Annex 6

Fourth Schedule for Fund Management of

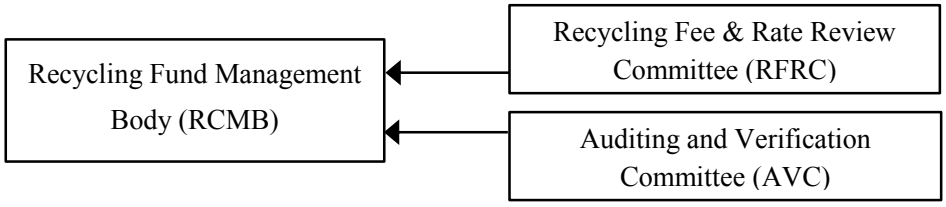
Household E-waste

SCHEDULE

RECYCLING CONTRIBUTION MANAGEMENT ORGANIZATION

1. Organizational Structure

(1) The organization consists of a Recycling Contribution Management Body (RCMB) and two committees that review the operation of the RCMB.



(2) Members of RCMB and 2 committees.

- RCMB: Government officers, headed by the Department of Environment (DOE).
- RFRC: Government agencies (DOE, MITI, MOF and KPDNKK), industry representatives (manufacturers/importers, retailers, recyclers), environmental and industrial associations, consumer associations and experts in hazardous waste management sector. Members are appointed by the Director-General (DG) of the DOE. Chairperson is elected among the members.
- AVC: Government agencies (DOE, MITI, Ministry of Home Affairs, KPKT and MOF), industry representatives (manufacturers/importers, retailers, recyclers), and experts in hazardous waste management sector. Members are appointed by the DG of DOE. Chairperson is elected among the members.

(3) The RFMB shall call for meeting with respective committee at least once a year.

2. Tasks of Recycling Contribution Management Body (RCMB)

(1) The Recycling Contribution Management Body has the following tasks:

- Preparing a budget of the fund for each fiscal year (estimation of future revenue and spending) for endorsement by the Environmental Fund Committee.

- Oversee the Reporting Mechanism
  - Create/update a list of manufacturers/importers of the targeted items
  - Create/update a list of registered collectors and collection centers

- Management of the reports on "put-on-market" volume of each item
- Management of the reports from recycling facilities
- Development and management of the manifest forms / E-manifest system

- Registration, Licensing and Auditing of Players
  - Enforcement & auditing of the players
  - Registration of manufacturers/importers
  - Registration of the collectors, collection centers, transporters and other players of HSW (Household Scheduled Waste)
  - Licensing of HSW Recyclers

- Collection and Management of the Recycling Fund
  - Collection of the recycling fee from manufacturers/importers
  - Disbursement of the subsidies to players

- Review of recycling rate, recycling fee rate and subsidies
  - Update of market and technological information
  - Review the recycling rate, recycling fee rate and subsidies periodically

- Public Relation and Awareness Raising Programmes, Research and Development
  - Publicity activities / handling of public complaints and inquiries
  - Development of awareness raising tools and materials
  - Research and Development (R&D) on HSW

- Development and management of database and IT system
- Information disclosure / publication of RFMB annual report

3. Tasks of Recycling Rate and Fee Review Committee (RFRC)

(1) The Recycling Rate and Fee Review Committee has the following tasks:

- Review and recommend the recycling rate
- Review and recommend the recycling fee rate and subsidies

(2) Terms of appointment: 2-year term subject to further extension by the DG.

4. Tasks of Auditing and Verification Committee (AVC)

(1) Tasks of Auditing and Verification Committee:

- Review auditing and verification activities
- Review and recommend the reporting requirements
- Review and recommend the collection requirements
- Review and recommend the recycling requirements

(2) Terms of appointment: 2-year term subject to further extension by the DG.

2019
2019
P.U. (A)

WARTA KERAJAAN PERSEKUTUAN

FEDERAL GOVERNMENT GAZETTE

Draft : 17 Mei 2018

PERATURAN-PERATURAN KUALITI ALAM SEKELILING (BUANGAN PERALATAN ELEKTRIK DAN ELEKTRONIK TERJADUAL) 2019

ENVIRONMENTAL QUALITY (SCHEDULED ELECTRICAL AND ELECTRONIC EQUIPMENT WASTE) REGULATIONS 2019

DISIARKAN OLEH/
PUBLISHED BY
JABATAN PEGUAM NEGARA/
ATTORNEY GENERAL'S CHAMBERS

ENVIRONMENTAL QUALITY
(SCHEDULED ELECTRICAL AND ELECTRONIC EQUIPMENT WASTE)
REGULATIONS 2019

In exercise of the powers conferred by section 51 of the Environmental Quality Act 1974 [*Act 127*], the Minister, after consultation with the Environmental Quality Council, makes the following regulations:

1. Citation and commencement.

(1) These regulations may be cited as the Environmental Quality (Scheduled Electrical and Electronic Equipment Waste) Regulations 2019 and shall come into force on 1st of January 2019.

