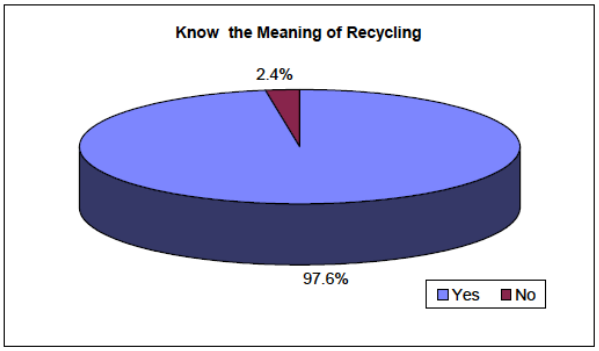


Figure 25: Knowledge of Household Respondents about the Meaning of Recycling

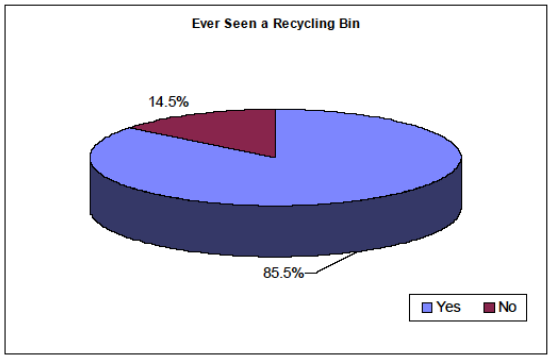


Figure 26: Household Responses whether they have seen Recycling Bins

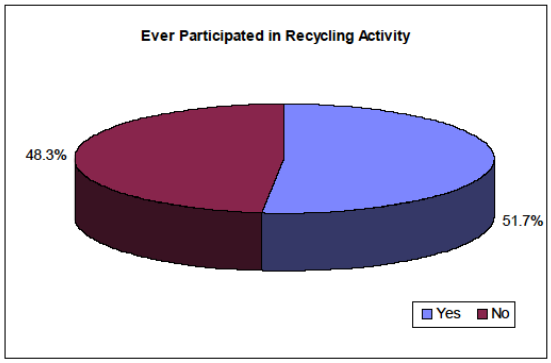


Figure 27: Household Responses whether they have Participated in Recycling Activities

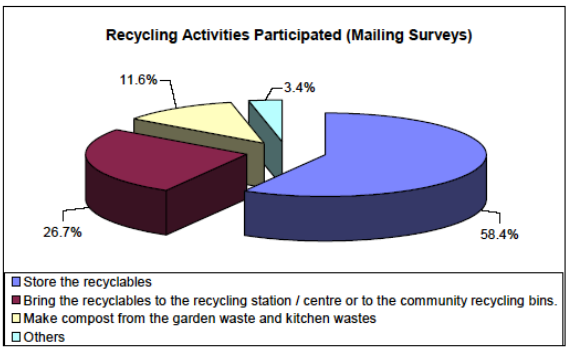


Figure 28: Types of Recycling Activities Participated by the Households (From Mailing Surveys)

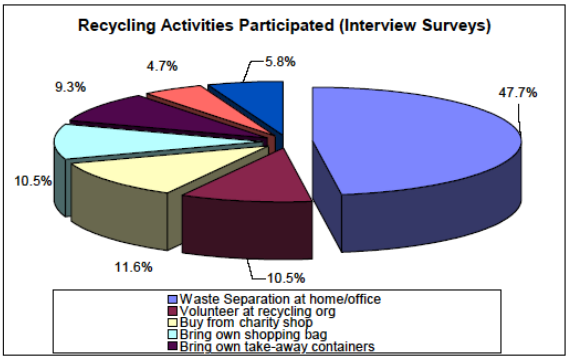


Figure 29: Types of Recycling Activities Participated by the Households (From Interview Surveys)

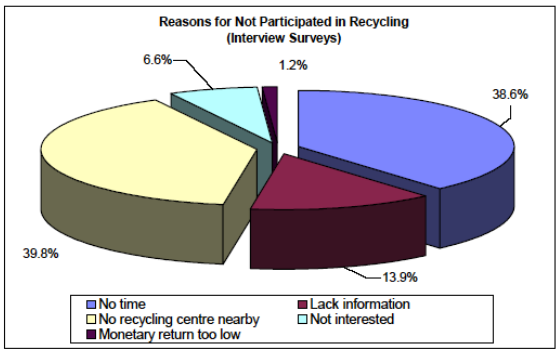


Figure 30: Reasons for not Participating in Recycling Activities

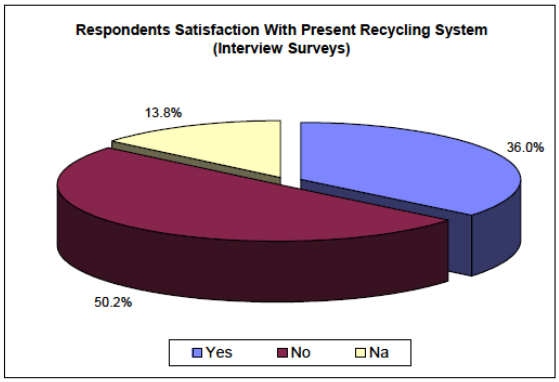


Figure 31: Respondents Satisfaction on the Present Recycling Systems

Table 7: Average Number and Estimated Lifespan of selected Furniture and Electrical Appliances in Households

No	Item	Number in House		Average Estimated Lifespan (Years)
		Total	Average	
1	Car	236	1.2	8.2
2	Motorbikes	182	0.9	8.7
3	Bicycles	157	0.8	6.2
4	Cupboards	511	2.5	8.8
5	Beds	626	3.1	8.3
6	Chairs	1087	5.4	8.2
7	Tables	364	1.8	8.3
8	Television	257	1.3	8.9
9	Refrigerators	202	1.0	10.5
10	Washing machines	194	1.0	8.8
11	Air conditional	116	0.6	8.1
12	Computers	104	0.5	5.1

Note: Total number of questionnaires collected was 202 (from interview only)

Table 8: Amount of Waste Generated from Commercial and Service Companies

No	Waste Materials	Total (kg)	Average (kg/Company/month)	Average (kg/Company/day)
1	Old newspapers	3,539.20	22.00	0.73
2	Waste magazines	1,083.40	6.70	0.22
3	Other papers	8,754.80	54.40	1.81
4	Aluminium cans	276.50	1.70	0.06
5	Steel cans	1,050.60	6.50	0.22
6	PET bottles	1,222.70	7.60	0.25
7	Kitchen wastes	2,488.50	15.50	0.52
8	Others	3,009.10	18.70	0.62
Total			133.10	4.43

Note: Total number of samples surveyed = 161

B) BUSINESS ENTITIES

Commercial and Services Companies

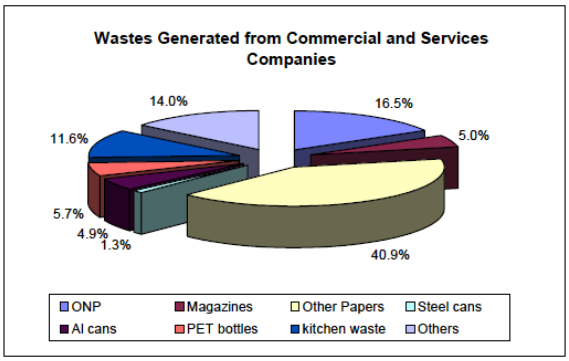


Figure 32: Wastes Generated from Commercial and Service Companies

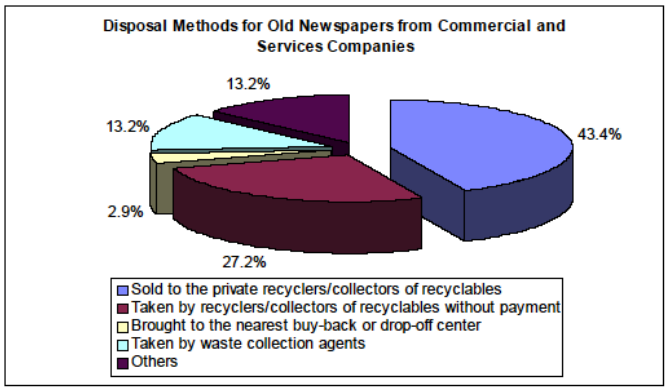


Figure 33: Disposal Methods for Old Newspapers from Commercial and Service Companies

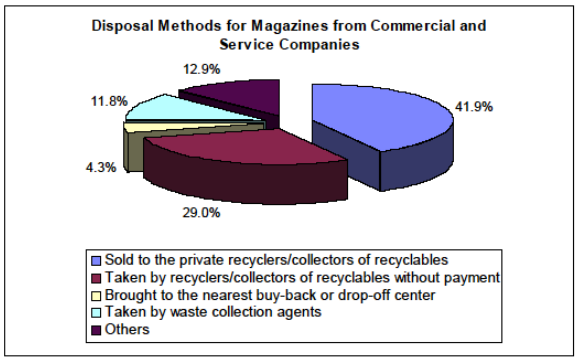


Figure 34: Disposal Methods for Magazines from Commercial and Service Companies

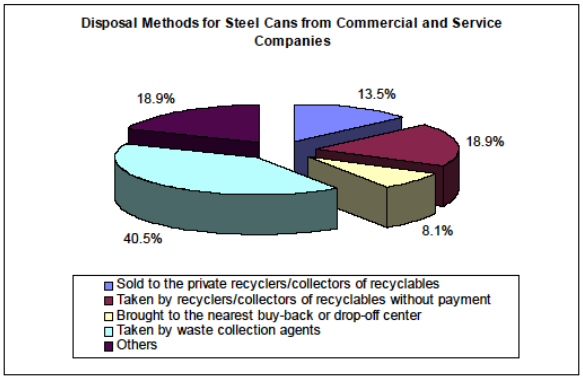


Figure 36: Disposal Methods for Steel Cans from Commercial and Service Companies

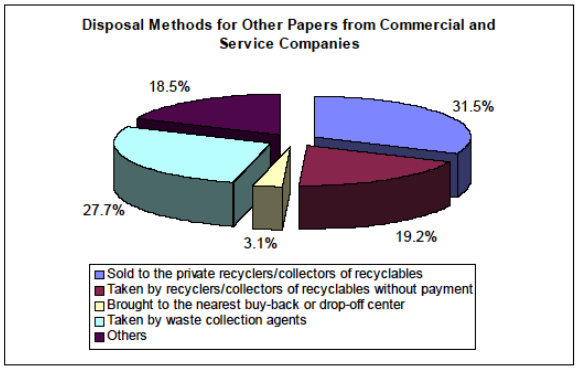


Figure 35: Disposal Methods for Other Papers from Commercial and Service Companies

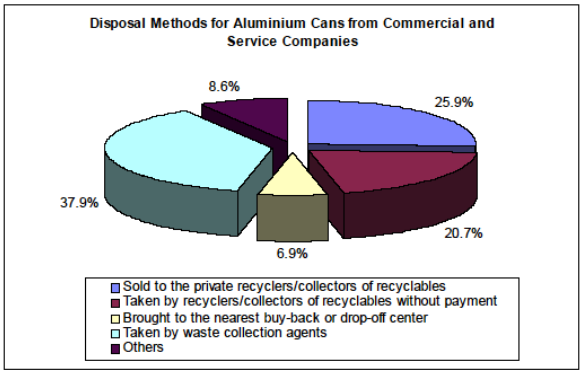


Figure 37: Disposal Methods for Aluminium Cans from Commercial and Service Companies

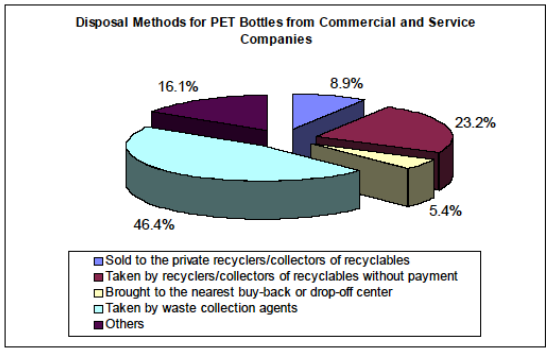


Figure 38: Disposal Methods for PET Bottles from Commercial and Service Companies

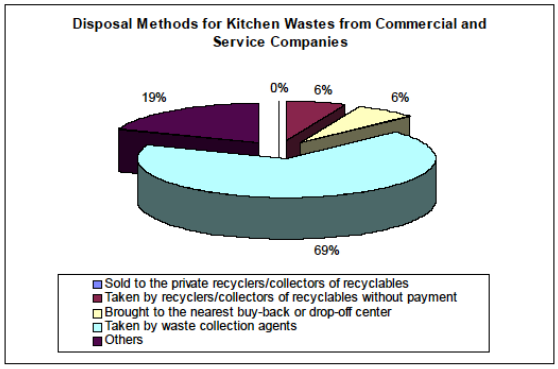


Figure 39: Disposal Methods for Kitchen Wastes from Commercial and Service Companies

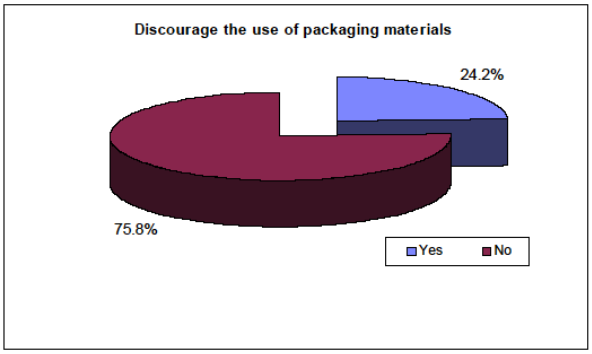


Figure 40: Discourage the Use of Packaging Materials by the Commercial and Service Companies

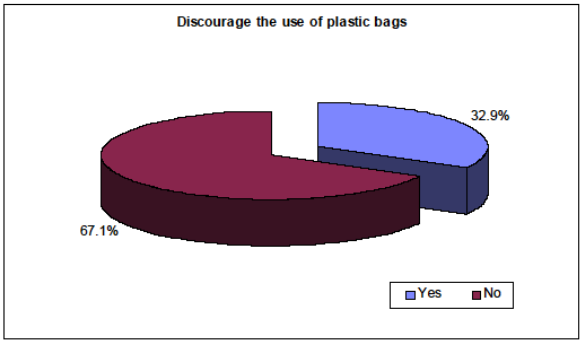


Figure 41: Discourage the Use of Plastic Bags by the Commercial and Service Companies

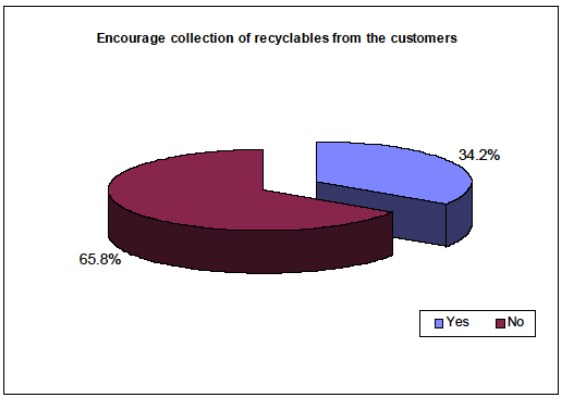


Figure 42: Encourage the Collection of Recyclables from the Customers by the Commercial and Service Companies

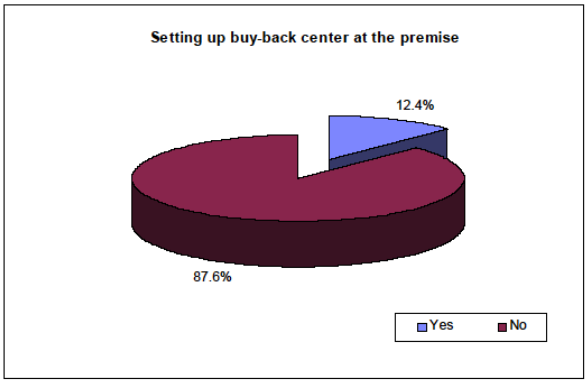


Figure 44: Setting up Buy Back Centre at the Premise of the Commercial and Service Companies

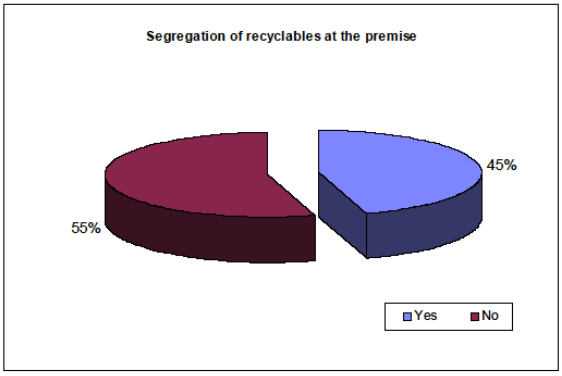


Figure 43: Segregations of Recyclables at the Premise of the Commercial and Service Companies

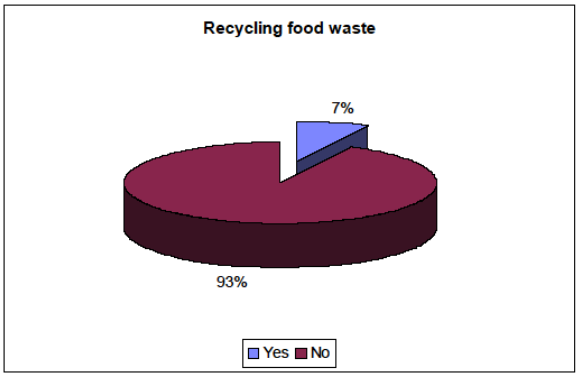


Figure 45: Recycling of Food Wastes by the Commercial and Service Companies

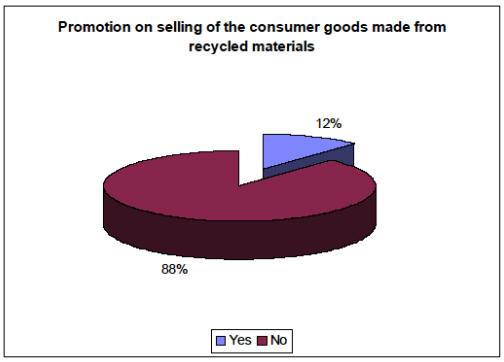


Figure 46: Promotion on the Sales of Products made from Recycled Materials by the Commercial and Service Companies

Table 9: Amount of Waste Generated from Offices

No	Waste Materials	Total (kg)	Average (kg/Office/month)	Average (kg/Office/day)
1	Old newspapers	1,565.00	21.15	0.71
2	Waste magazines	208.40	2.82	0.09
3	Other papers	1,416.80	19.15	0.64
4	Aluminium cans	43.90	2.33	0.08
5	Steel cans	172.50	0.59	0.02
6	PET bottles	44.60	0.60	0.02
7	Kitchen wastes	134.00	1.81	0.06
8	Others	248.80	3.36	0.11
Total			51.81	1.73