2. Interpretation.

(1) In these Regulations, unless the context otherwise requires—

"scheduled electrical and electronic equipment waste" or "scheduled E-waste" means discarded electrical and electronic equipment falling within the categories of waste in the First Schedule, which are generated from household, commercial, industrial, institutional entities, and any other sources;

"electrical and electronic equipment" means equipment falling within the categories of waste in the First Schedule at the end of its life;

"manufacturer" means any person who manufactures the electrical and electronic equipment falling within the categories of waste in the First Schedule at the end of its life;

"importer" means any person who imports or brings into Malaysia the new or used electrical and electronic equipment falling within the categories of waste in the First Schedule at the end of its life;

"retailer" means any person who operates a business that sells electrical and electronic equipment falling within the categories of waste in the First Schedule at the end of its life;

"waste generator" means any person who generates the scheduled E-waste;

"collector" means any person who collects, stores and transports the scheduled E-waste;

"recycling" includes any act of dismantling of the scheduled E-waste to separate components and materials in order to use them as components or raw materials for products.

"recycler" means any person who performs recycling of the scheduled E-waste;

"recycling contribution" means the monetary contribution paid by the manufacturers and importers at a rate as specified by the Minister;

"put-on-market" means the quantity of electrical and electronic equipment falling within the categories of waste in the First Schedule at the end of its life that are placed into the Malaysian market by manufacturer and importer.

"subsidy" means the monetary subsidy to be provided to collector and recycler of the scheduled E-waste;

3. Registration of manufacturer of electrical and electronic equipment

(1) Every manufacturer who introduces the electrical and electronic equipment shall register with the Director General.

(2) The registration under subregulation (1) shall include the information as determined by the Director General.

4. Registration of importer of electrical and electronic equipment

(1) Every importer who imports or brings into Malaysia the new or used electrical and electronic equipment shall register with the Director General.

(2) The registration under subregulation (1) shall include the requirement as determined by the Director General.

5. Notification

(1) Every manufacturer and importer shall, by the 31st of January every year, notify the Director General on the put-on-market during the period from January to December of the previous year.

(2) The notification under subregulation (1) shall include the requirement as determined by the Director General.

6. Approval of collector

(1) A collector shall apply for approval from the Director General.

(2) The application made under sub regulation (1) shall fulfill the requirements as determined by the Director General.

(3) Upon receiving the application, the Director General shall grant an approval of collector if the requirements under sub regulation (2) are met and complied.

(4) An approval shall, remain in force for a period of one year from the date of its issue and shall be renewed upon application made at any time not more than four months before the date of the expiration of the approval.

7. Licensing of recycler

(1) A recycler shall apply for a license from the Director General.

(2) The application made under sub regulation (1) shall fulfill the requirements as determined by the Director General.

(3) A license shall be granted to a recycler by each category of waste in the First Schedule.

8. Responsibility of waste generator

Every waste generator shall discard electrical and electronic equipment to retailer, approved collector or licensed recycler.

9. Responsibility of manufacturer and importer

Every manufacturer and importer shall—

(1) provide information to the Director General on—

(a) the method of dismantling of their electrical and electronic equipment; and

(b) the components that contain hazardous substances in their electrical and electronic equipment; and

(2) pay recycling contribution to the fund at a rate as determined by the Minister after consultation with the Environmental Council in accordance with the Second Schedule in this Regulation or other methods as he thinks fit.

10. Responsibility of retailer

Every retailer shall—

(a) collect or receive the scheduled E-waste from the waste generator;

(b) record and report the information on the collected scheduled E-waste in accordance with the requirements as determined by the Director General;

(c) ensure that the scheduled E-waste that are collected or received shall be sent only to the approved collector or licensed recycler;

(d) ensure that no environmental pollution is caused during collection, transportation and storage of the scheduled E-waste; and

(e) ensure no dismantling of the collected scheduled E-waste.