Note: Total number of samples surveyed = 74

Offices

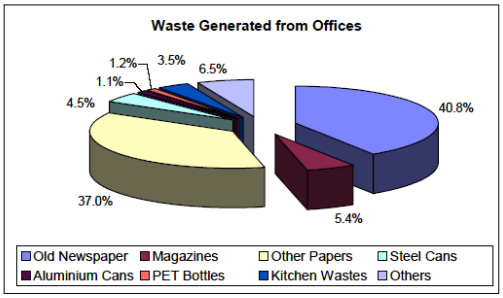


Figure 47: Main Categories of Wastes Generated from Offices

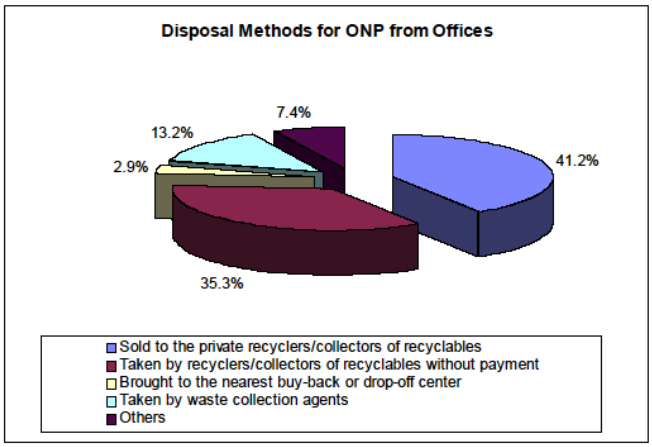


Figure 48: Disposal Methods of Old Newspapers from Offices

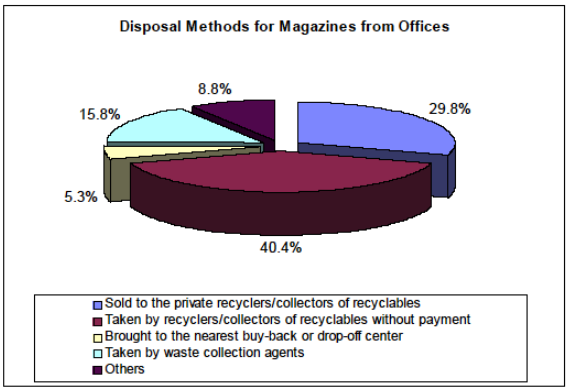


Figure 49: Disposal Methods of Magazines from Offices

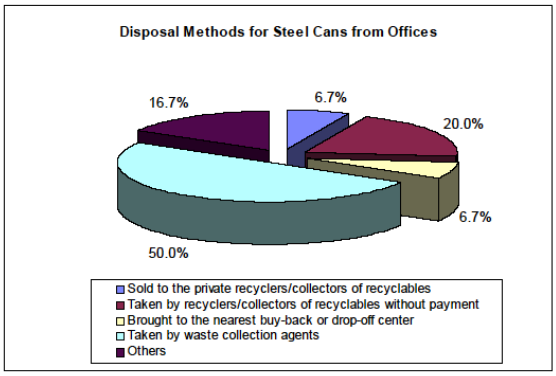


Figure 51: Disposal Methods of Steel Cans from Offices

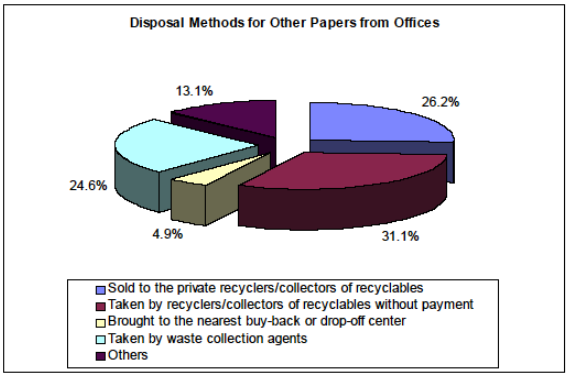


Figure 50: Disposal Methods of Other Papers from Offices

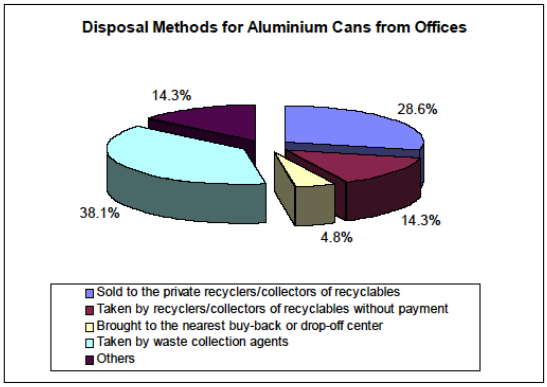


Figure 52: Disposal Methods of Aluminium Cans from Offices

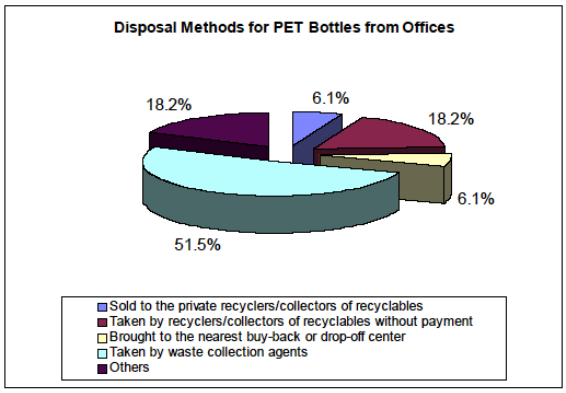


Figure 53: Disposal Methods of PET Bottles from Offices

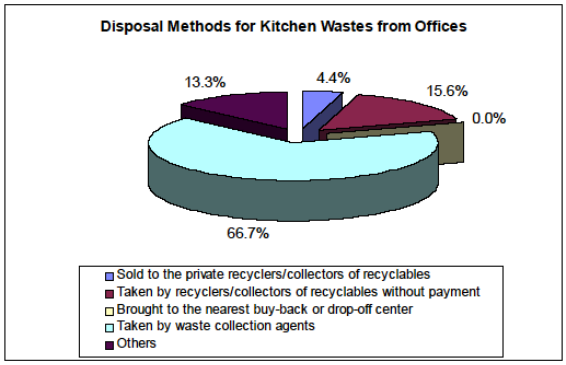


Figure 54: Disposal Methods of Kitchen Wastes from Offices

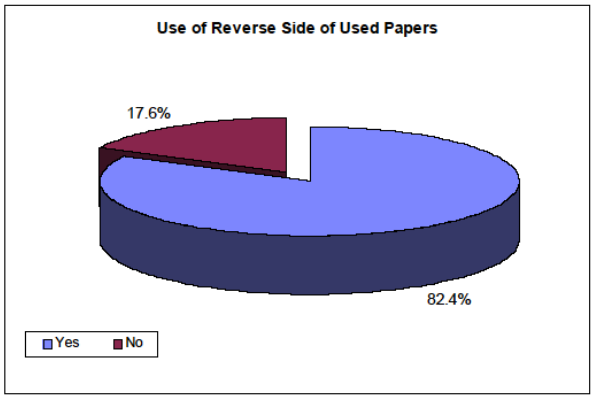


Figure 57: Use of Reverse Side of Used Papers in Offices

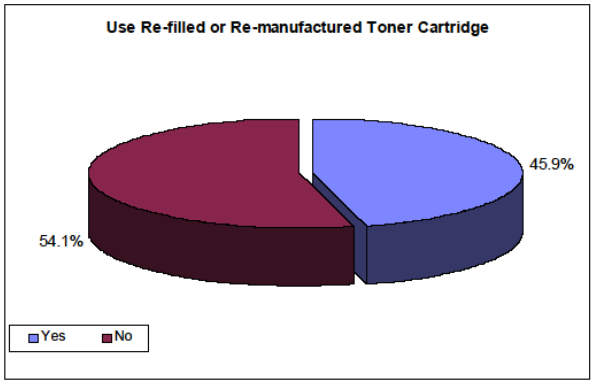


Figure 58: Use of Refilled or Re-manufactured Toners in Offices

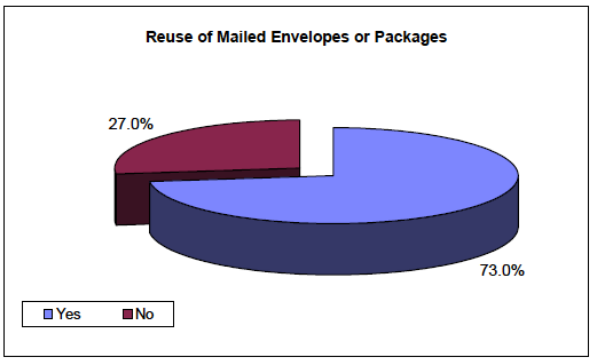


Figure 55: Reuse of Mailed Envelopes or Packages in Offices

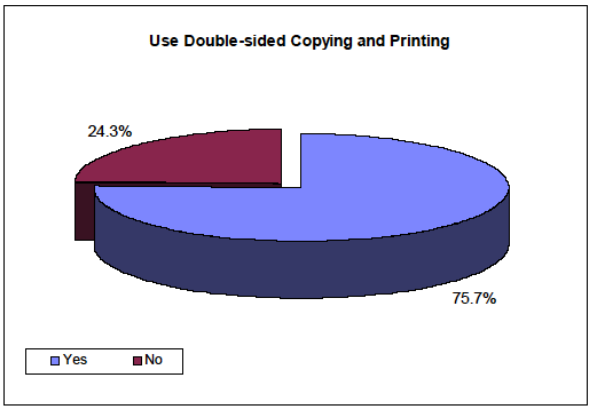


Figure 56: Use of Double-sided Copying in Offices

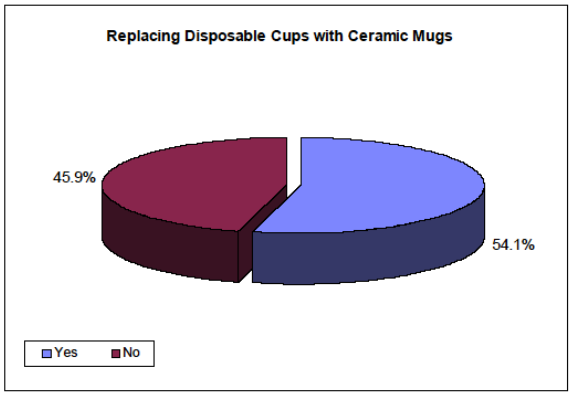


Figure 59: Replacing Disposable Cups with Ceramic Mugs in Offices

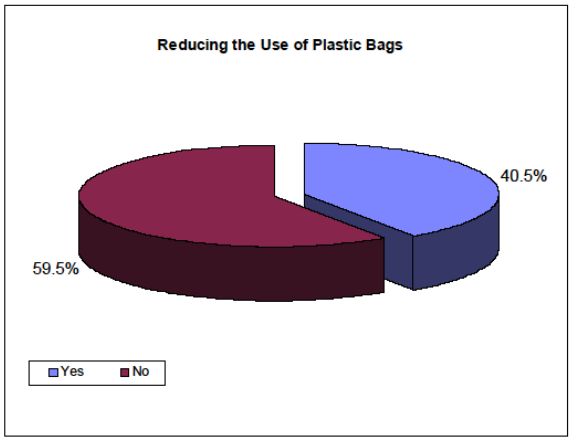


Figure 60: Reduce the Use of Plastic Bags in Offices

Construction Companies

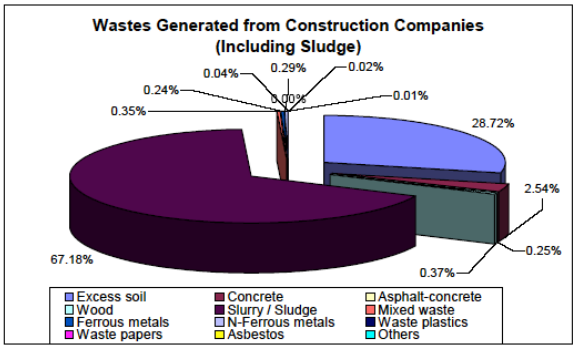


Figure 61: Main Waste Categories Generated by the Construction Companies (Including Sludge)

Table 10: Amount of Waste Generated from Construction Companies

No	Waste Materials	Total (tonnes)	Average (ton/company/month)	Average (ton/company/day)
1	Excess soil	108,914.30	1,237.66	41.26
2	Concrete	9,645.58	109.61	3.65
3	Asphalt-concrete	937.25	10.65	0.36
4	Wood	1,400.75	15.92	0.53
5	Slurry / Sludge	254,797.80	2,895.43	96.51
6	Mixed waste	1,318.95	14.99	0.50
7	Ferrous metals	903.59	10.27	0.34
8	N-Ferrous metals	1,107.18	12.58	0.42
9	Waste plastics	144.36	1.64	0.05
10	Waste papers	78.10	0.89	0.03
11	Asbestos	20.90	0.24	0.01
12	Others	8.25	0.09	0.003
Total			4,309.87	143.66

Note: Total number of samples surveyed = 88; solid content of slurry/sludge is only 0.5 -5%

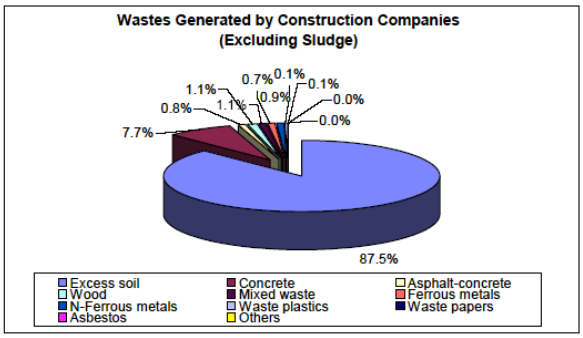


Figure 62: Main Waste Categories Generated by the Construction Companies (Including Sludge)

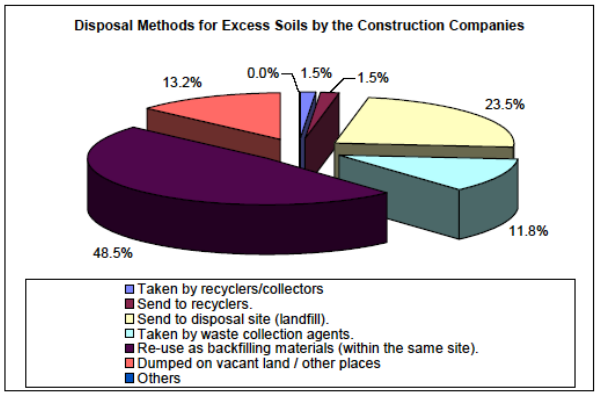


Figure 63: Disposal Methods for Excess Soils by the Construction Companies

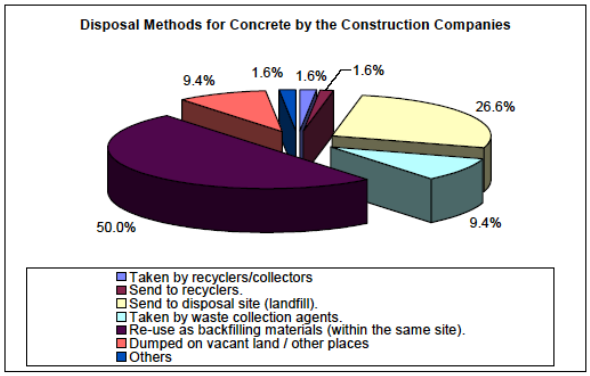


Figure 64: Disposal Methods for Concrete by the Construction Companies

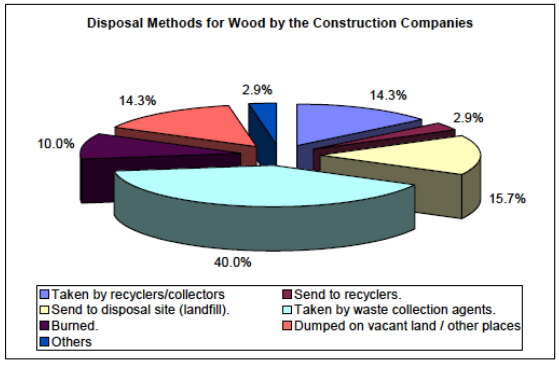
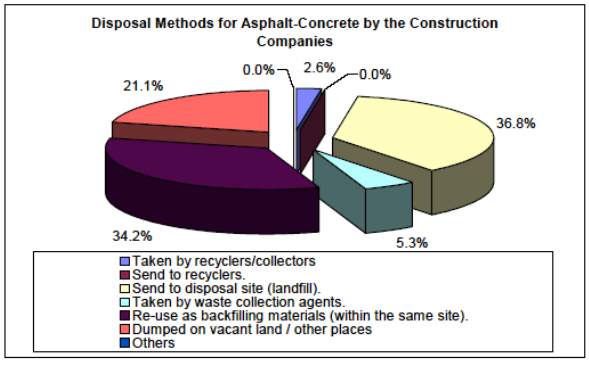


Figure 66: Disposal Methods for Wood by the Construction Companies



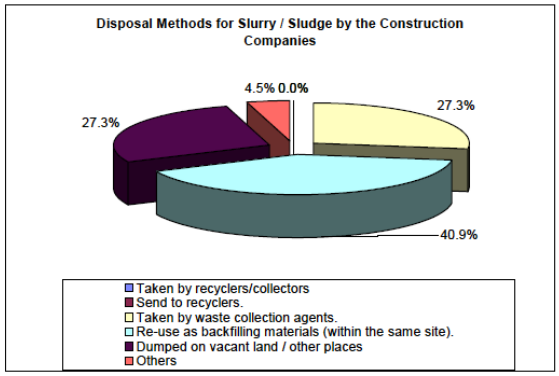


Figure 67: Disposal Methods for Slurry / Sludge by the Construction Companies

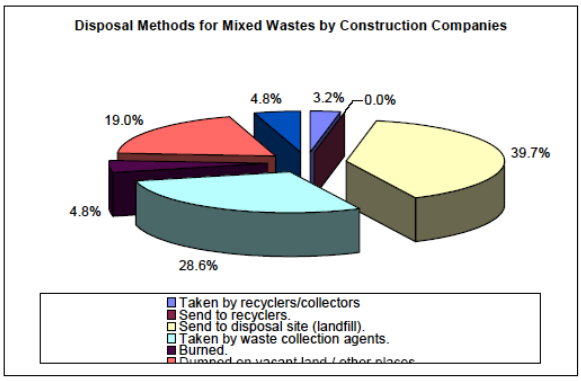


Figure 68: Disposal Methods for Mixed Wastes by the Construction Companies

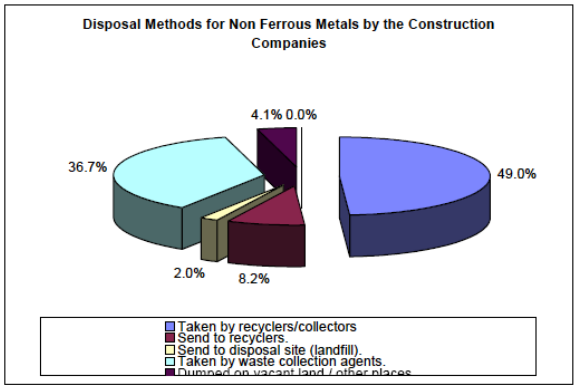


Figure 70: Disposal Methods for Non-Ferrous Metals by the Construction Companies

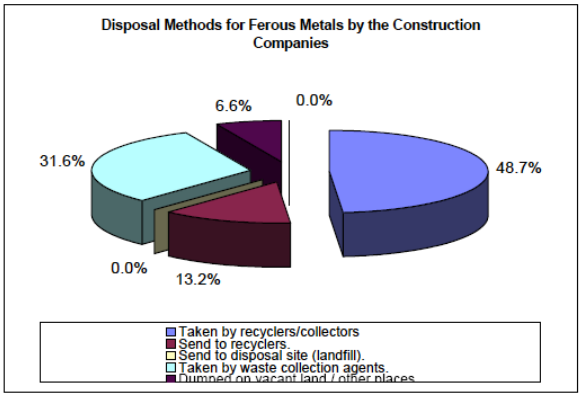


Figure 69: Disposal Methods for Ferrous Metals by the Construction Companies

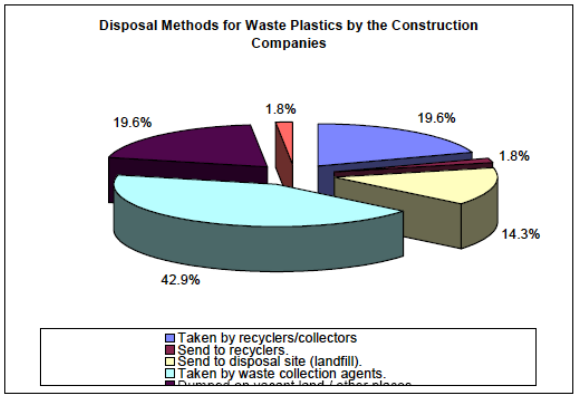


Figure 71: Disposal Methods for Waste Plastics by the Construction Companies

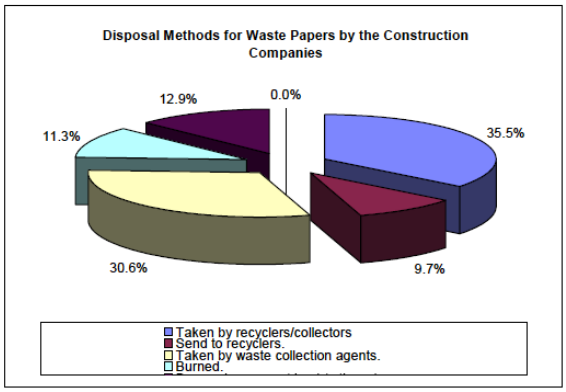


Figure 72: Disposal Methods for Waste Papers by the Construction Companies

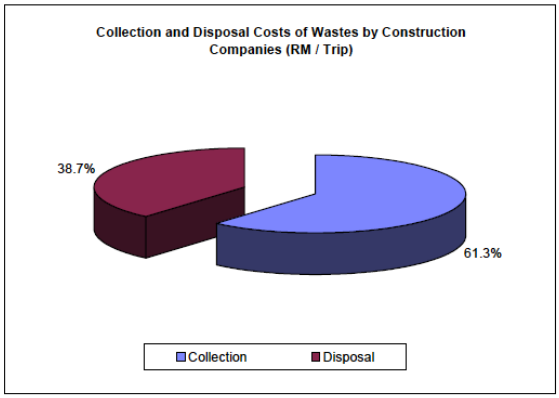


Figure 74: Waste Disposal and Collection Costs Paid by the Construction Companies