11. Responsibility of collector

Every collector shall—

(a) meet the collection and storage requirements prescribed by the Director General;
(b) record and report the information on the collected scheduled E-waste in accordance with the requirements as determined by the Director General;
(c) transfer the collected scheduled E-waste only to licensed recycler;
(d) ensure that no environmental pollution is caused during collection, transportation and storage of the scheduled E-waste; and
(e) ensure no dismantling of the collected scheduled E-waste.

12. Responsibility of recyclers

Every recycler shall—

(a) perform recycling of the scheduled E-waste in an environmentally sound manner in accordance with the requirements as determined by the Director General;
(b) comply with the requirements stipulated under the Environmental Quality (Prescribed Premises) (Scheduled Wastes Treatment and Disposal Facilities) Order as an off-site recovery facility;
(c) comply with the requirements to handle any refrigerant environmentally hazardous substance stipulated under Environmental Quality (Refrigerant Management) Regulations 1999 [P.U(A) 451/1999];
(d) make reporting in accordance with the requirements as determined by the Director General.

13. Application of the Recycling Contribution

The recycling contribution shall be administered for the purpose of—

(a) providing subsidy to the collector at a rate determined by the Minister; and
(b) providing subsidy to the recycler at a rate determined by the Minister.

14. Compounding of offences.

(1) Every offence which consists of any omission or neglect to comply with, or any act done or attempted to be done contrary to these Regulations may be compounded under section 45 of the Act.
(2) The compounding of offences referred to in sub regulation (1) shall be in accordance with the procedure prescribed in the Environmental Quality (Compounding of Offences) Rules 1978.

Made [AS(S) ; PN(PU2)280/XVII

FIRST SCHEDULE

(Regulation 2)

ENVIRONMENTAL QUALITY ACT 1974

Enviromental Quality (Scheduled Electrical And Electronic Equipment Waste) Regulations 2019

EEEW100	**Household electrical and electronic wastes**
EEEW 101	Air Conditioner
EEEW 102	Washing Machine / Cloth Dryer
EEEW 103	Refrigerator / Freezer
EEEW 104	Television
EEEW 105	Computer
EEEW 106	Mobile Phone /Tablet PC

SECOND SCHEDULE

(Regulation 9)

Recycling Contribution Rate Calculation Formula

Recycling Contribution (RM/unit)				
Total logistic cost (RM/year)	Total recycling cost (RM/year)	Collected and recycled units (unit)	Management cost (RM/year)	Put-on-market amount (unit)
(i)	**(ii)**	**(iii)**	**(iv)**	**(v)**

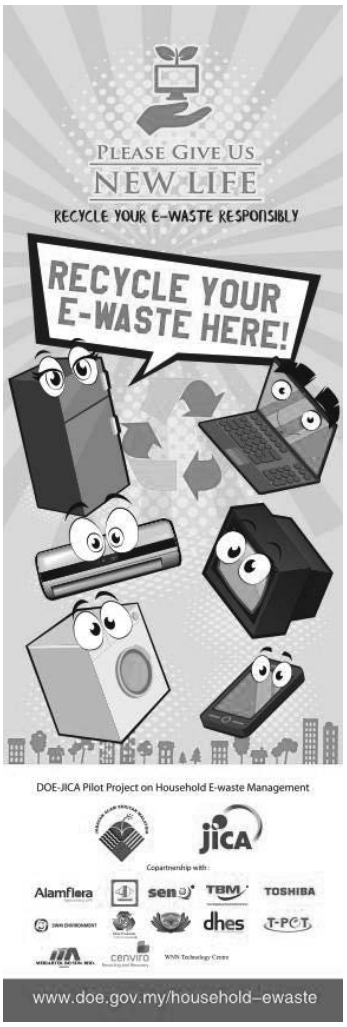
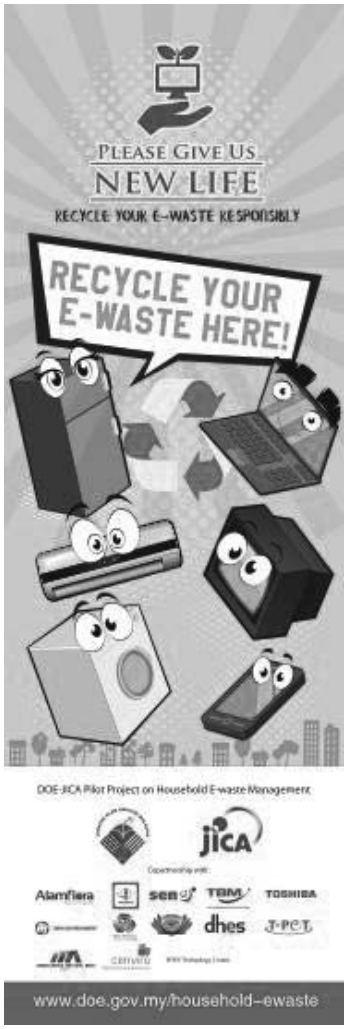
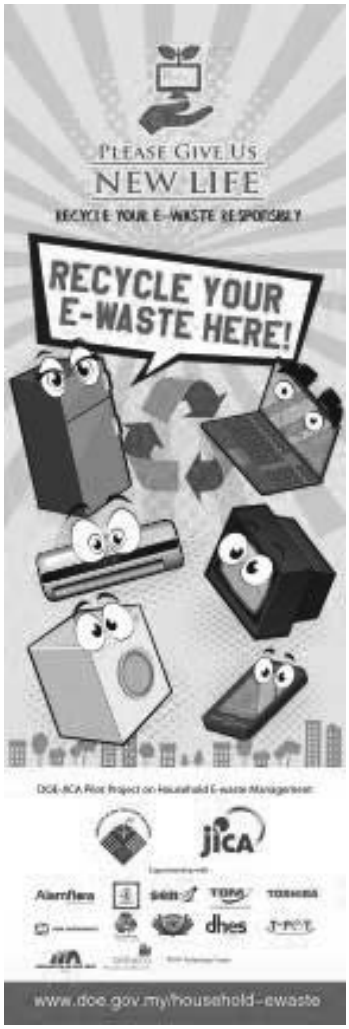
Recycling Contribution Rate