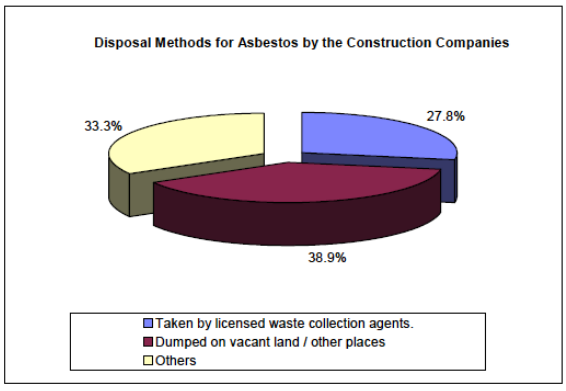


Figure 73: Disposal Methods for Asbestos by the Construction Companies

Manufacturers

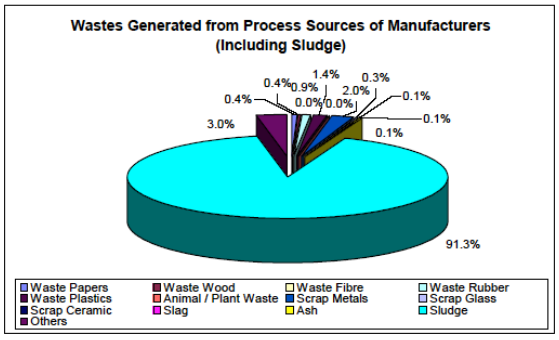


Figure 75: Wastes Generated from Process Sources of Manufacturers (Including Sludge)

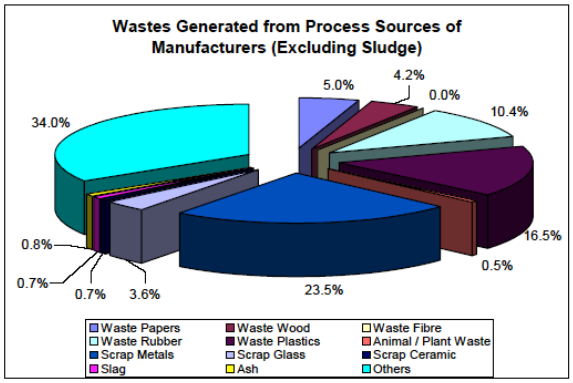


Figure 76: Wastes Generated from Process Sources of Manufacturers (excluding sludge)

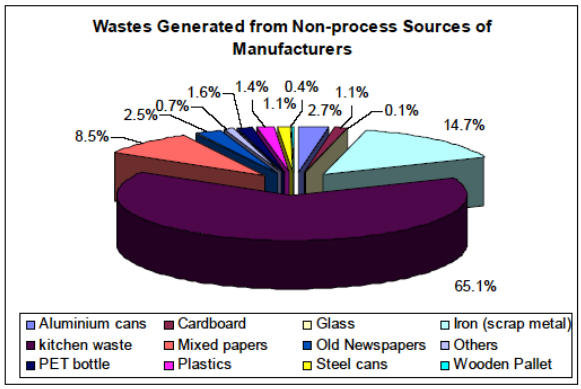


Figure 77: Wastes Generated from Non-Process Sources of Manufacturers

Table 11: Amount of Waste Generated from Process Sources of Manufacturers

No	Waste Materials	Total (tonnes)	Average (kg/Manufacturer/ month)	Average (kg/Manufacturer/ day)
1	Waste Papers	507,409	2,265.22	75.51
2	Waste Wood	427,050	1,906.47	63.55
3	Waste Fibre	4,807	21.46	0.72
4	Waste Rubber	1,057,668	4,721.73	157.39
5	Waste Plastics	1,670,562	7,457.86	248.60
6	Animal/Plant Waste	55,012	245.59	8.19
7	Scrap Metals	2,383,685	10,641.50	354.72
8	Scrap Glass	364,173	1,625.77	54.19
9	Scrap Ceramic	66,240	295.71	9.86
10	Slag	72,150	322.10	10.74
11	Ash	81,789	365.13	12.17
12	Sludge	106,574,519	475,779.00	15,859.30
13	Others	3,445,714	15,382.70	512.76
Total			521,030.00	17,367.68
Generation Rate (kg/employee/day)			24.73	

Note: Total number of samples surveyed = 224
Average number of employees = 61

Table 12: Amount of Waste Generated from Non-Process Sources of Manufacturers

No	Waste Materials	Total (kg)	Average (kg/Manufacturer/ month)	Average (kg/Manufacturer/ day)
1	Aluminium cans	2,543.68	11.36	0.38
2	Cardboards	990.70	4.42	0.15
3	Glass	119.30	0.53	0.02
4	Scrap metals	13,854.68	61.85	2.06
5	Kitchen wastes	61,267.40	273.52	9.12
6	Mixed papers	7,985.30	35.65	1.19
7	Old newspapers	2,380.00	10.63	0.35
8	PET bottles	1,502.00	6.71	0.22
9	Other plastics	1,359.60	6.07	0.20
10	Steel cans	1,055.00	4.71	0.16
11	Wood pallets	381.00	1.70	0.06
12	Others	670.20	2.99	0.10
Total			420.14	14.01
Generation Rate (kg/employee/day)			0.23	

Note: Total number of samples surveyed = 224
Average number of employees = 61

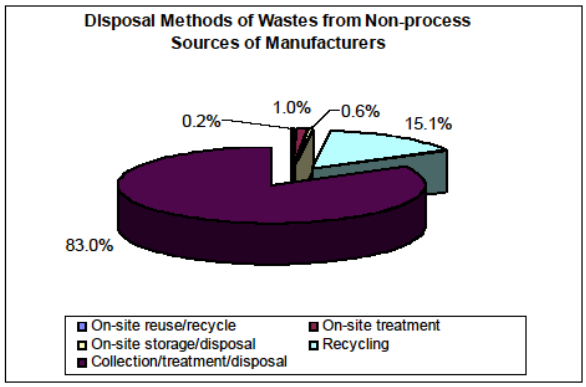


Figure 78: Disposal Methods for Wastes Generated from Non-Proces Sources of Manufacturer

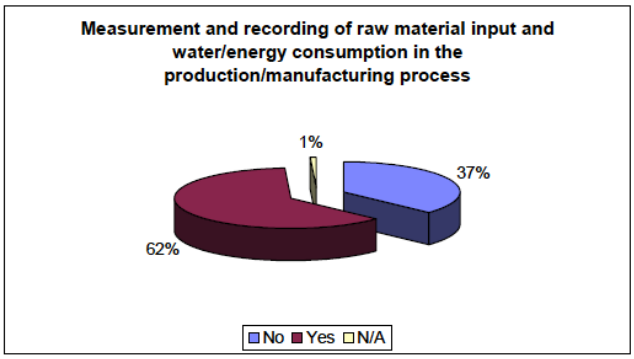


Figure 80: Measurement and Recording of Raw Material Input and Water/Energy Consumption in the Manufacturing Process

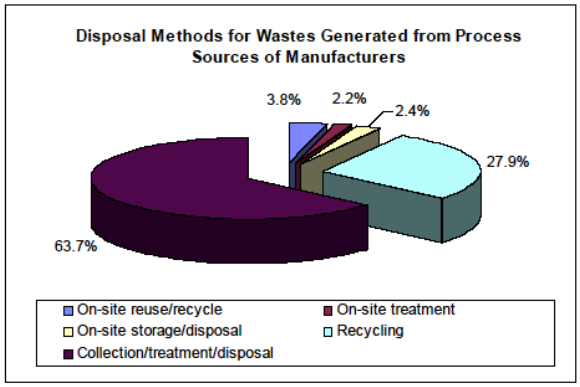


Figure 79: Disposal Methods for Wastes Generated from Process Sources of Manufacturer

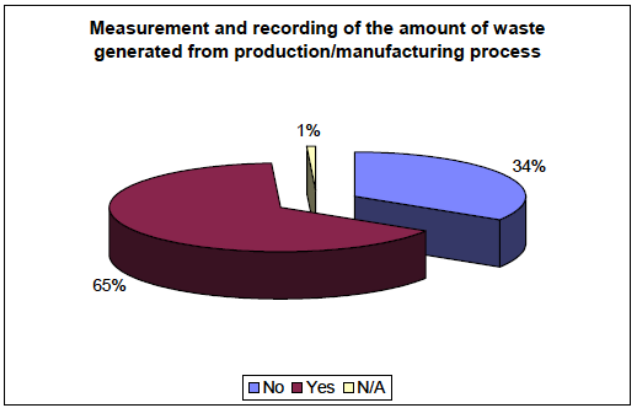


Figure 81: Measurement and Recording of the Amount of Waste Generated from Manufacturing Process

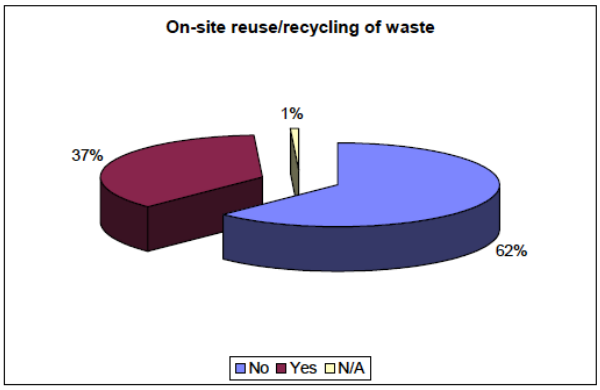


Figure 82: On-site reuse/recycling of waste

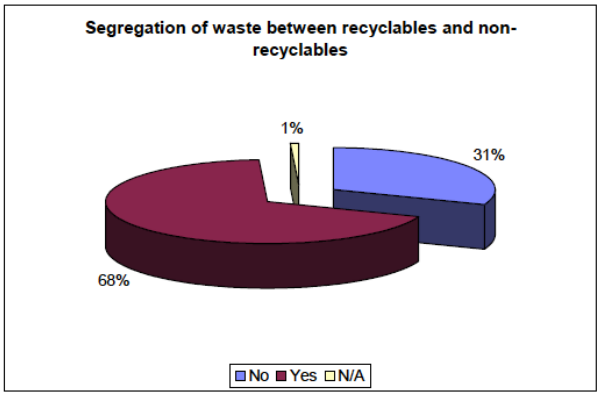


Figure 83: Segregation of Waste between Recyclables and Non-recyclables

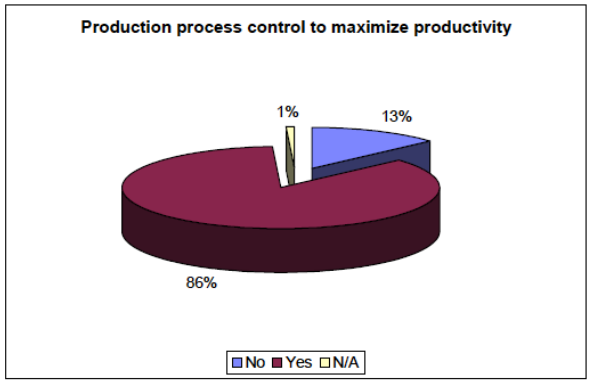


Figure 84: Production Process Control to Maximize Productivity

Summary

Table 13: Summary of the Entire Study

No	Sources	Estimated Generation Rate			
		Amount	Unit	Amount	Unit
1	Households	37.5	Kg/household /month	1.25	Kg/household /day
2	Commercial and Service Companies	133.1	Kg/company /month	4.43	Kg/company /day
3	Offices	51.8	Kg/office/month	1.73	Kg/office/day
4	Construction Companies	4,309.9	Tonnes/company /month	143.66	Tonnes/company /day
5	Manufacturers	521.0	Tonnes/m'facturer /month	17.37	Tonnes/ m'facturer /day

Note:
Estimations were based on the following numbers of samples surveyed:
1) Households – 609 samples
2) Commercial and Service Companies – 162 samples
3) Offices – 74 samples
4) Construction Companies – 88 samples
5) Manufacturers – 224 samples

Table 14: Summary of the Entire Study on Households and Business Entities

Source | ***Waste Categories and Amount Generated***

Household

Type	Quantity (kg/day)	Two Major Methods of Collection / Disposal	
		1	2
Old newspapers	0.39	Gave/Sold to door-to-door buyer	Municipal Waste Collection
Waste magazines	0.10	Gave/Sold to door-to-door buyer	Municipal Waste Collection
Other papers	0.12	Gave/Sold to door-to-door buyer	Municipal Waste Collection
Aluminium cans	0.02	Municipal Waste Collection	Gave/Sold to door-to-door buyer
Steel cans	0.03	Municipal Waste Collection	Gave/Sold to door-to-door buyer
PET bottles	0.01	Municipal Waste Collection	Gave/Sold to door-to-door buyer
Other plastic bottles	0.03	Municipal Waste Collection	Bring to recycling centers
Other plastics	0.02	Municipal Waste Collection	Bring to recycling centers
Glass bottles	0.10	Municipal Waste Collection	Gave/Sold to door-to-door buyer
Other glass	0.01	Municipal Waste Collection	Bring to recycling centers
Kitchen wastes	0.42	Municipal Waste Collection	Animal Feed
Garden wastes	-	Municipal Waste Collection	Buried
Others	0.01	Depending	Depending
TOTAL	1.26	-	-

Office

Type	Quantity (kg/day)	Two Major Methods of Collection / Disposal	
		1	2
Old newspapers	0.71	Sold / given free to recyclers / collectors	Collected by waste municipal collectors
Waste magazines	0.09	Sold / given free to recyclers / collectors	Collected by waste municipal collectors
Other papers	0.64	Sold / given free to recyclers / collectors	Collected by waste municipal collectors
Aluminium cans	0.08	Collected by waste municipal collectors	Sold / given free to recyclers / collectors
Steel cans	0.02	Collected by waste municipal collectors	Given free to recyclers / collectors
PET bottles	0.02	Collected by waste municipal collectors	Given free to recyclers / collectors
Kitchen wastes	0.06	Collected by waste municipal collectors	Given free to recyclers / collectors
Others	0.11	Depending	Depending
TOTAL	1.73	-	-

Commercial /Service

Type	Quantity (kg/day)	Two Major Methods of Collection / Disposal	
		1	2
Old Newspapers	0.73	Sold / given free to recyclers / collectors	Collected by waste municipal collectors
Waste Magazines	0.22	Sold / given free to recyclers / collectors	Others
Other Papers	1.81	Sold / given free to recyclers / collectors	Collected by waste municipal collectors
Aluminium Cans	0.06	Collected by waste municipal collectors	Sold / given free to recyclers / collectors
Steel cans	0.22	Collected by waste municipal collectors	Sold / given free to recyclers / collectors
PET bottles	0.25	Collected by waste municipal collectors	Sold / given free to recyclers / collectors
Kitchen wastes	0.52	Collected by waste municipal collectors	Others
Others	0.62	Depending	Depending
TOTAL	4.43	-	-

Construction

Type	Quantity (tonnes/day)	Two Major Methods of Collection / Disposal	
		1	2
Excess soil	41.26	Reuse for backfilling	Sent to Landfill
Concrete	3.65	Reuse for backfilling	Sent to Landfill
Asphalt-concrete	0.36	Sent to Landfill	Reuse for backfilling
Wood	0.53	Collected by waste collector	Sent to Landfill
Slurry / Sludge	96.51	Sent to Landfill	Dumped to vacant land
Mixed waste	0.50	Sent to Landfill	Collected by waste collector
Ferrous metals	0.34	Sold to recycler / buyers	Collected by waste collector
N-Ferrous metals	0.42	Sold to recycler / buyers	Collected by waste collector
Waste plastics	0.05	Collected by waste collector	Sold to recycler / buyers
Waste papers	0.03	Sold to recycler / buyers	Collected by waste collector
Asbestos	0.01	Dumped to vacant land	Others
Others	0.003	Depending	Depending
TOTAL	143.66	-	-

Manufacturers

Type	On-site			Off-site	
	Reuse/ Recycle	Treatment	Storage / Disposal	Recycling	Collection/ Treatment / Disposal
Wastes from Process Sources (Average = 521.03 tonnes/ manufacturer / month)	3.8% (19.80 tonnes / month)	2.2% (11.46 tonnes / month)	2.4% (12.50 tonnes / month)	27.9% (145.37 tonnes / month)	63.7% (331.90 tonnes /month)
Wastes from Non-process Sources (Average = 420.14 kg/ manufacturer / month)	0.2% (0.84kg/month)	1.0% (4.20kg/month)	0.6% (2.52kg/month)	15.1% (63.44kg/month)	83.0% (348.72kg/month)

7.3 Survey on Material Flow of Recyclables

1. The Objective of the Survey

The objective of the survey is to determine the flow of selected recyclable materials in Malaysia at each stage from generation, collection, trading, recycling and disposal. The existing practices and involvements of private companies, NGOs, CBOs and other organisations were also identified.

The main task of doing the surveys was to identify the types of recyclable materials currently being collected by each respective recycling player, the buying prices, selling prices etc. Information obtained from each respondent was used to track and trace the flow of the recyclable materials from one point to another as far as possible.

2. Survey Areas

The survey was conducted to determine the flow of recyclable materials at macro levels or at larger scale and hence areas with large number of population and industrial premises were selected for the survey.

Initially, the JICA Study Team selected four (4) areas in Peninsular Malaysia for the survey i.e.:

1) Shah Alam – to represent the Central region
2) Kuantan – to represent the Eastern region
3) Pulau Pinang – to represent the Northern region
4) Johor Bahru – to represent the Southern region

However, due to poor response and hence the number of samples collected were very small, the survey was expanded to other nearby areas such as the whole Klang Valley including Kuala Lumpur, Seberang Prai, Alor Setar, Sungai Petani, Sekudai etc. This countermeasure was taken to achieve a total number of samples to 400 as required by the JICA Study Team.

For Sabah and Sarawak, the survey was also carried out in about the same time as in Peninsular Malaysia. Cities that were selected for the survey are as follows:

1) Kuching, Miri and Sibu – to represent Sarawak
2) Kota Kinabalu and Sandakan – to represent Sabah

Table 3-1 Selected Survey Areas

No.	Regions	Cities
1	Southern	Johor Bahru, Sekudai
2	Northern	Pulau Pinang, Seberang Prai, Alor Setar, Sungai Petani
3	Central	Kuala Lumpur, Klang Valley
4	Sarawak	Miri, Sibu, Kuching
5	Sabah	Kota Kinabalu, Sandakan

3. Survey Approach/Methodology

(1) Interview Surveys

Primary data collection was carried out by interviewing the respondents using the questionnaire forms provided by the JICA Study Team (See Appendix A for the samples of the questionnaire forms).

There are 4 types of questionnaires used for different targets, namely:

a) Questionnaire for scavengers, waste pickers, street collectors etc.

b) Questionnaire for recycling centres (buy back and drop off centres)

c) Questionnaire for traders, middlemen, junkshops of recyclable materials

d) Questionnaire for recycling industries or any industry that uses recyclable materials in their production

Information collected and report for the survey was based on the questions in the questionnaires. However, information was also collected through informal communication and discussions with the respondents.

(2) Recycling Players Targeted

The recycling players targeted in this survey are as follows:

- The primary collectors (scavengers, waste pickers, street collectors etc.)
- The recycling centres (buy back and drop off centres)
- Traders
- Middlemen
- Junkshops of recyclable materials and recycling industries

In addition, some associations of manufacturers were also visited, and they are as follows:

a) Pulp and Paper Association of Malaysia

b) Malaysia Plastic Manufacturers Association (MPMA)

c) Glass Manufacturers Association of Malaysia

At the initial stage, places such as local authorities and some known recycling centres were visited for gathering information on the other recycling players in the markets. Based on the information given and some surveys done on primary collectors such as scavengers at landfill sites and street collectors etc., the surveys were then be extended to more wide coverage areas to determine more recycling players especially the middlemen and traders until the recycling industries where the recyclable materials are finally sold.

The total number of samples required in this survey is 400 samples covering all variety of recycling players at the survey areas.

(3) Recyclable Materials Targeted

There are five (5) main categories of recyclable materials that were focussed in this survey, i.e.: plastics, glass, paper, ferrous metals and non-ferrous metals. However, the flows for other materials identified such as scrap computers, used batteries, used tyres, food wastes, electronic wastes etc. were also investigated.

(4) Data Entry and Analysis

Primary data collected by using the questionnaire was compiled in both soft and hard copies. Data in softcopies were formatted in Microsoft Excel and analysis was done based on both information gathered in the questionnaires as well as informal discussions made with the respondents.

4. Results

The field survey for the surveys of questionnaires was completed on 15 December 2004 when the total number of questionnaires obtained has achieved 400 samples. The distribution of the number of questionnaires done by survey area is summarised in Table 3-2.

Table 3-2 Summary of the Types and Number of Samples by Areas

	KL/SLG	PP	JH	KTN	SRW	SBH	TOTAL
Street Collector/Scavengers/Waste Pickers etc.	29	21	32	12	20	17	131
Recycling/Buy Back Centres	17	29	2	4	28	4	84
Traders/Middle-men/Junkshops	56	35	20	14	31	7	163
Recycling Industries	6	6	1	1	7	1	22
TOTAL	108	91	55	31	86	29	400

Note: KL/SLG - Kuala Lumpur & Selangor; PP - Pulau Pinang; JH - Johor, KTN - Kuantan; SRW - Sarawak; SBH - Sabah

Based on the information obtained from the questionnaires as well as field observations on the existing recycling activities in the survey areas, detailed analysis was carried out to determine the current situations of recycling in the survey areas, including the existing recycling practices, the recycling players, major recyclable materials being collected, the prices of the recyclable materials and finally the material flows of the recyclable materials.