$$= \frac{[(\mathbf{i}) + (\mathbf{ii})] \times (\mathbf{iii}) + (\mathbf{iv})}{(\boldsymbol{v})}$$

Annex 7

Tools for Promotion / Dissemination

[バンティング / Bunting]

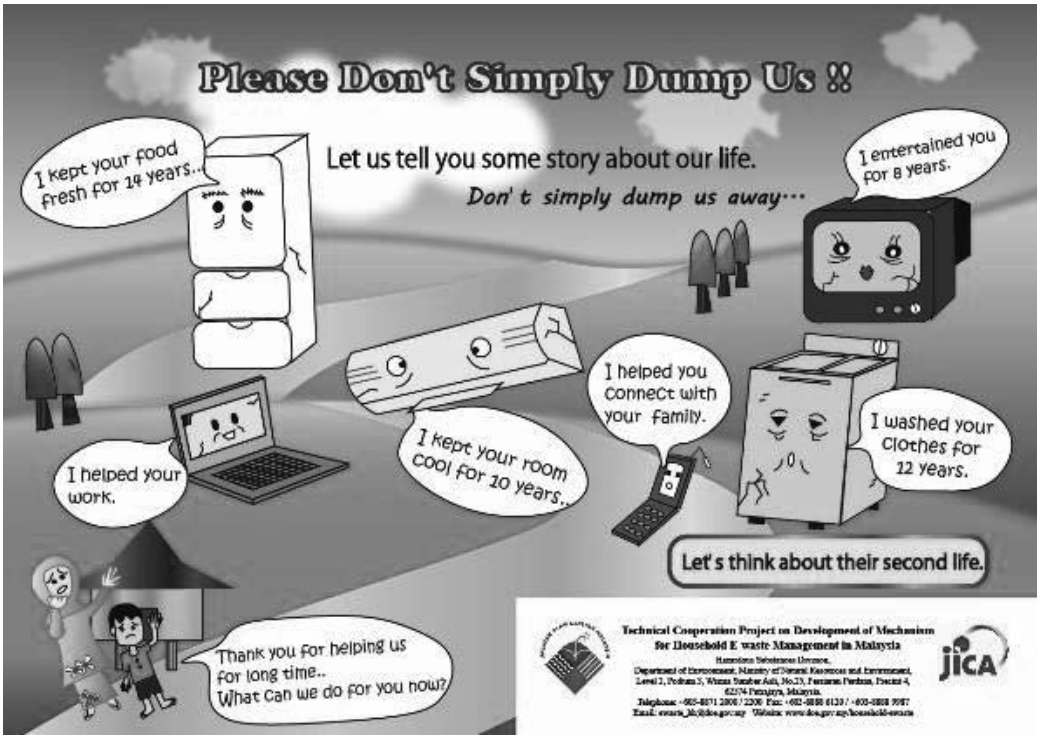
バンティング/ Bunting
  

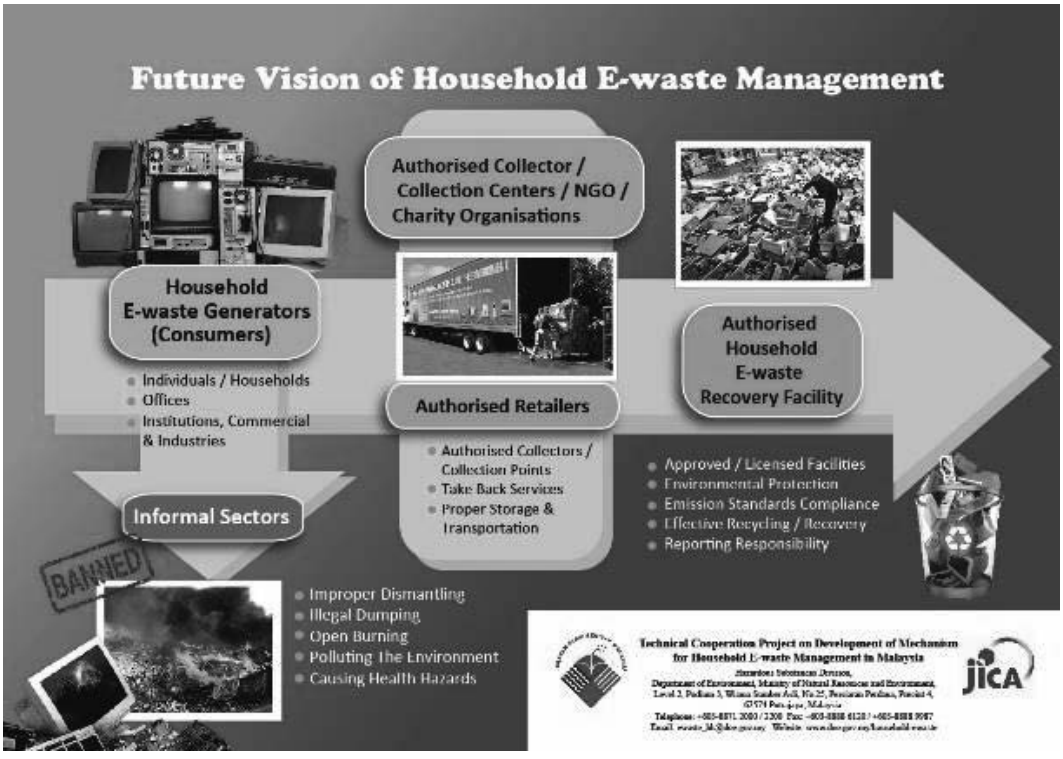
[バナー / Banner]

バナー（一般用) / Banner

輸送機材（トラック）用バナー / Outdoor Lorry side banner


[カレンダー / Calendar]


Please Don't Simply Dump Us !!
Let us tell you some story about our life.
Don't simply dump us away···
I kept your food fresh for 14 years..
I entertained you for 8 years.
I helped your work.
I kept your room cool for 10 years.
I helped you connect with your family.
I washed your clothes for 12 years.
Let's think about their second life.
Thank you for helping us for long time.. What can we do for you now?
Technical Cooperation Project on Development of Mechanism for Household E-waste Management in Malaysia
JICA


Future Vision of Household E-waste Management
Authorised Collector / Collection Centers / NGO / Charity Organisations
Household E-waste Generators (Consumers)
Individuals / Households
Offices
Institutions, Commercial & Industries
Authorised Retailers
Authorised Collectors / Collection Points
Take Back Services
Proper Storage & Transportation
Authorised Household E-waste Recovery Facility
Approved / Licensed Facilities
Environmental Protection
Emission Standards Compliance
Effective Recycling / Recovery
Reporting Responsibility
Informal Sectors
BANNED
Improper Dismantling
Illegal Dumping
Open Burning
Polluting the Environment
Causing Health Hazards
Technical Cooperation Project on Development of Mechanism for Household E-waste Management in Malaysia
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What is Household E-waste?

PLEASE GIVE US NEW LIFE Recycle Your **E-waste** Responsibly

"E-wastes" are broken, non-working or old/obsolete electric/electronic appliances such as.....