(1) Existing Recycling Practices

a. Generation at Sources

For recyclable materials generated from households, the amount and compositions are generally similar but depending on the types of houses, number of households, income levels etc. Based on the results from the other survey on waste compositions at different household income levels, the overall composition of recyclable materials generated from households are summarised in Table 3-3.

Table 3-3 The Average of Recyclable Materials Generated at Households

	High Income	Medium Income	Low Income	Average (%)
Major recyclable materials				
Mixed paper	16.34	20.09	14.84	17.09
Mixed plastic	7.98	9.51	9.72	9.07
Glass	3.4	4.33	3.41	3.71
Ferrous metals	1.25	1.81	1.76	1.60
Non-ferrous metals	0.005	0.05	0.00	0.02
Aluminium	0.52	0.47	0.13	0.37
Sub-total	29.50	36.25	29.85	31.86
Batteries	0	0.04	0.06	0.03
Electrical & Electronics	0.08	0.02	0.43	0.18
Sub-total	0.08	0.06	0.49	0.21
Others	70.42	63.69	69.66	67.93
Total	100	100	100	100

Note: Others include mainly food wastes, yard wastes etc

b. Recycling Industries

Generally, most of the recyclable materials currently being collected in the markets are finally sent to domestic recycling industries or industries that use some recyclables as part of their manufacturing processes. This includes the industries for plastics, papers and carton boxes (cardboards), iron and steels, non-ferrous metals such as aluminium cans and coppers etc. The products that are manufactured are summarised in Table 3-4 as follows:

Table 3-4 Products Manufactured from Recycling Industries

No	Recyclable Materials	Products
1	Waste papers	Recycled papers, tissue papers, handicrafts
2	Waste carton boxes	Recycled carton boxes, handicrafts
3	Old newspapers	Recycled pencils, newspapers, handicrafts
4	Waste plastics	Recycled plastic resin, other plastic products
5	Scrap irons and steels	Recycled irons and steels
6	Scrap aluminium	Aluminium cans
7	Waste glass bottles	Glass bottles (reuse or recycling)
8	Expired food (bread)	Dried food (bread), animal feed
9	Waste candles	Recycled candles
10	Old clothes	Handicrafts

(2) Major Recyclable Materials and the Prices

The prices obtained from the survey are summarised in Table 3-3 below in order to make a comparison of price range for recyclable materials at different levels of recycling. It is clearly shown in the table that there is a big range for the selling price of each different recyclable material in the markets.

Table 3-3 Comparison of Price Range for Recyclable Materials at Different Levels of Recycling

No	Recyclable Materials	Selling Prices		
		Primary Collectors	Recycling Centres	Middlemen / Trader
1	Aluminium cans	RM0.35 - 5.50/kg	RM1.70 - 5.00/kg	RM1.50 - 5.20/kg
2	Car Batteries	RM1.00 - 3.00/Pcs	RM0.60/kg or RM5-10/pcs	RM1.75 - 13.00/pcs
3	Carton boxes (cardboards)	RM0.07 - 0.40/kg	RM0.10 - 0.85/kg	RM0.07 - 0.80/kg
4	Copper	RM1.00 - 3.20/kg	NA	RM0.85 - 9.50/kg
5	Glass Bottles	RM0.10/kg or RM0.16/pc	RM0.03 - 0.25/kg	RM0.05 - 3.00/kg
6	Other Papers	RM0.10 - 0.30/kg	RM0.07 - 0.50/kg	RM0.09- 0.70/kg
7	Old Newspaper	RM0.10 - 0.49/kg	RM0.10 - 0.35/kg	RM0.08 - 0.42/kg
8	Paper (Computer)	RM0.20 - 0.30/kg	RM0.20 - 0.45/kg	RM0.20 - 0.60/kg
9	Paper (Pure white)	RM0.20 - 0.30/kg	RM0.20 - 0.45/kg	RM0.77 - 0.80/kg
10	Paper (Magazine Book)	RM0.20 - 0.30/kg	RM0.05 - 0.50/kg	NA
11	Waste Plastics	RM0.10 - 0.70/kg	RM0.04 - 0.90/kg	RM0.18 - 1.10/kg
12	Scrap Metals	RM0.15 - 6.00/kg	RM0.10 - 6.00/kg	RM0.18 - 7.00/kg
13	Wood Pallets	RM 0.67/kg	NA	RM1.20 - 3.00/kg
14	Stainless Steels	NA	NA	NA
15	Old Clothes	FOC	Donate or RM1.60 - 2.00/kg	Donate or RM1.20/kg
16	Ink Cartridges	FOC	RM0.30/kg	RM3.00/kg
17	Used Mattress	NA	NA	RM15/pcs
18	Used computers	NA	NA	Depending
19	Rubber	FOC	NA	RM0.30/kg
20	Old furniture	FOC	Depending	Depending
21	Used electrical appliances	RM3.00 - 20.00 /pcs	Depending	Depending
22	Candles	RM0.10/kg	RM0.80/kg	NA
23	White Foam	NA	RM0.50/kg	NA
24	Waste poly-carbonate (1st and 2nd grade)	NA	RM0.15 - 0.60/kg	NA

Note: NA - Not Available; FOC - Free of charge;
Depending - price depending on the quality and conditions of the items

Summarised Results/ Data:

Table 1: Selected Study Areas

No.	Regions	Cities
1	Southern	Johor Bahru, Sekudai
2	Northern	Pulau Pinang, Seberang Prai, Alor Setar, Sungai Petani
3	Central	Kuala Lumpur, Shah Alam, Serdang, Subang, Puchong etc.
4	Eastern	Kuantan
5	Sarawak	Miri, Sibu, Kuching
6	Sabah	Kota Kinabalu, Sandakan

Table 2: Summary of the Types and Number of Samples by Areas

	KL/SLG	PP	JH	KTN	SRW	SBH	TOTAL
Street Collector / Scavengers / Waste Pickers etc.	29	21	32	12	20	17	131
Recycling / Buy Back Centres	17	29	2	4	28	4	84
Traders / Middle-men / Junkshops	56	35	20	14	31	7	163
Recycling Industries	6	6	1	1	7	1	22
TOTAL	108	91	55	31	86	29	400

Note: KL/SLG - Kuala Lumpur & Selangor; PP - Pulau Pinang; JH - Johor, KTN - Kuantan; SRW - Sarawak; SBH - Sabah

Table 3: The Average of Recyclable Materials Generated at Households

	High Income	Medium Income	Low Income	Average %
Major recyclable materials				
Mixed paper	16.34	20.09	14.84	17.09
Mixed plastic	7.98	9.51	9.72	9.07
Glass	3.4	4.33	3.41	3.71
Ferrous metals	1.25	1.81	1.76	1.60
Non-ferrous metals	0.005	0.05	0.00	0.02
Aluminium	0.52	0.47	0.13	0.37
Sub-total	29.50	36.25	29.85	31.86
Batteries	0	0.04	0.06	0.03
Electrical & Electronics	0.08	0.02	0.43	0.18
Sub-total	0.08	0.06	0.49	0.21
Others	70.42	63.69	69.66	67.93
Total	100	100	100	100

Note: Others include mainly food wastes, yard wastes etc

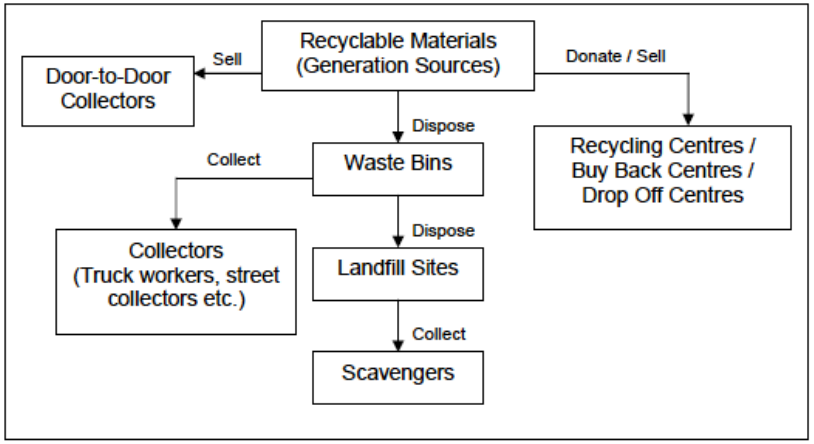


Figure 1: The Collection System of Recyclable Materials

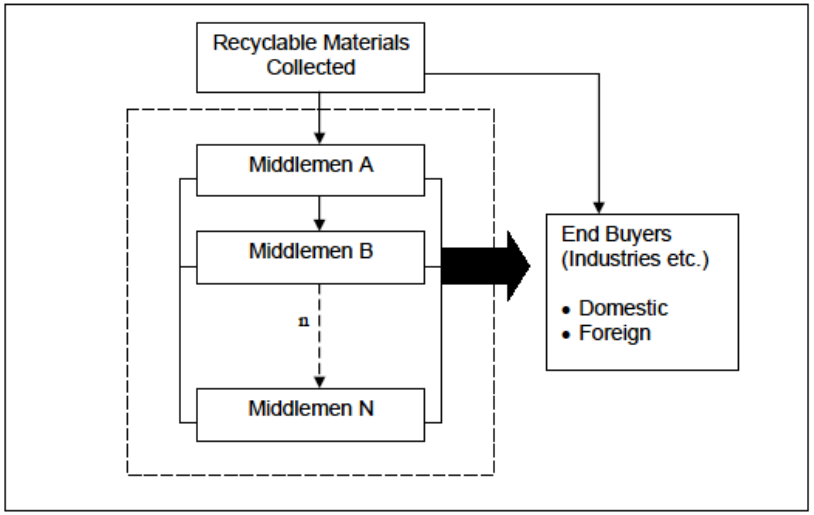


Figure 2: The Trading System of Recyclable Materials

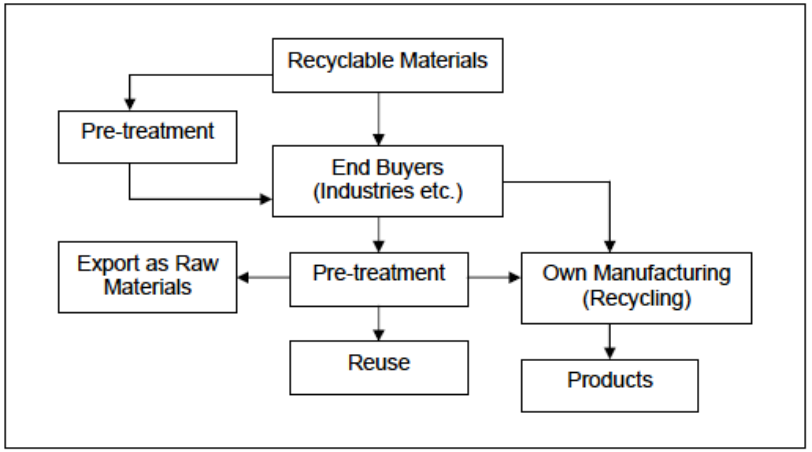


Figure 3: Reuse and Recycling of Recyclable Materials

Table 4: Range of Prices for Recyclable Materials Sold by Waste Pickers / Street Collectors / Scavengers

No	Recyclable Materials	Selling Prices
1	Aluminium cans	RM0.35 - 5.50/kg
2	Car Batteries	RM1.00 - 3.00/Pcs
3	Carton boxes (cardboards)	RM0.07 - 0.40/kg
4	Copper Wires	RM1.00 - 3.20/kg
5	Glass Bottles	RM0.10/kg or RM0.16/pc
6	Mixed Papers	RM0.10 - 0.30/kg
7	Old Newspaper	RM0.10 - 0.49/kg
8	Paper (Magazine, Book)	RM0.20 - 0.30/kg
9	Paper (Computer)	RM0.20 - 0.30/kg
10	Mixed Plastics	RM0.10 - 0.70/kg
11	Scrap Metals	RM0.15 - 6.00/kg
12	Used Electrical	RM3.00 - 20.00 /pcs
13	Wood Pallets	RM 0.67/kg

Table 5: Buying and Selling Price Range of Recyclable for Recycling Centres

No	Recyclable Materials	Buying Prices	Selling Prices
1	Aluminium cans	RM1.00 - 3.30/kg	RM1.70 - 5.00/kg
2	Car Batteries	RM1.00 - 4.00/pcs	RM0.60/kg or RM5-10/pcs
3	Carton boxes (cardboards)	RM0.04 - 0.80/kg	RM0.10 - 0.85/kg
4	Glass Bottles	RM0.02 - 0.05/kg	RM0.03 - 0.05/kg
5	Mixed Papers	RM0.04 - 0.35/kg	RM0.07 - 0.50/kg
6	Old Newspaper	RM0.05 - 0.20/kg	RM0.10 - 0.35/kg
7	Paper (Computer)	RM0.10 - 0.30/kg	RM0.20 - 0.45/kg
8	Paper (Magazine, Book)	RM0.15/kg	RM0.05 - 0.50/kg
9	Mixed Plastics	RM0.03 - 0.40/kg	RM0.04 - 0.90/kg
10	Scrap Metals	RM0.08 - 0.50/kg	RM0.10 - 0.70/kg
11	Wood Pallets	RM1.00 - 2.50/kg	Unknown
12	Candles	RM0.10/kg	RM0.80/kg
13	Old Clothes	FOC	RM1.60 - 2.00/kg
14	Ink Cartridges	FOC	RM0.30/kg
15	White Foam	FOC	RM0.50/kg
16	Waste polycarbonate (1st grade)	Unknown	RM0.60/kg
17	Waste polycarbonate (2nd grade)	Unknown	RM0.15/kg
18	Rubber	RM0.10/kg	Unknown
19	Old furniture	FOC	Depending
20	Used electrical appliances	FOC	Depending

Note:
1) *The buying prices shown are prices of recyclable materials collected mainly by the buy back centres since there are some recycling centres that are operating on charity with all materials collected with FOC.*
2) *Out of 84 recycling / buy back centres surveyed, 51 are collecting recyclable materials on FOC basis, 33 are paying for the recyclable materials.*

Table 6: Buying and Selling Price Range of Recyclable for Traders / Junkshops / Middlemen

No	Recyclable Materials	Buying Prices	Selling Prices
1	Aluminium cans	RM1.10 - 5.50/kg	RM1.50 - 5.20/kg
2	Car Batteries	RM1.50 - 10.00/pcs	RM1.75 - 13.00/pcs
3	Carton boxes (cardboards)	RM0.02 - 0.33/kg	RM0.07 - 0.80/kg
4	Copper	RM1.50 - 9.00/kg	RM0.85 - 9.50/kg
5	Glass Bottles	RM0.05 - 0.20/kg	RM0.05 - 3.00/kg
6	Mixed Papers	RM0.04 - 0.50/kg	RM0.09- 0.70/kg
7	Old Newspaper	RM0.04 - 0.33/kg	RM0.08 - 0.42/kg
8	Paper (Computer)	RM0.10 - 0.60/kg	RM0.20 - 0.60/kg
9	Paper (Pure white)	RM0.60 - 0.83/kg	RM0.77 - 0.80/kg
10	Paper (Magazine, Book)	RM0.15 - 0.20/kg	Unknown
11	Mixed Plastics	RM0.10 - 1.20/kg	RM0.18 - 1.10/kg
12	Scrap Metals	RM0.08 - 6.50/kg*	RM0.18 - 0.90/kg
13	Wood Pallets	RM1.00 - 2.50/kg	RM1.20 - 3.00/kg
14	Stainless Steels	RM0.20 - 4.80/kg	Unknown
15	Old Clothes	FOC or RM0.20 - 3.00/kg	Donate or RM1.20/kg
16	Ink Cartridges	Unknown	RM3.00/kg
17	Used Mattress	RM10/pcs	RM15/pcs
18	Used computers	RM5.00 - 40.00/pcs	Depending
19	Rubber	Unknown	RM0.30/kg
20	Old furniture	FOC	Depending
21	Used electrical appliances	FOC	Depending

Note:
** The high upper range price of scrap metals is due to the mixed scrap metals reported including the copper, stainless steels etc.*

Table 7: Comparison of Price Range for Recyclable Materials at Different Levels of Recycling

No	Recyclable Materials	Selling Prices		
		Primary Collectors	Recycling Centres	Middlemen / Trader
1	Aluminium cans	RM0.35 - 5.50/kg	RM1.70 - 5.00/kg	RM1.50 - 5.20/kg
2	Car Batteries	RM1.00 - 3.00/Pcs	RM0.60/kg or RM5-10/pcs	RM1.75 - 13.00/pcs
3	Carton boxes (cardboards)	RM0.07 - 0.40/kg	RM0.10 - 0.85/kg	RM0.07 - 0.80/kg
4	Copper	RM1.00 - 3.20/kg	NA	RM0.85 - 9.50/kg
5	Glass Bottles	RM0.10/kg or RM0.16/pc	RM0.03 - 0.25/kg	RM0.05 - 3.00/kg
6	Other Papers	RM0.10 - 0.30/kg	RM0.07 - 0.50/kg	RM0.09- 0.70/kg
7	Old Newspaper	RM0.10 - 0.49/kg	RM0.10 - 0.35/kg	RM0.08 - 0.42/kg
8	Paper (Computer)	RM0.20 - 0.30/kg	RM0.20 - 0.45/kg	RM0.20 - 0.60/kg
9	Paper (Pure white)	RM0.20 - 0.30/kg	RM0.20 - 0.45/kg	RM0.77 - 0.80/kg
10	Paper (Magazine Book)	RM0.20 - 0.30/kg	RM0.05 - 0.50/kg	NA
11	Waste Plastics	RM0.10 - 0.70/kg	RM0.04 - 0.90/kg	RM0.18 - 1.10/kg
12	Scrap Metals	RM0.15 - 6.00/kg	RM0.10 - 6.00/kg	RM0.18 - 7.00/kg
13	Wood Pallets	RM 0.67/kg	NA	RM1.20 - 3.00/kg
14	Stainless Steels	NA	NA	NA
15	Old Clothes	FOC	Donate or RM1.60 - 2.00/kg	Donate or RM1.20/kg
16	Ink Cartridges	FOC	RM0.30/kg	RM3.00/kg
17	Used Mattress	NA	NA	RM15/pcs
18	Used computers	NA	NA	Depending
19	Rubber	FOC	NA	RM0.30/kg
20	Old furniture	FOC	Depending	Depending
21	Used electrical appliances	RM3.00 - 20.00 /pcs	Depending	Depending
22	Candles	RM0.10/kg	RM0.80/kg	NA
23	White Foam	NA	RM0.50/kg	NA
24	Waste poly-carbonate (1st and 2nd grade)	NA	RM0.15 - 0.60/kg	NA

Note: NA - Not Available; FOC - Free of charge;
Depending - price depending on the quality and conditions of the items

Table 8: Typical Selling Price for Major Recyclable Materials at Different Levels of Recycling

No	Recyclable Materials	Selling Prices		
		Primary Collectors	Recycling Centres	Middlemen / Trader
1	Aluminium cans	RM2.50/kg	RM2.50/kg	RM3.50/kg
2	Glass Bottles	RM0.10/kg	RM0.075/kg	RM0.175/kg
3	Waste Papers	RM0.25/kg	RM0.15/kg	RM0.45/kg
4	Waste Plastics	RM0.20/kg	RM0.15/kg	RM0.25/kg
5	Scrap Metals	RM0.35/kg	RM0.10/kg	RM0.75/kg