Technical Cooperation Project on Development of Mechanism for Household E-waste Management in Malaysia

Hazardous Substances Division,
Department of Environment, Ministry of Natural Resources and Environment,
Level 3, Podium 3, Wisma Sumber Asli No.25, Persiaran Perdana, Precint 4,
62574 Putrajaya, Malaysia.
Telephone : +603-8871 2000 / 2208 Fax : +603-8888 8120 / +603-8888 9597
Email: swaste_kh@doe.gov.my Website: www.doe.gov.my/household-swaste

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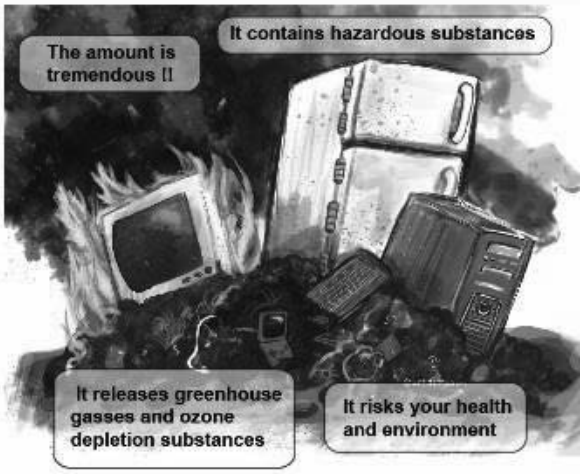
Why is E-waste a Problem?

PLEASE GIVE US NEW LIFE Recycle Your **E-waste** Responsibly



Technical Cooperation Project on Development of Mechanism for Household E-waste Management in Malaysia

Hazardous Substances Division,
Department of Environment, Ministry of Natural Resources and Environment,
Level 3, Podium 3, Wisma Sumber Asli No.25, Persiaran Perdana, Precint 4,
62574 Putrajaya, Malaysia.
Telephone : +603-8871 2000 / 2208 Fax : +603-8888 8120 / +603-8888 9597
Email: swaste_kh@doe.gov.my Website: www.doe.gov.my/household-swaste

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How E-waste Risks the Environment?

MARCH 2016

S	M	T	W	T	F	S
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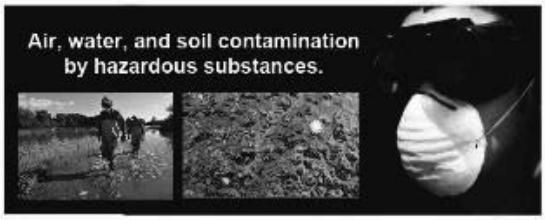
27	28	29	30	31		

PUBLIC HOLIDAY
4 Mar Anniversary of Installation of Sultan of Terengganu
* Terengganu only
23 Mar Sultan of Johor's Birthday *Johor only
25 Mar Good Friday *Sabah & Sarawak only



PLEASE GIVE US NEW LIFE Recycle Your **E-waste** Responsibly

Technical Cooperation Project on Development of Mechanism for Household E-waste Management in Malaysia

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How E-waste Risks Human Health?

APRIL 2016

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PUBLIC HOLIDAY
15 Apr Declaration of Malacca as a Historical City
* Malacca only
28 Apr Sultan of Terengganu's Birthday
* Terengganu only

Direct/indirect contact or inhalation causes acute as well as chronic poisoning to human being.

PLEASE GIVE US NEW LIFE Recycle Your **E-waste** Responsibly

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How E-waste Recycling Saves Natural Resources?

MAY 2016

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22	23	24	25	26	27	28
29	30	31				

PUBLIC HOLIDAY

1 May Labour Day
5 May Israk & Mikraj *Kedah, Negeri Sembilan & Perlis only
7 May Hari Hol Pahang *Pahang only
17 May Raja Perlis' Birthday *Perlis only
21 May Vesak Day
30,31May Harvest Festival *Sabah & Labuan only

Many natural resources are used to produce each electronic / electrical product.

V.S.


Glass Cullet


Plastic Resins


Gold Ingots


Iron Ingots

Reducing, Reusing and Recycling electronic products can conserve natural resources.

PLEASE GIVE US NEW LIFE Recycle Your **E-waste** Responsibly

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How Much Household E-waste is Generated in the World?

JUNE 2016

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PUBLIC HOLIDAY # Subject to Change

1,2 June Hari Gawai *Sarawak only
4 June Agong's Birthday
6 June # Awal Ramadan * Johor, Kedah & Malacca only
22 June Nuzul Al-Quran *Kelantan, Pahang, Perak, Perlis, Penang, Selangor ,Terengganu and Federal Territories (KL , Putrajaya and Labuan) only

PLEASE GIVE US NEW LIFE Recycle Your **E-waste** Responsibly

The global quantity of E-waste generation in 2014 was around 41.8 metric tonnes.

Generation of E-waste is expected to increase tremendously in coming years.

Technical Cooperation Project on Development of Mechanism for Household E-waste Management in Malaysia

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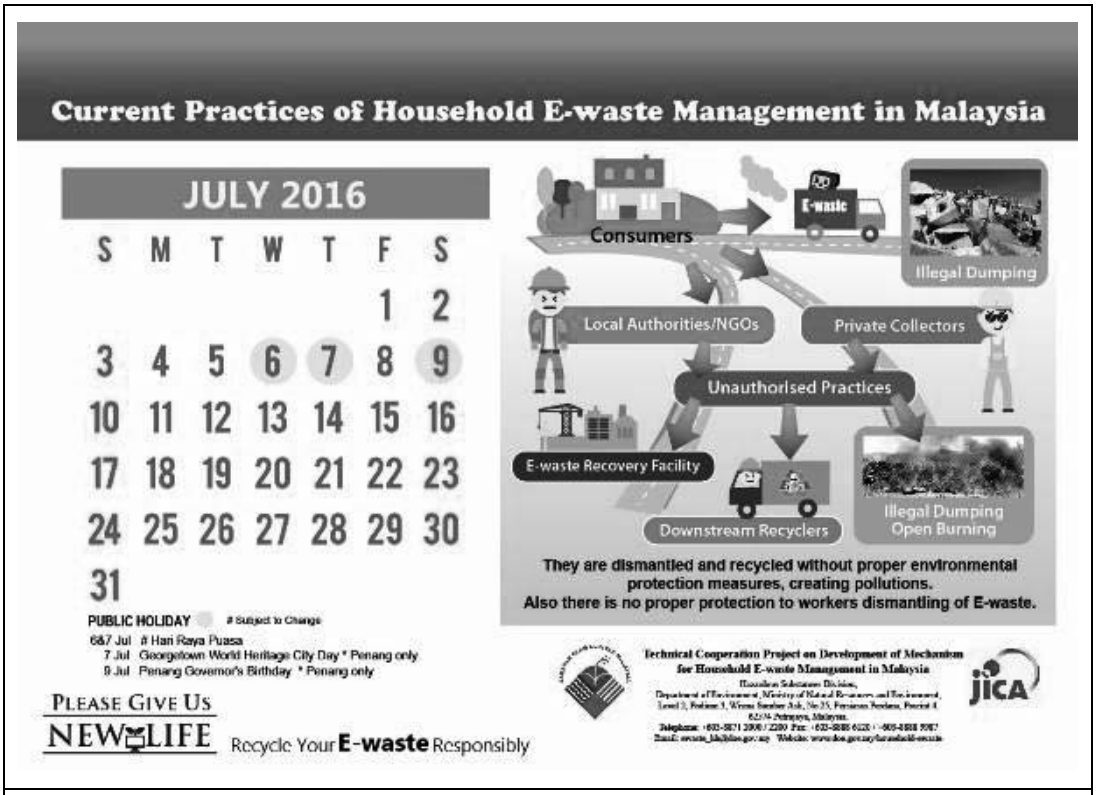
Current Practices of Household E-waste Management in Malaysia
JULY 2016
S M T W T F S
1 2
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17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
PUBLIC HOLIDAY
Subject to Change
6&7 Jul # Hari Raya Puasa
7 Jul Georgetown World Heritage City Day * Penang only
9 Jul Penang Governor's Birthday * Penang only
PLEASE GIVE US NEW LIFE
Recycle Your E-waste Responsibly
Consumers
E-waste
Illegal Dumping
Local Authorities/NGOs
Private Collectors
Unauthorised Practices
E-waste Recovery Facility
Downstream Recyclers
Illegal Dumping
Open Burning
They are dismantled and recycled without proper environmental protection measures, creating pollutions.
Also there is no proper protection to workers dismantling of E-waste.
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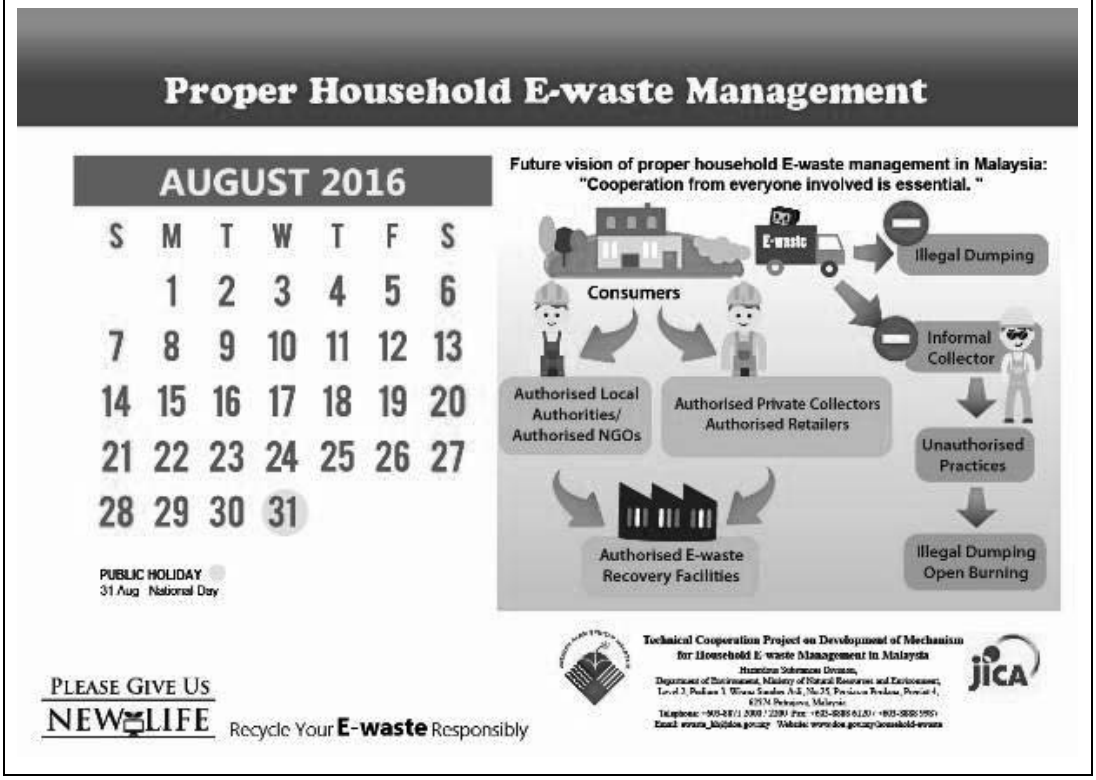
Proper Household E-waste Management
AUGUST 2016
S M T W T F S
1 2 3 4 5 6
7 8 9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28 29 30 31
PUBLIC HOLIDAY
31 Aug National Day
PLEASE GIVE US NEW LIFE
Recycle Your E-waste Responsibly
Future vision of proper household E-waste management in Malaysia:
"Cooperation from everyone involved is essential. "
E-waste
Illegal Dumping
Consumers