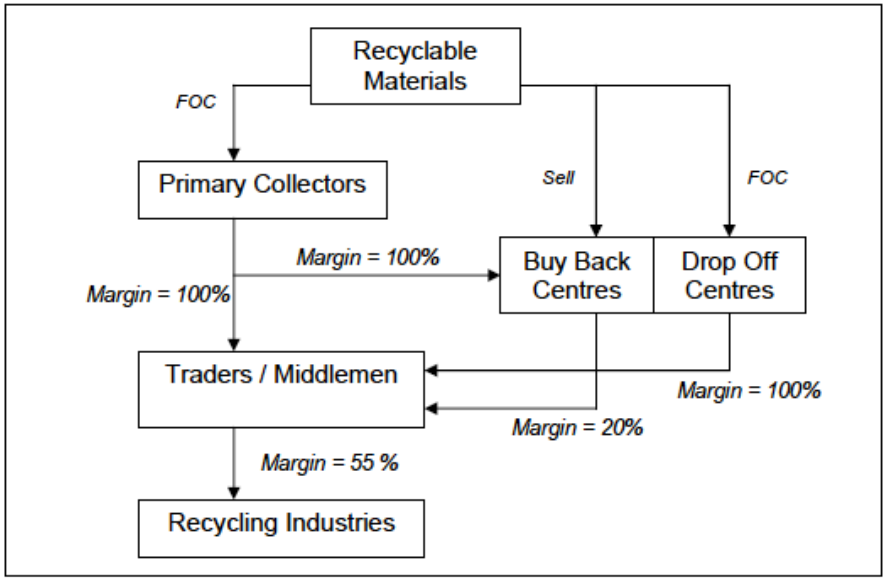


Figure 4: Profit Margins at Different Levels of Recycling

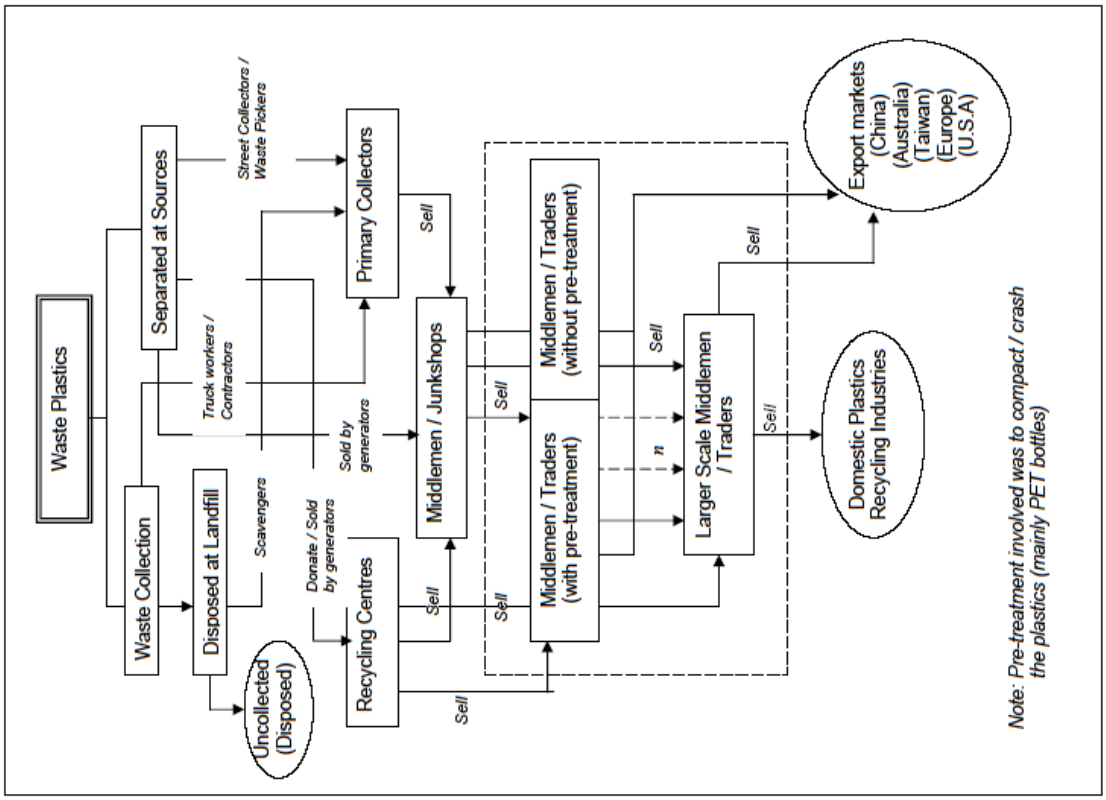


Figure 6: Material Flow for Plastics

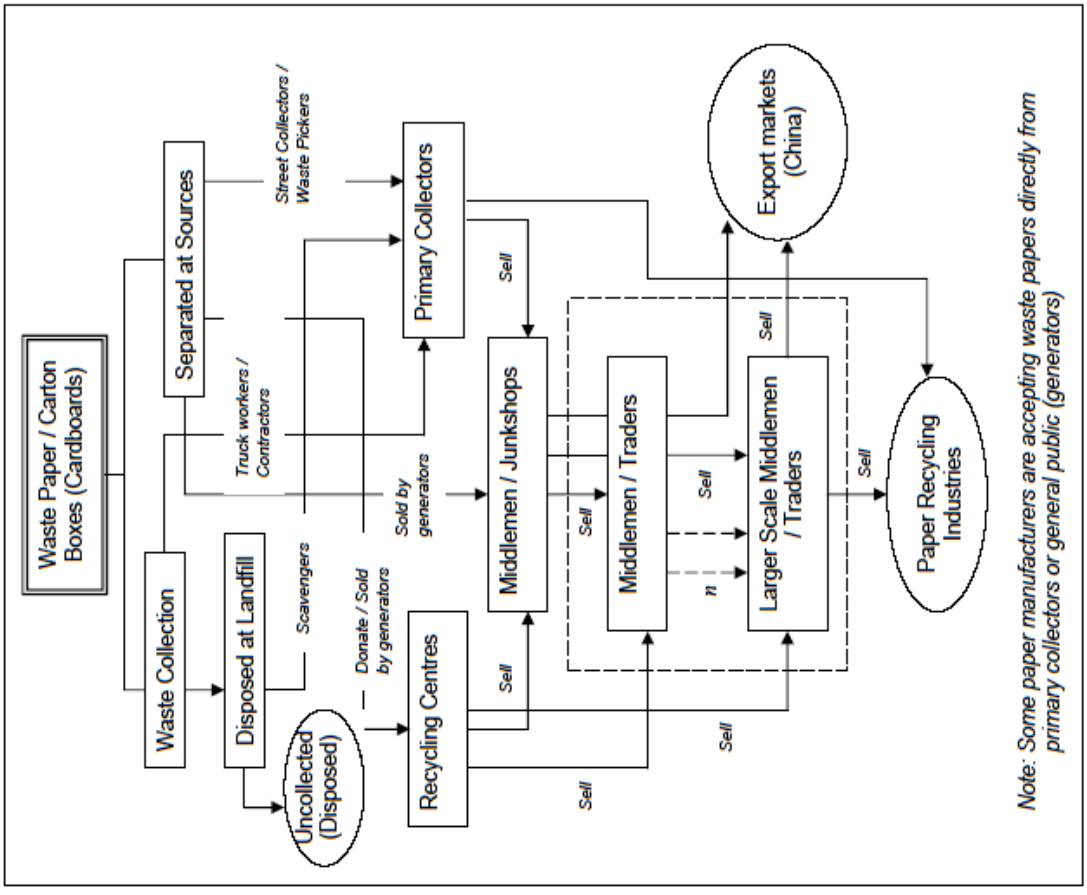


Figure 5: Material Flow for Papers and Cardboards

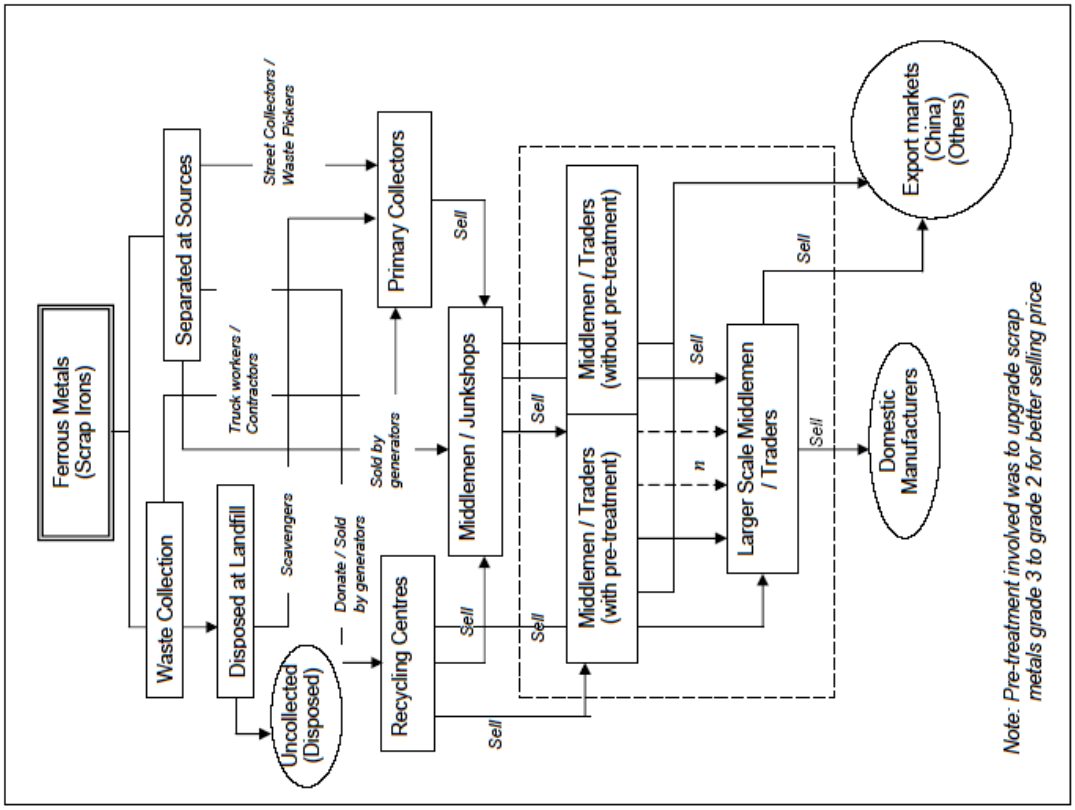


Figure 8: Material Flow for Ferrous Metals (Irons)

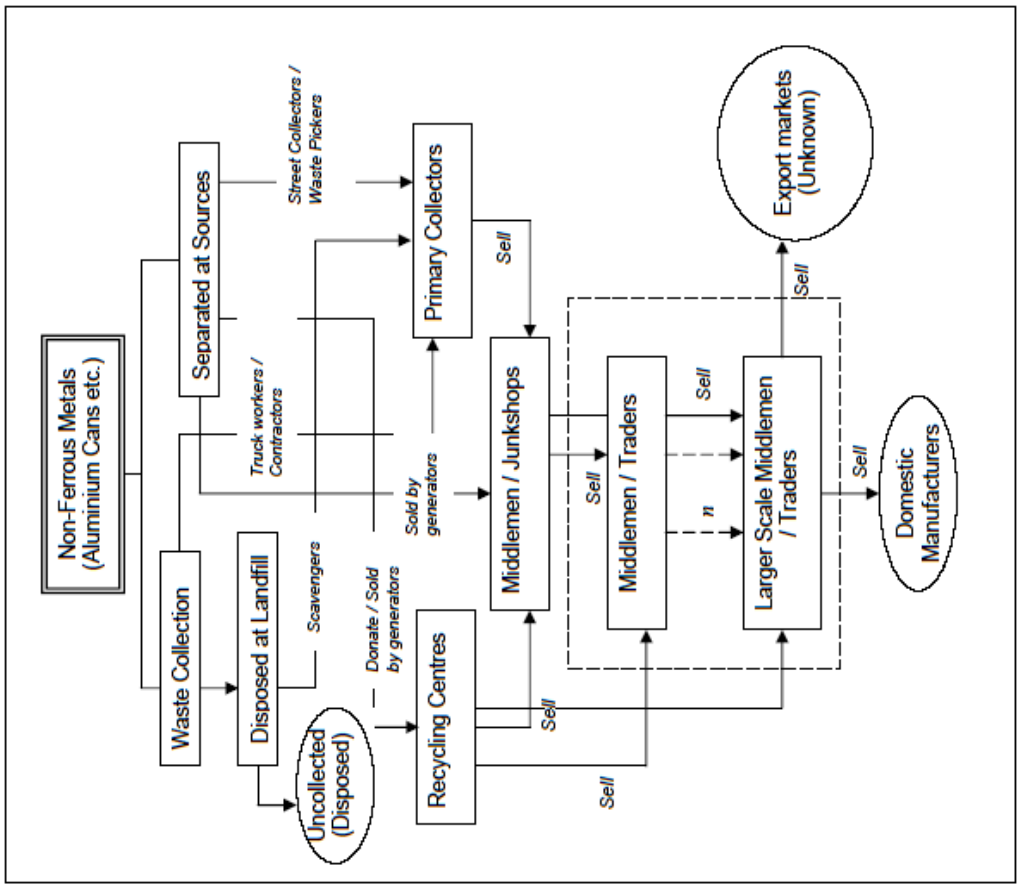


Figure 7: Material Flow for Non Ferrous Metals (Aluminium Cans etc.)

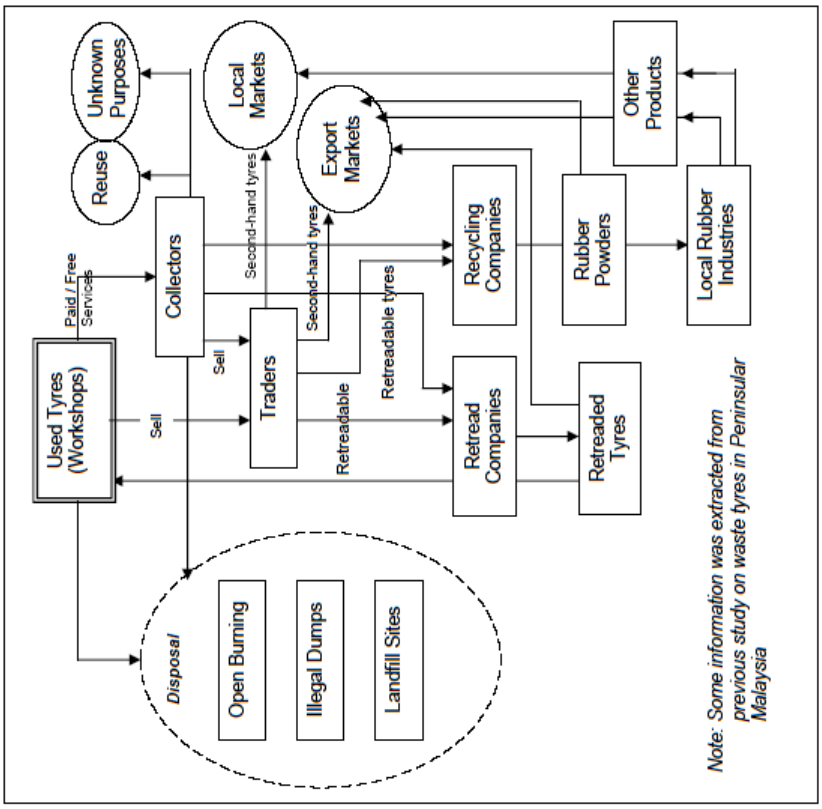


Figure 10: Material Flow for Used Tyres

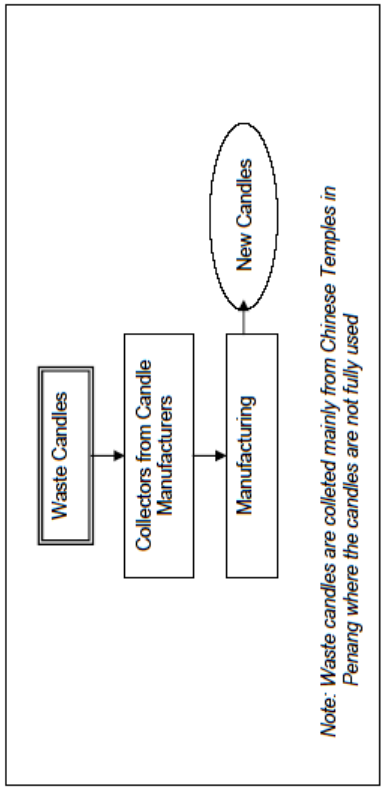


Figure 11: Material Flow for Waste Candles

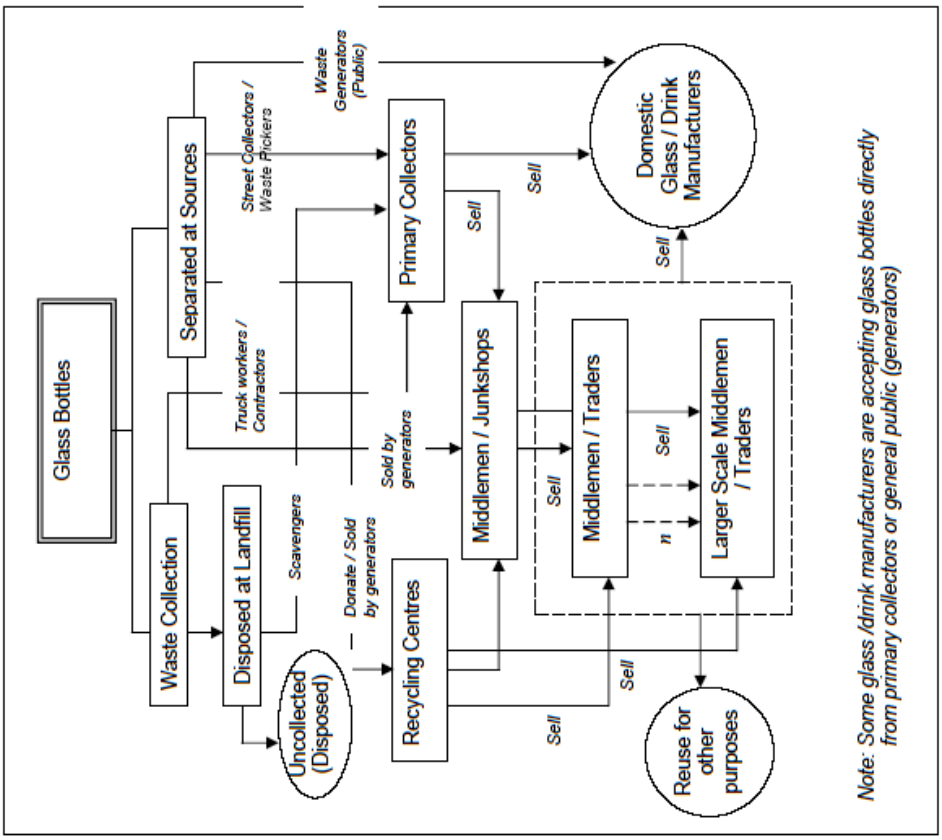


Figure 9: Material Flow for Glass Bottles

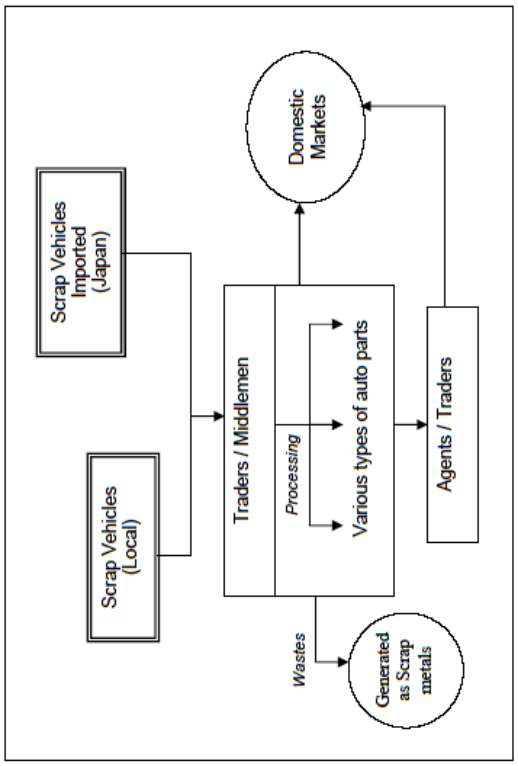


Figure 12: Material Flow for Scrap Vehicles

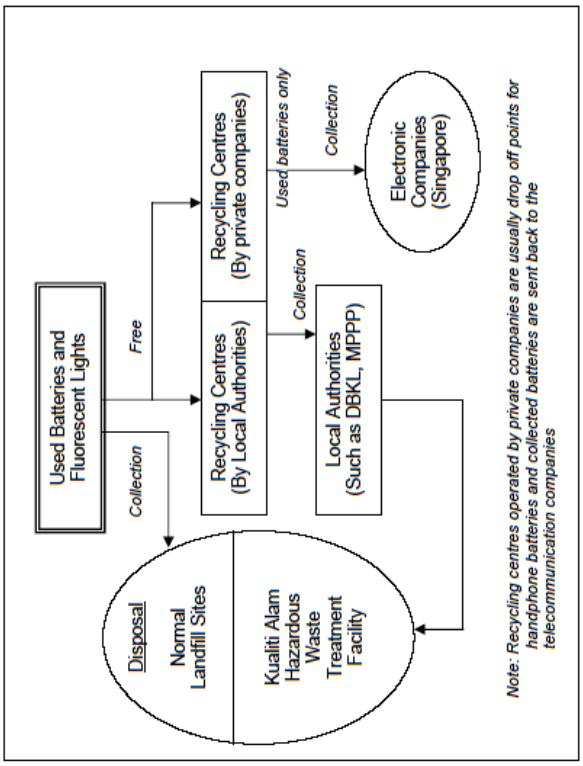


Figure 13: Material Flow for Used Batteries and Fluorescent Lights

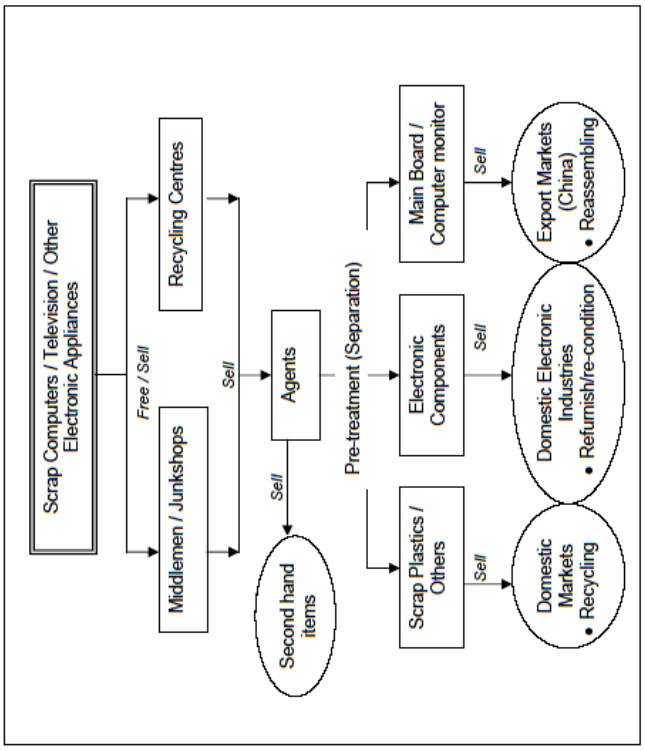


Figure 14: Material Flow for Used Computers / Television / Other Electronic Appliances

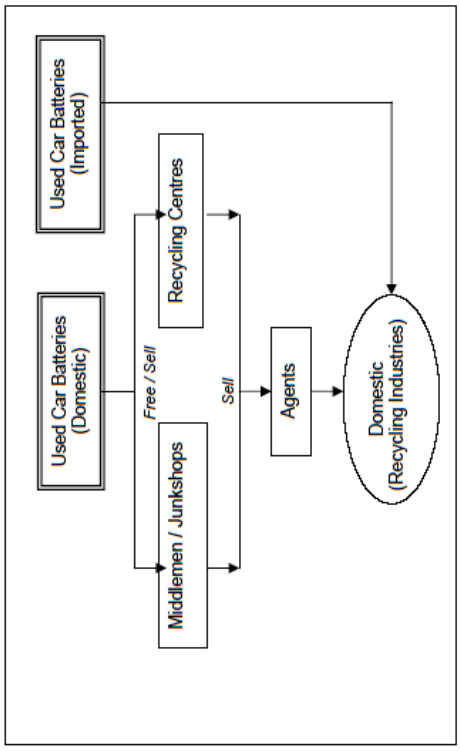


Figure 15: Material Flow for Car Batteries

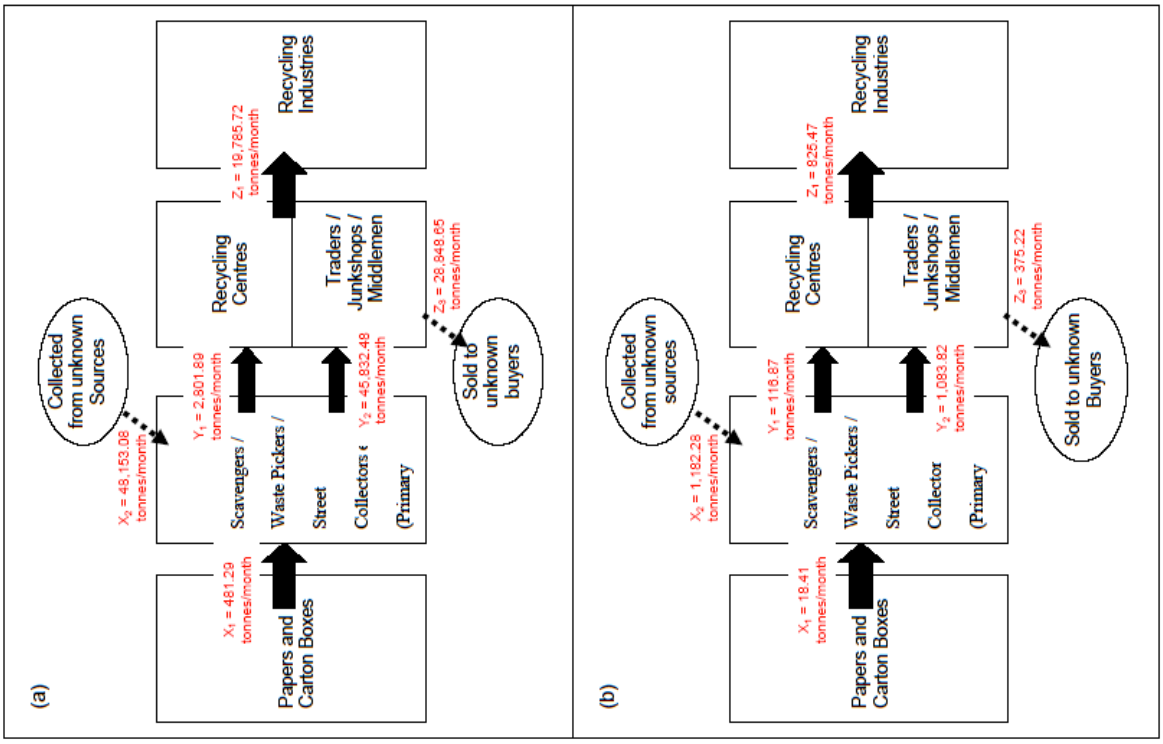


Figure 18: Mass Balance of Material Flow for Papers and Carton Boxes

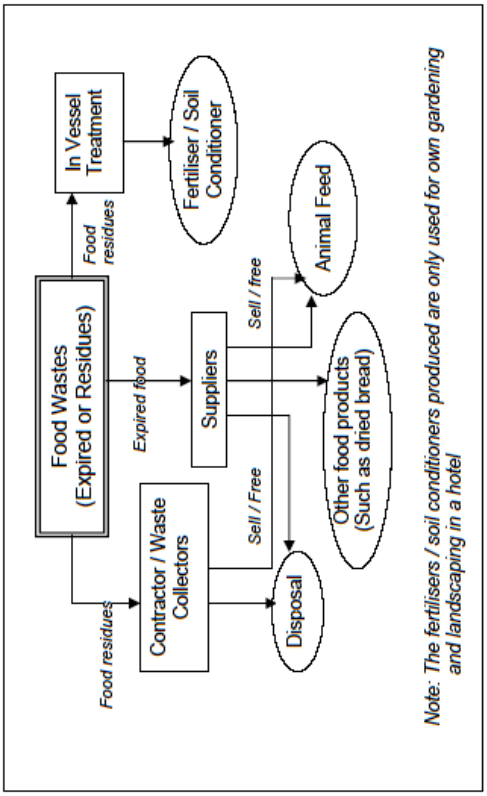


Figure 16: Material Flow for Food Wastes

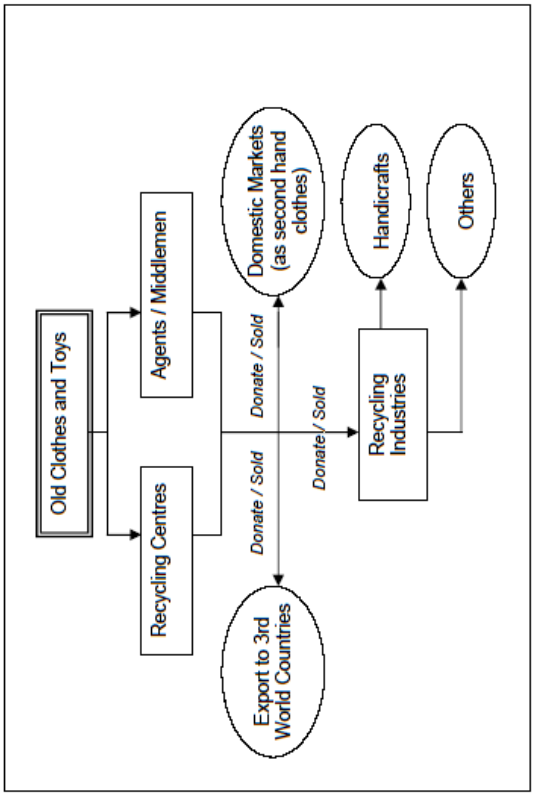


Figure 17: Material Flow for Old Clothes and Toys

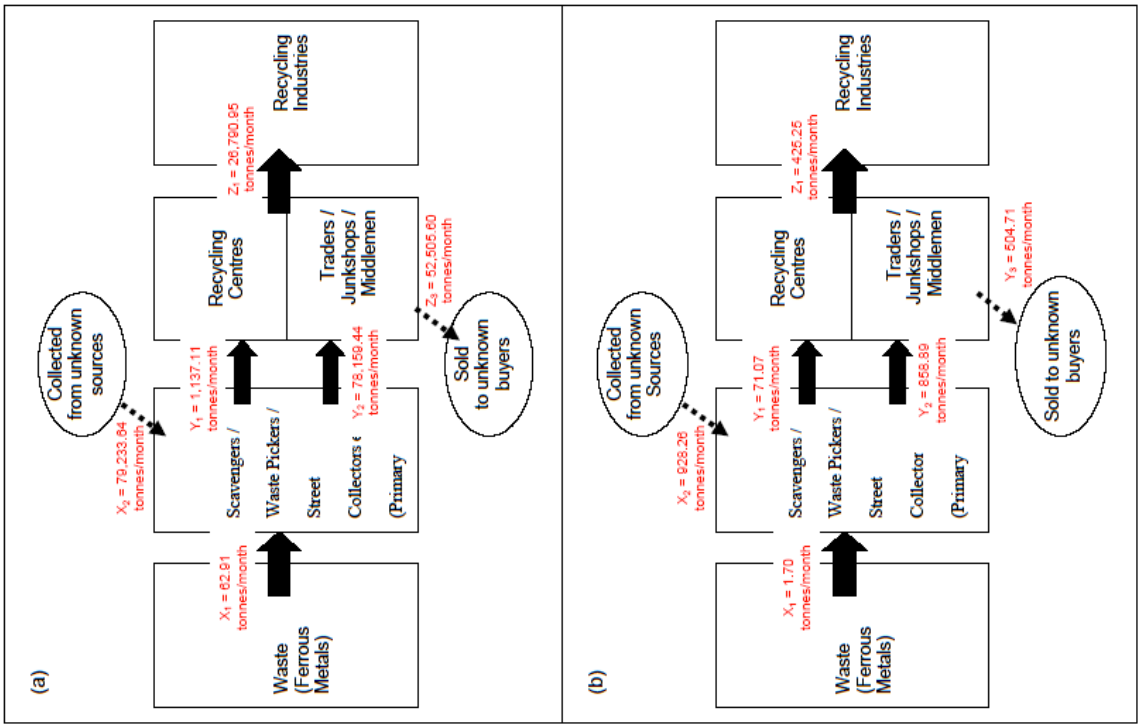


Figure 20: Mass Balance of Material Flow for Ferrous Metals (Iron)

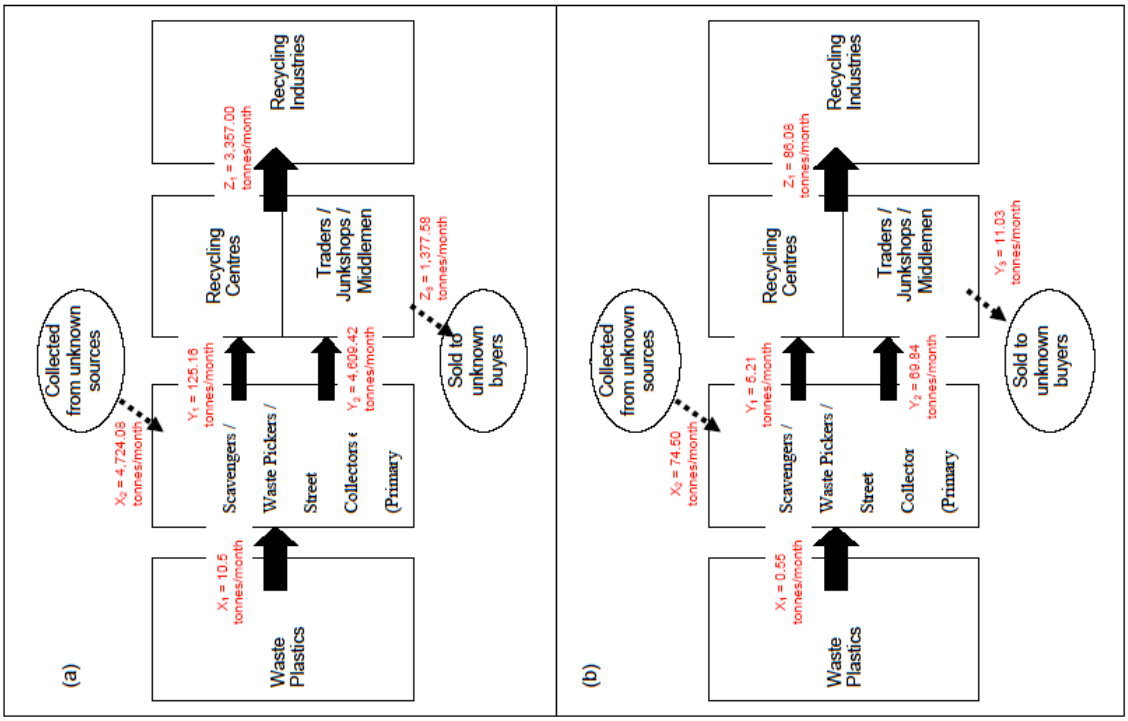


Figure 19: Mass Balance of Material Flow for Plastics

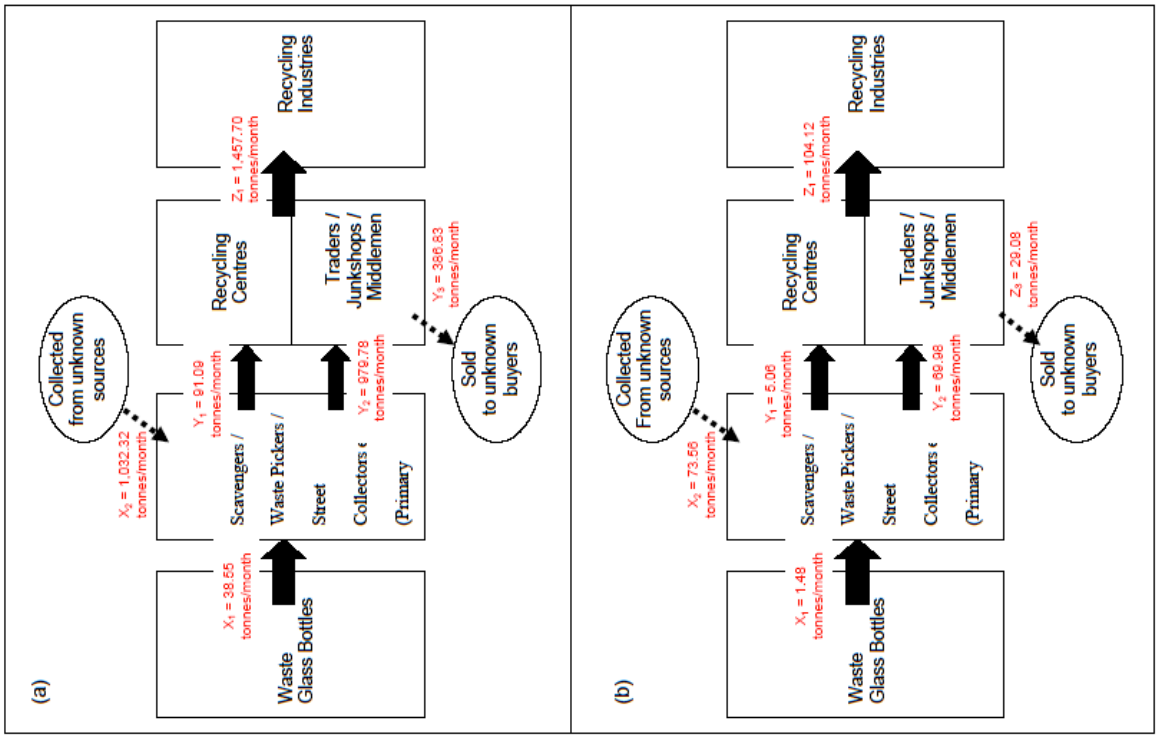


Figure 22: Mass Balance of Material Flow for Glass Bottles

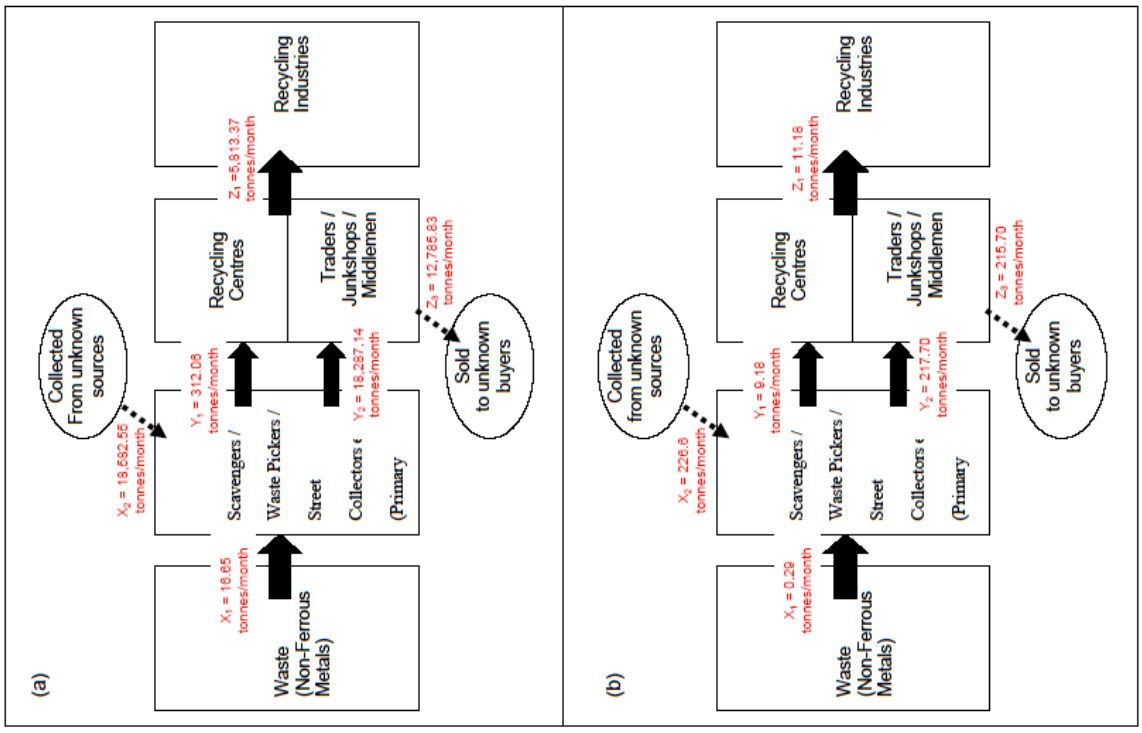


Figure 21: Mass Balance of Material Flow for Non-ferrous Metals (Aluminium cans)

7.4 Calculation of Per Capita Generation and Recycling Rate in Malaysia

a) Calculation of Waste Generation, Recovery and Disposed

In this study, field studies were carried out in the first Phase to determine some background data on per capita waste generation rate in selected areas within Kuala Lumpur areas. The waste generation rates from different sources of generation were identified including the low, medium and high income households, as well as the business entities. The results of the findings are summarised in Table 4-1 as follows:

Table 4-1 Summary Results on Per Capita Generation Rate from Phase 1 of the Study

No	Descriptions	Generation Rate (kg/cap/day)
1	Per capita Generation Rate of High/Medium Income (Households)	0.710
2	Per capita Generation Rate of Low Income (Households)	0.502
3	Per Capita Generation Rate of Business Entities	0.304
4	Average Per Capita Waste Recovery Rate	0.111

Due to the fact that the Phase 1 studies were carried out mainly in Kuala Lumpur areas, some extrapolations need to be done in order to produce figures that are more representable for the overall per capita generation rate in the country. The major concern on the results of studies carried out in Kuala Lumpur area as compared with other areas is the difference in terms of peoples' standard of living of these places, where it is assumed to directly affect the amount of solid waste generation.

Some useful information for the extrapolation was obtained from various sources as summarised below:

i) Percentage of Urban vs Rural in Malaysia:

1991 – Urban (51.05%) : Rural (48.95%)
2000 – Urban (61.99%) : Rural (38.01%)
2004 – Urban (66.86%) : Rural (33.14%)

Source: Statistic Yearbook 2004 (Department of Statistic Malaysia)

ii) Population in Malaysia (2004) : 25,580,900
Urban population (66.86%) : 17,103,390
Rural population (33.14%) : 8,477,510

Source: Statistic Yearbook 2004 (Department of Statistic Malaysia)

iii) Statistics on Expenditure:

Urban expenditure	:	RM1,943.00 per month
Rural expenditure	:	RM 1,270.00 per month
Ratio (Urban vs Rural)	:	60.47% vs 39.53%
	:	1 : 0.65

Source: Household Expenditure Survey 98/99 (Department of Statistic Malaysia)

Based on this information and results obtained from Phase 1 of the studies, estimation for the waste generation, recovery and disposal were carried with some key assumptions that:

- Waste generation rate for medium/high income areas in Phase 1 of the studies was taken to represent URBAN
- Waste generation rate for RURAL was calculated based on ration of Urban : Rural published by EPU, i.e. 1 : 0.65)
- Assuming that waste generation is proportional with level of expenditure
- Per Capita Waste Recovery Rate from se 1 of the studies was taken to represent URBAN
- Waste Recovery Rate for RURAL was assumed to be 50% of URBAN
- Waste Disposal Rate = Waste Generation Rate - Waste Retained Rate
- Assumption that the waste loss on other destinations are insignificant

Therefore, the total waste generation, recovery and disposal from households and business entities was calculated as follows:

Waste Generation:

i) For Households

Urban (per capita generation rate)	= 0.710 kg/cap/day
Rural (per capita generation rate)	= 0.710 kg/cap/day x 0.65
	= 0.464 kg/cap/day
Total wastes generated from Urban	= 17,103,390 x 0.710 kg/cap/day
	= 12,135 tones/day
Total wastes generated from Rural	= 8,477,510 x 0.464 kg/cap/day
	= 3,931 tones/day
Total wastes generated	= **16,066 tones/day**
Average per capita generation rate	= **0.628 kg/cap/day**

ii) For Business Entities

Urban (per capita generation rate)	= 0.304 kg/cap/day
Rural (per capita generation rate)	= 0.304 kg/cap/day x 0.65 = 0.198 kg/cap/day
Total wastes generated from Urban	= 17,103,390 x 0.304 kg/cap/day = 5,193 tones/day
Total wastes generated from Rural	= 8,477,510 x 0.198 kg/cap/day = 1,682 tones/day
Total wastes generated	= **6,875 tones/day**
Average per capita generation rate	= **0.269 kg/cap/day**

Based on these calculations, the total wastes generated in Malaysia was then estimated to be (16,066 + 6,875) tones/day, or **22,941 tones/day.** This is equivalent to about **0.897 kg/cap/day.**

Waste Recovery:

i) For Households

Urban (per capita recovery rate)	= 0.111 kg/cap/day
Rural (per capita recovery rate)	= 0.111 kg/cap/day x 0.5 = 0.055 kg/cap/day
Total wastes recovered from Urban	= 17,103,390 x 0.111 kg/cap/day = 1,896 tones/day
Total wastes recovered from Rural	= 8,477,510 x 0.055 kg/cap/day = 470 tones/day
Total wastes recovered	= **2,365 tones/day**
Average per capita recovery rate	= **0.092 kg/cap/day**

ii) For Business Entities

Urban (per capita recovery rate)	= 0.061 kg/cap/day
Rural (per capita recovery rate)	= 0.061 kg/cap/day x 0.5 = 0.031 kg/cap/day
Total wastes recovered from Urban	= 17,103,390 x 0.061 kg/cap/day = 1,047 tones/day
Total wastes recovered from Rural	= 8,477,510 x 0.031 kg/cap/day = 259 tones/day
Total wastes recovered	= **1,306 tones/day**
Average per capita recovered rate	= **0.051 kg/cap/day**

Based on these calculations, the total wastes recovered in Malaysia was then estimated to be (2,365+ 1,306) tones/day, or **3,671 tones/day.** This is equivalent to about **0.144 kg/cap/day.**

Waste Disposal:

i) For Households

Per capita disposal rate = (0.628 – 0.092) kg/cap/day
= **0.536 kg/cap/day**

Total wastes disposed from households = (16,066 – 2,365) tones/day
= **13,701 tones/day**

For Business Entities

Per capita disposal rate = (0.269 – 0.051) kg/cap/day
= **0.218 kg/cap/day**

Total wastes disposed from b. entities = (6,875 – 1,306) tones/day
= **5,569 tones/day**

Based on these calculations, the total wastes recovered in Malaysia was then estimated to be (13,701+ 5,569) tones/day, or **19,270 tones/day.** This is equivalent to about **0.753 kg/cap/day.**

In summary, the overall waste generation, recovery and disposal rates estimated for Malaysia are summarized in Table 4-2 as follows:

Table 4-2 Summary of Overall Waste Generation, Recovery and Disposal Rates in Malaysia

Descriptions	Unit in kg/cap/day		
	Households	B. Entities	Total
Per Capita Generation Rate	0.628	0.269	0.897
Per Capita Recovery Rate	0.092	0.051	0.144
Per Capita Disposal Rate	0.536	0.218	0.753
	Unit in tones/day		
	Households	B. Entities	Total
Total Waste Generated	16,066	6,875	22,941
Total Waste Recovered	2,365	1,306	3,671
Total Waste Disposed	13,701	5,569	19,270

b) Calculation of Existing Recycling Rate

It was found from the field studies that not all the wastes generated from sources (households and business entities) are discarded from the sources, but some of the wastes are retained at sources for other purposes including recycling. It is therefore observed that recycling activities take parts not only at recycling centres which are always the targets as far as recycling is concerned, but it happens even at the generation sources, where the wastes are directly sold as recyclables.

Therefore, two different types of recycling activities should be clearly defined, i.e. the recycling activities that are carried out under private business initiatives, and recycling activities are under public sector initiatives. The boundaries of these two different types of recycling activities can be illustrated in the overall wastes flow as shown in Figure 4-1 below.

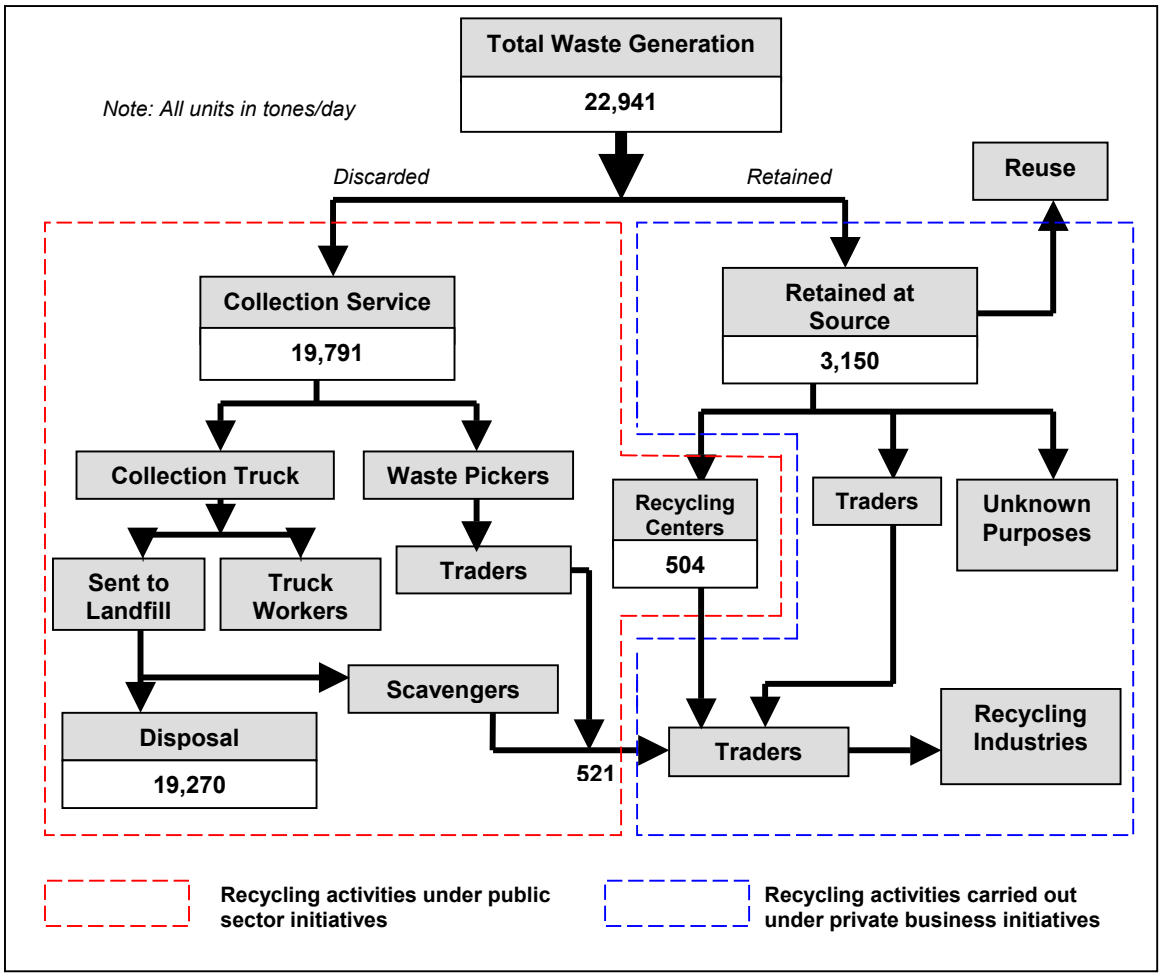


Figure- 4-1 Boundaries of Recycling Activities Carried out under Private Business and Public Sector Initiatives

The recycling activities that are under private business initiatives are difficult to be captured and these private businesses are unpredictable depending on the market price of the recyclables.

Therefore the target recycling rate is focused only on the public sector initiatives, where it covers mainly the recycling activities in recycling centres initiated not only by the government, but also the local authorities and other organisations such as charity organisations and NGOs.

The numbers shown in Figure 1 show the estimated amount of waste generated, recovered and disposed as discussed earlier. The total waste generated in Malaysia was calculated as 22,941 tones/day. Out of this total, about 3,671 tones/day of wastes were recovered, but only 1,025 tones/day was recorded as part of the recycling activities

under public sector initiatives (504 from recycling centres and 521 from waste pickers and scavengers).

The recycling rate is therefore calculated as:

The Recycling Rate	= (1,025 / 22,941) x 100%
	= 4.5%

APPENDICES

Questionnaires Used in the Survey

Appendix 1

Survey on Waste Generation / Composition and Questionnaires on Selected Households in Kuala Lumpur

AMOUNT AND COMPOSITION OF WASTE FROM HOUSEHOLDS (for Interview)

Interviewer: _____ Date: _____

I. BASIC DESCRIPTION OF RESPONDENT

1. Name: (Mr / Mrs / Ms / others (Pls. specify) _____

2. Address: _____

_____

3. Telephone : _____ **E-mail :** _____

4. Age Group : *(a)16~25 (b)26~35 (c)36~45 (d)46~55 (e)56~65 (f) more than 65*

5. Are you the head of the household: *(a) Yes (b) No*

II. HOUSEHOLD

Q1. Total number of family members living in the house _____*persons*

Q2. Household total monthly income

(a) less than RM1000 (b) RM1000~RM2000 (c) RM2001~RM3000 (d) RM3001~RM4000
(e) RM 4001~RM5001 (f) RM5001~RM7000 (g) more than RM7000

Q3. How many persons are working for your family? _____*persons*

Q4. Type of housing:

(a) Single Storey Terraced House (b) 2-3 Storey Terraced House (c) Single Storey Semi-Detached House
(d) 2-3 Storey Semi-Detached House (e) Single Storey Detached House (f) 2-3 Storey Detached House
(g) Low Cost Flats (h) Apartment / Condominium (i) Others ……...

III. HOUSEHOLD WASTE

Q5. In the past 7 days (1 week), how much waste did your household throw out? Please indicate the days and estimated amount of waste in the table below.

Date (D/M/Y)	Days	Waste thrown out (*Specify the type of waste*)	Estimated equivalent amount of waste		
			Small Bag	***Medium Bag***	***Large Bag***
	Sun	Yes☐ No☐ ( )			
	Mon	Yes☐ No☐ ( )			
	Tue	Yes☐ No☐ ( )			
	Wed	Yes☐ No☐ ( )			
	Thu	Yes☐ No☐ ( )			
	Fri	Yes☐ No☐ ( )			
	Sat	Yes☐ No☐ ( )			

Q6. Please specify the amount of recyclables produced from your house for the PAST ONE WEEK.

Items	Amount	Unit (Pls. specify)	Recycling Method
(1) Newspaper			[ ] a. Sell or give to the door-to-door collectors [ ] b. Bring to the recycling station / centre [ ] c. Waste bin (no separation) [ ] d. Others (*pls. specify*)
(2) Magazines			[ ] a. Sell or give to the door-to-door collectors [ ] b. Bring to the recycling station / centre [ ] c. Waste bin (no separation) [ ] d. Others (*pls. specify*)

Items	Amount	Unit (Pls. specify)	Recycling Method
(3) Other papers			[ ] a. Sell or give to the door-to-door collectors [ ] b. Bring to the recycling station / centre [ ] c. Waste bin (no separation) [ ] d. Others (*pls. specify*)
(4) Aluminium Can			[ ] a. Sell or give to the door-to-door collectors [ ] b. Bring to the recycling station / centre [ ] c. Waste bin (no separation) [ ] d. Others (*pls. specify*)
(5) Steel Cans water/ Soft drink bottles)			[ ] a. Sell or give to the door-to-door collectors [ ] b. Bring to the recycling station / centre [ ] c. Waste bin (no separation) [ ] d. Others (*pls. specify*)
(6) PET Bottles			[ ] a. Sell or give to the door-to-door collectors [ ] b. Bring to the recycling station / centre [ ] c. Waste bin (no separation) [ ] d. Others (*pls. specify*)
(7) Other plastic bottles			[ ] a. Sell or give to the door-to-door collectors [ ] b. Bring to the recycling station / centre [ ] c. Waste bin (no separation) [ ] d. Others (*pls. specify*)
(8) Other plastics (*pls. specify*)			[ ] a. Sell or give to the door-to-door collectors [ ] b. Bring to the recycling station / centre [ ] c. Waste bin (no separation) [ ] d. Others (*pls. specify*)
(9) Glass Bottles			[ ] a. Sell or give to the door-to-door collectors [ ] b. Bring to the recycling station / centre [ ] c. Waste bin (no separation) [ ] d. Others (*pls. specify*)
(10) Other types of glass / ceramic			[ ] a. Sell or give to the door-to-door collectors [ ] b. Bring to the recycling station / centre [ ] c. Waste bin (no separation) [ ] d. Others (*pls. specify*)
(11) Kitchen Waste			[ ] a. Put into bags/bin for municipal waste collection [ ] b. Bury in the yard [ ] c. Feed to animals (livestock / pets / others) [ ] d. Sell or give to the door-to-door collectors [ ] e. Bring to the recycling station / centre [ ] f. Others (*pls. specify*)
(12) Others (*pls. specify*)			[ ] a. Sell or give to the door-to-door collectors [ ] b. Bring to the recycling station / centre [ ] c. Waste bin (no separation) [ ] d. Others (*pls. specify*)
(13)			
(14)			
(15)			

IV. DISPOSAL AND RECYCLING METHOD

Q7. Please indicate your household disposal methods in the table below. (Please indicate **[1]** for the most frequent method, and **[2]** for the 2nd frequent method.)

Items	**Disposal and recycling methods**
(a) Car lead acid battery	[ ] a. Call up the municipal waste collection service to collect [ ] b. Sell or give to the door-to-door collectors [ ] c. Bring to the recycling station / centre [ ] d. Leave at the car repair workshop [ ] e. Others (*pls. specify:*)
(b) Small dry cell batteries and hp batteries	[ ] a. Put into bags / bin for waste collection service [ ] b. Sell or give to the door-to-door collectors [ ] c. Bring to the recycling station / centre [ ] d. Others (*pls. specify:*)
(c) Fluorescent tubes	[ ] a. Put into bags / bin for municipal waste collection [ ] b. Bury in the yard [ ] c. Sell or give to the door-to-door collectors [ ] d. Bring to the recycling station / centre [ ] g. Others (*pls. specify:*)

V. LIFESPAN OF THE ITEMS IN YOUR HOUSE

Q8. Please indicate how many of the following items you have in your house and after how many years do you usually replace the items

Items	a. Car	b. Motor bike	c. Bicycle	d. Cupboards	e. Beds	f. Chairs
No. units						
After how many years do you usually replace the items?						

Items	g. Table & Desks	h. TV sets	i. Refrigerators	j. Washing Machines	k. Air Conditioners	l. PC devices
No. units						
After how many years do you usually replace the items?						

VI. AWARENESS AND WILLINGNESS TO RECYCLE

Q9. Do you know the meaning of "*Recycling*"? *(a) Yes (b) No (c) No idea*

Q10. Have you ever seen the "*Recycling bin*"? *(a) Yes (b) No (c) No idea*

Q11. Do you participate in any recycling activity (individual basis)? *(a) Yes (b) No*

(1) If **yes**, please describe activity:

(a) Waste Separation at home/office (b) Volunteer at recycling org (c) Buy from charity shops
(d) Bring own shopping bag (e) Bring own take-away containers
(f) Operate recycling business (*pls. specify*) ……..
(g) Other activities (*pls. specify*) ……

(2) If **No**, please state reason:

(a) No time (b) Lack information (c) No recycling centre nearby (d) Not interested
(e) Monetary return too low
(f) Other reasons (*pls. specify*) ……

Q12. Are you satisfied with the present recycling system/facilities?

(a) Yes (b) No

Please give reasons: ……

……

……

……

Q13. Do you have any comment on the "Solid Waste Management" in your community?

Ans.

This is the end of questionnaire. Thank you for kind cooperation!!

Appendix 2

Survey on Waste Generation and Recycling by Business Entities and Households

Questionnaire on Business Entities (Offices)

Date		
Interviewer		
Respondent	Name	
	Position	

1. Company Profile

Name of Company			
Type of Business			
Year of Incorporation		Website	
Office Address		Phone	
		FAX	
		E-mail	
Annual Sales (Turnover)		Number of Employees	
Annual Report Provided?	☐ Yes ☐ No		

2. Current Status of Recycling Activities

2.1 Segregation of waste for recycling at your office

Do you segregate the waste at your office? If you do, specify the types and amount of the waste that are segregated.

	Types of Waste Segregated	Amount (per month)	
		Unit	Amount
1	ONP (Old Newspaper)		
2	Magazines		
3	Other waste papers		
4	Steel cans		
5	Aluminum cans		
6	PET bottles		
7	Kitchen waste		
8	Others ( )		
9	Others ( )		
10	Others ( )		

2.2 Destination of Segregated Wastes

Please specify how you deal with the segregated wastes. Please ☑ the appropriate box.

Items		Methods of Recycling
1	ONP (Old Newspaper)	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
2	Magazines	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
3	Other waste papers	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
4	Steel cans	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
5	Aluminum cans	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
6	PET bottles	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)

Items		Methods of Recycling
7	Kitchen / Pantry waste	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
8	Others (Specify)	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
9	Others (Specify)	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
10	Others (Specify)	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)

2.3 Price of Segregated Recyclables

If you sell your recyclables, please indicate the prices.

Type of recyclables		Price	
		Unit	RM
1	ONP (Old Newspaper)		
2	Magazines		
3	Other waste papers		
4	Steel cans		
5	Aluminum cans		
6	PET bottles		
7	Kitchen waste		
8	Others ( )		
9	Others ( )		
10	Others ( )		

2.4 Activities in relation to Waste Minimization and Recycling

What other waste minimization and recycling activities are carried out at your office? Please ☑

1	Reuse of mailed envelopes and/or packages	
2	Use double-sided copying and printing	
3	Use of reverse side of used papers	
4	Using re-filled or re-manufactured toner cartridge	
5	Replacing disposable cups with ceramic mugs	
6	Reducing the use of plastic bags	
7	Others (Specify)	
8	Others (Specify)	
9	Others (Specify)	

2.5 Issues in further promoting waste minimization and recycling

What are the main issues that should be addressed for further promoting waste minimization and recycling? Select the 3 most important issues.

1	Raising awareness on recycling.	
2	Establishment of clear National Guidelines and Regulations	
3	Strict enforcement of the regulations	
4	Provision of incentives	
5	More material recycling facilities required	
6	Introduction of waste collection and disposal taxes	
7	Consistent collection and buy-buck system	
8	Others (Specify)	
9	Others (Specify)	

This is the end of questionnaire. Thank you for your kind cooperation.

Questionnaire on Business Entities (Commercial & Services)

Date		
Interviewer		
Respondent	Name	
	Position	

1. Company Profile

Name of Company			
Type of Business			
Year of Incorporation		Website	
Office Address		Phone	
		FAX	
		E-mail	
Annual Sales (Turnover)		Number of Employees	
Annual Report Provided?	☐ Yes ☐ No		

2. Current Status of Recycling Activities

2.1 Segregation of waste for recycling

Do you segregate the waste at your premise? If you do, specify the types and amount of the waste that are segregated.

	Types of Waste Segregated	Amount (per month)	
		Unit	Amount
1	ONP (Old Newspaper)		
2	Magazines		
3	Other waste papers		
4	Steel cans		
5	Aluminum cans		
6	PET bottles		
7	Pantry / food waste		
8	Others ( )		
9	Others ( )		
10	Others ( )		

2.2 Destination of Segregated Wastes

Please specify how you deal with the segregated wastes. Please ☑ the appropriate box.

Items		Methods of Recycling
1	ONP (Old Newspaper)	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
2	Magazines	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
3	Other waste papers	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
4	Steel cans	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
5	Aluminum cans	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
6	PET bottles	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)

Items		Methods of Recycling
7	Pantry / food waste	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
8	Others (Specify)	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
9	Others (Specify)	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)
10	Others (Specify)	☐ Sold to the private recyclers/collectors of recyclables ☐ Taken by recyclers/collectors of recyclables without payment ☐ Brought to the nearest buy-back or drop-off center ☐ Taken by waste collection agents ☐ Others (Specify)

2.3 Price of Segregated Recyclables

If you sell your recyclables, please indicate the prices.

Type of recyclables		Price	
		Unit	RM
1	ONP (Old Newspaper)		
2	Magazines		
3	Other waste papers		
4	Steel cans		
5	Aluminum cans		
6	PET bottles		
7	Kitchen waste		
8	Others ( )		
9	Others ( )		
10	Others ( )		

2.4 Activities in relation to Waste Minimization and Recycling

What other waste minimization and recycling activities are carried out at your premise? Please ☑

1	Discourage the use of packaging materials	
2	Discourage the use of plastic bags	
3	Encourage collection of recyclables from the customers (e.g. setting up recycling bins)	
4	Segregation of recyclables at the premise	
5	Setting up buy-back center at the premise	
6	Recycling food waste	
7	Promotion on selling of the consumer goods made from recycled materials	
8	Others (Specify)	
9	Others (Specify)	
10	Others (Specify)	

2.5 Issues in further promoting waste minimization and recycling

What are the main issues that should be addressed for further promoting waste minimization and recycling? Select the 3 most important issues.

1	Raising awareness on recycling.	
2	Establishment of clear National Guidelines and Regulations	
3	Strict enforcement of the regulations	
4	Provision of incentives	
5	More material recycling facilities required	
6	Introduction of waste collection and disposal taxes	
7	Consistent collection and buy-buck system	
8	Others (Specify)	
9	Others (Specify)	

This is the end of questionnaire. Thank you for your kind cooperation.

Questionnaire on Business Entities (Construction)

Date		
Interviewer		
Respondent	Name	
	Position	

1. Company Profile

Name of Company			
Type of Business			
Year of Incorporation		Website	
Office Address		Phone	
		FAX	
		E-mail	
Annual Sales (Turnover)		Number of Employees	
Annual Report Provided?	☐ Yes ☐ No		

2. Generation & Management of Construction Waste

2.1 The amount of construction waste generated

Specify the types and amount of construction waste that are generated from your construction activities.

	Types of Waste Segregated	Amount (per month)	
		Unit	Amount
1	Excess soil		
2	Concrete waste		
3	Asphalt-concrete waste		
4	Wood waste		
5	Slurry / Sludge		
6	Mixed construction waste		
7	Scrap metals (Ferrous)		
8	Scrap metals (Non-Ferrous)		
9	Waste plastics		
10	Waste papers		
11	Asbestos		
12	Others (specify		

2.2 Treatment and disposal methods of construction waste

Please specify how you deal with the construction wastes. Please ☑ the appropriate box.

Items		Methods of Recycling
1	Excess soil	☐ Taken by recyclers/collectors ☐ Send to recyclers. ☐ Send to disposal site (landfill). ☐ Taken by waste collection agents. ☐ Re-use as backfilling materials (within the same site). ☐ Dumped on vacant land / other places ☐ Others (Specify)
2	Concrete waste	☐ Taken by recyclers/collectors ☐ Send to recyclers. ☐ Send to disposal site (landfill). ☐ Taken by waste collection agents. ☐ Re-use as backfilling materials (within the same site). ☐ Dumped on vacant land / other places ☐ Others (Specify)
3	Asphalt-concrete waste	☐ Taken by recyclers/collectors ☐ Send to recyclers. ☐ Send to disposal site (landfill). ☐ Taken by waste collection agents. ☐ Re-use as backfilling materials (within the same site). ☐ Dumped on vacant land / other places ☐ Others (Specify)
4	Wood waste	☐ Taken by recyclers/collectors ☐ Send to recyclers. ☐ Send to disposal site (landfill). ☐ Taken by waste collection agents. ☐ Burned. ☐ Dumped on vacant land / other places ☐ Others (Specify)
5	Slurry / Sludge	☐ Taken by recyclers/collectors ☐ Send to recyclers. ☐ Taken by waste collection agents. ☐ Re-use as backfilling materials (within the same site). ☐ Dumped on vacant land / other places ☐ Others (Specify)
6	Mixed construction waste	☐ Taken by recyclers/collectors ☐ Send to recyclers. ☐ Send to disposal site (landfill). ☐ Taken by waste collection agents. ☐ Burned. ☐ Dumped on vacant land / other places ☐ Others (Specify)

Items		Methods of Recycling
7	Scrap metals (Ferrous)	☐ Taken by recyclers/collectors ☐ Send to recyclers. ☐ Send to disposal site (landfill). ☐ Taken by waste collection agents. ☐ Dumped on vacant land / other places ☐ Others (Specify)
8	Scrap metals (Non-Ferrous)	☐ Taken by recyclers/collectors ☐ Send to recyclers. ☐ Send to disposal site (landfill). ☐ Taken by waste collection agents. ☐ Dumped on vacant land / other places ☐ Others (Specify)
9	Waste plastics	☐ Taken by recyclers/collectors ☐ Send to recyclers. ☐ Send to disposal site (landfill). ☐ Taken by waste collection agents. ☐ Dumped on vacant land / other places ☐ Others (Specify)
10	Waste papers	☐ Taken by recyclers/collectors ☐ Send to recyclers. ☐ Taken by waste collection agents. ☐ Burned. ☐ Dumped on vacant land / other places ☐ Others (Specify)
11	Asbestos	☐ Taken by licensed waste collection agents. ☐ Dumped on vacant land / other places ☐ Others (Specify)
12	Others (specify	☐ Taken by recyclers/collectors ☐ Send to recyclers. ☐ Send to disposal site (landfill). ☐ Taken by waste collection agents. ☐ Re-use as backfilling materials (within the same site). ☐ Burned. ☐ Dumped on vacant land / other places ☐ Others (Specify)

2.3 Price of Recyclables

If you sell your recyclables, please indicate the prices.

Type of recyclables		Price	
		Unit	RM
1	Excess soil		
2	Concrete waste		
3	Asphalt-concrete waste		
4	Wood waste		
5	Slurry / Sludge		
6	Mixed construction waste		
7	Scrap metals (Ferrous)		
8	Scrap metals (Non-Ferrous)		
9	Waste plastics		
10	Waste papers		
11	Asbestos		
12	Others (specify		

2.4 Collection and disposal fees

If you use the disposal services of the 3rd party contractors, please specify the charges for collection and disposal.

Items	Charges		Remarks
	Unit	RM	
Collection			
Disposal			

This is the end of questionnaire. Thank you for your kind cooperation.

Questionnaire on Business Entities (Manufacturing Factory)

Date		
Interviewer		
Respondent	Name	
	Position	

1. Company Profile

Name of Company			
Type of Business			
Year of Incorporation		Website	
Office Address		Phone	
		FAX	
		E-mail	
Annual Sales (Turnover)		Number of Employees	
Annual Report Provided?	☐ Yes ☐ No		

2. Baseline Data of the Factory

2.1 Types and amount of production output

Please specify the types and amount of production output in your factory.

	Types of Products	Production Output (per month)	
		Unit	Amount
1			
2			
3			
4			
5			
6			
7			
8			

2.2 Types and amount of raw materials used

Please specify the types and amount of raw and processed materials input in your factory

	Type	Usage/Purpose	Amount (Tonnes/month)
1			
2			
3			
4			
5			
6			
7			
8			

2.3 Water consumption

Please specify the amount of water consumed in your factory by following purposes.

	Purpose	Water consumption (m^3/month)	Cost of Water Consumption (RM/month)
1	Industrial Use (Process Water)		
2	Others		

2.4 Energy consumption

Please specify the types and amount of energy resources used in your factory.

	Type	Monthly Consumption	
		Unit	Amount
1	Electricity	KWH	
2	Solid fuels (Coal, Coke, Peat, etc.)		
3	Liquid fuels (Oil and other petroleum products)		
4	Gaseous fuels (Natural Gas, LPG, etc)		
5	Biomass (wood, charcoal, etc.)		
6	Others (please specify)		
7	Others		
8	Others		

2.5 Production Process Flow Chart

Production process flow chart provided? ☐ Yes ☐ No

3. Baseline Data of Waste Generation

3.1 Types and amount of waste generated from production process

Please specify the types and amount of waste generated from your production process.

Type		Generation Source in the Process	Generation (per month)	
			Unit	Amount
1. Non-Scheduled Waste				
1	Waste paper			
2	Waste wood			
3	Waste fibres			
4	Waste rubber			
5	Waste plastic			
6	Animal/Plant waste			
7	Scrapped metals			
8	Scrapped glass			
9	Scrapped ceramics			
10	Slag			
11	Ash			
12	Sludge			
13	Others (Specify)			
14	Others			
15	Others			
16	Others			
17	Others			
18	Others			
19	Others			
20	Others			

Type		Generation Source in the Process	Generation (per month)	
			Unit	Amount
2. Scheduled Waste (Please specify in accordance with DOE's Scheduled Waste Code)				
1				
2				
3				
4				
5				
6				
7				

3.2 Types and amount of non-scheduled waste generated from non-process sources

Please specify the types and amount of waste generated from non-process sources in your factory.

Type		Generation (per month)	
		Unit	Amount
1	Waste papers		
2	Steel cans		
3	Aluminum cans		
4	PET bottles		
5	Glass bottles		
6	Kitchen waste		
7	Other Wastes (specify)		
8			
9			
10			
11			
12			
13			
14			
15			

3.3 Efforts of Waste Minimization at Source

What kind of efforts are currently made in your factory for waste minimization at the source? Please ☑ all that apply.

a	Measurement and recording of raw material input and water/energy consumption in the production/manufacturing process.	
b	Measurement and recording of the amount of waste generated from production/manufacturing process.	
c	On-site reuse/recycling of waste	
d	Segregation of waste between recyclables and non-recyclables	
e	Production process control to maximize productivity (water/energy/raw material saving, minimization of defective products, etc.)	
f	Others (Please specify)	

4. Waste Management and Recycling Activities

4.1 Recycling and treatment/disposal measures and destination of waste generated from the factory

Please specify recycling and treatment/disposal measures and destination of waste generated from your factory.
(Remark: Data entry is to be made on monthly basis.)

Type of Waste	Amount Generated (tonne/mth)	On-site Management							Off- site management							
		On-site reuse/recycle		On-site treatment			On-site storage/disposal		Recycling				Collection/treatment/disposal			
		Amount		Method	Amount		Amount		Amount		Name of Recycler	Price	Amount		Name of Collector	Fee
		Qty	Unit		Qty	Unit	Qty	Unit	Qty	Unit		(RM)	Qty	Unit		(RM)
1. Non-Scheduled Waste from Production Process (Refer to 3.1)																
2. Waste from Non-Process Sources (Refer to 3.2)																

4.2 Use of Recycled Materials in the Factory

Do you currently accept any recycled materials for use in your factory? If you do, please specify them in accordance with the table below.

Type	Amount (per month)		Supply		Price (RM/kg)	Use/Purpose
		Unit	from	%		
			1. Collectors			☐ Raw Materials ☐ Energy use (as fuel) ☐ Others (Specify)
			2. Other factories			
			3. Import			
			4. Others			
			1. Collectors			☐ Raw Materials ☐ Energy use (as fuel) ☐ Others (Specify)
			2. Other factories			
			3. Import			
			4. Others			
			1. Collectors			☐ Raw Materials ☐ Energy use (as fuel) ☐ Others (Specify)
			2. Other factories			
			3. Import			
			4. Others			
			1. Collectors			☐ Raw Materials ☐ Energy use (as fuel) ☐ Others (Specify)
			2. Other factories			
			3. Import			
			4. Others			
			1. Collectors			☐ Raw Materials ☐ Energy use (as fuel) ☐ Others (Specify)
			2. Other factories			
			3. Import			
			4. Others			
			1. Collectors			☐ Raw Materials ☐ Energy use (as fuel) ☐ Others (Specify)
			2. Other factories			
			3. Import			
			4. Others			

4.3. Future use of Recycled Material

What other future / potential recycled materials to be used in your factory? Please specify.

4.4 Issues on Waste Management and Recycling

Please describe the issues your factory is currently facing in relation to waste management and recycling.

This is the end of questionnaire. Thank you for your kind cooperation

Appendix 3

Survey on Material Flows of Recyclables in Malaysia

QUESTIONNAIRE ON MATERIAL FLOW OF RECYCLABLES
(Recycling Stations and Centres)

Date		
Interviewer		
Respondent	Name	
	Position	

1. Company Profile

Name of Organisation			
Type of Business			
Year of Incorporation		Website	
Address		Phone	
		FAX	
		E-mail	
Annual Sales (Turnover)		Number of Employees	

2. Recycling Activities

2.1 Types, Amount and Price Purchase of Recyclable Materials

Please specify the types, amount and price of recyclable materials currently accepted in your premise and the number of sellers of those items in accordance with the table below.

Type of Recyclables	Amount (kg/month)	Price (RM)	Number of Sellers

2.2 Buyer of Recyclables

Please specify the name, location of the major buyers go to your station or centre and the type of recyclables that they buy, in accordance with the table below.

Buyer	Amount (kg/month)	Price (RM)	Number of Buyers

2.3 Sales of Recyclable Materials

If you have any recyclables collected and packed in your premise, please specify their types, sale amount, selling price and destination of the items in accordance with the table below.

Type of Recyclable	Monthly Sales		Price of Recyclables (RM)		Major Destination of Recyclables Collected
	Unit		Unit		
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign

2.4 Recycling Cost

Please specify the recycling cost at your premise in accordance with the table below.
(*Remark: If you do not produce any specific recycled products, but still use recyclable materials at your premise for other purposes, please specify the incremental cost arising from accepting the recyclable materials*.)

Items	Cost (RM/month)
1. Labour cost	
2. Input materials cost	
3. Fuel cost	
4. Utility Cost (Water, Electricity, etc.)	
5. Maintenance/Repair cost	
6. Depreciation of facility/machinery	
7. Others (specify below)	
8.	
9.	
10.	

2.5. Factors Affecting Recycling Activities

Please choose the three (3) biggest factors affecting the recycling activities at your premise from the options below.

- ☐ Difference in price between virgin and recyclable materials
- ☐ Quantity of recyclable materials supplied
- ☐ Quality of recyclable materials supplied
- ☐ Market demand of recycled products
- ☐ Awareness of the company in recycling
- ☐ Others (Please specify below)

This is the end of questionnaire. Thank you for kind cooperation!!

QUESTIONNAIRE ON MATERIAL FLOW OF RECYCLABLES
(Recyclers and Manufacturers who accept recyclables)

Date		
Interviewer		
Respondent	Name	
	Position	

1. Company Profile

Name of Company			
Type of Business			
Year of Incorporation		Website	
Address		Phone	
		FAX	
		E-mail	
Annual Sales (Turnover)		Number of Employees	

2. Recycling Activities

2.1 Types, Amount and Price and Use of Recyclable Materials

Please specify the types, amount and price of recyclable materials currently accepted in your premise in accordance with the table below.

Type of Recyclables	Amount (kg/month)	Price (RM)	Use

2.2 Sellers of Recyclables

Please specify the name, location of the major sellers go to your premise and the type of recyclables that they sell, in accordance with the table below.

Seller	Location	Type of Recyclables

2.3 Manufacturing of Recycled Products

If you have any recycled products manufactured in your premise, please specify their types, production amount, selling price and destination of product market in accordance with the table below.

Type of Product	Monthly Production		Price of Product (RM)		Major Destination of Product Market
	Unit		Unit		
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign

2.4 Recycling Cost

Please specify the recycling cost at your premise in accordance with the table below.
(*Remark: If you do not produce any specific recycled products, but still use recyclable materials at your premise for other purposes, please specify the incremental cost arising from accepting the recyclable materials*.)

Items	Cost (RM/month)
1. Labour cost	
2. Input materials cost	
3. Fuel cost	
4. Utility Cost (Water, Electricity, etc.)	
5. Maintenance/Repair cost	
6. Depreciation of facility/machinery	
7. Others (specify below)	
8.	
9.	
10.	

2.5. Factors Affecting Recycling Activities

Please choose the three (3) biggest factors affecting the recycling activities at your premise from the options below.

☐ Difference in price between virgin and recyclable materials
☐ Quantity of recyclable materials supplied
☐ Quality of recyclable materials supplied
☐ Market demand of recycled products
☐ Awareness of the company in recycling
☐ Others (Please specify below)

This is the end of questionnaire. Thank you for kind cooperation!!

QUESTIONNAIRE ON MATERIAL FLOW OF RECYCLABLES
(Traders, Middle man and Junk shop who deal recyclables)

Date		
Interviewer		
Respondent	Name	
	Position	

1. Company Profile

Name of Company			
Type of Business			
Year of Incorporation		Website	
Address		Phone	
		FAX	
		E-mail	
Annual Sales (Turnover)		Number of Employees	

2. Recycling Activities

2.1 Types, Amount and Price Purchase of Recyclable Materials

Please specify the types, amount and price of recyclable materials currently accepted in your premise and the number of sellers of those items in accordance with the table below.

Type of Recyclables	Amount (kg/month)	Price (RM)	Number of Sellers

2.2 Buyer of Recyclables

Please specify the name, location of the major buyers go to your premise and the type of recyclables that they buy, in accordance with the table below.

Buyer	Amount (kg/month)	Price (RM)	Number of Buyers

2.3 Sales of Recyclable Materials

If you have any recyclables collected and packed in your premise, please specify their types, sale amount, selling price and destination of the items in accordance with the table below.

Type of Recyclable	Monthly Sales		Price of Recyclables (RM)		Major Destination of Recyclables Collected
	Unit		Unit		
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign
					☐ Domestic ☐ Foreign

2.4 Recycling Cost

Please specify the recycling cost at your premise in accordance with the table below.
(*Remark: If you do not produce any specific recycled products, but still use recyclable materials at your premise for other purposes, please specify the incremental cost arising from accepting the recyclable materials*.)

Items	Cost (RM/month)
1. Labour cost	
2. Input materials cost	
3. Fuel cost	
4. Utility Cost (Water, Electricity, etc.)	
5. Maintenance/Repair cost	
6. Depreciation of facility/machinery	
7. Others (specify below)	
8.	
9.	
10.	

2.5. Factors Affecting Recycling Activities

Please choose the three (**3**) biggest factors affecting the recycling activities at your premise from the options below.

- ☐ Difference in price between virgin and recyclable materials
- ☐ Quantity of recyclable materials supplied
- ☐ Quality of recyclable materials supplied
- ☐ Market demand of recycled products
- ☐ Awareness of the company in recycling
- ☐ Others (Please specify below)

This is the end of questionnaire. Thank you for kind cooperation!!

QUESTIONNAIRE ON MATERIAL FLOW OF RECYCLABLES

(Street Collector, Waste Picker at Collection Vehicles, and Scavenger at Landfill)

Date		
Interviewer		
Respondent	Name	
	Position	

1. Collection and Recovery Field

Name of Site or Streets			
Type of Business	☐ *(a) Door-to-door collector* ☐ *(b) Street collector* ☐ *(c) Waste collection workers*	Years of Work	years
		Working Day	S M T W T F S
No. of Colleagues	/week	Only Collectors May Answer Below	
Weekly Sales	RM /week	No. of the waste bins you visit	/day
Other Income (if available)	RM /month	No. of the households you visit	/day

2. Recycling Activities

2.1 Types, Amount and Price of Recyclable Materials

Please specify the types, amount and price of recyclable materials currently collected and the number of sellers of those items in accordance with the table below.

Type of Recyclables	Amount (kg/week)	Price (RM)	Buyer (Pls. specify Name or Place)

Type of Recyclables	Amount (kg/week)	Price (RM)	Buyer (Pls. specify Name or Place)

2.2 Problems

What is a major problem at present, when you collect the recyclables?
What is a major problem at present, when you segregate the recyclables?
What is a major problem at present, when you sell the recyclables?

This is the end of questionnaire. Thank you for kind cooperation!!