Informal Collector
Authorised Local Authorities/ Authorised NGOs
Authorised Private Collectors Authorised Retailers
Unauthorised Practices
Authorised E-waste Recovery Facilities
Illegal Dumping
Open Burning
Technical Cooperation Project on Development of Mechanism for Household E-waste Management in Malaysia
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Who Should Be Responsible?

SEPTEMBER 2016

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25	26	27	28	29	30	

PUBLIC HOLIDAY # Subject to Change
10 Sep Sarawak Governor's Birthday * Sarawak only
12 Sep # Hari Raya Haji
13 Sep # Hari Raya Haji (2nd Day)
* Kedah, Kelantan, Perlis & Terengganu Only
16 Sep Malaysia Day

PLEASE GIVE US NEW LIFE Recycle Your **E-waste** Responsibly

Everyone is Responsible!!
No single party can solve this big issue alone.

Technical Cooperation Project on Development of Mechanism for Household E-waste Management in Malaysia

JICA

DOs and DON'Ts

OCTOBER 2016

S	M	T	W	T	F	S
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16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

PUBLIC HOLIDAY # Subject to Change
1 Oct Sabah Governor's Birthday *Sabah only
2 Oct Awal Muharram (Maal Hijrah)
14 Oct Malacca Governor's Birthday * Malacca only
24 Oct Sultan of Pahang's Birthday * Pahang only
29 Oct # Deepavali * National except Sarawak

PLEASE GIVE US NEW LIFE Recycle Your **E-waste** Responsibly

Technical Cooperation Project on Development of Mechanism for Household E-waste Management in Malaysia

JICA

Give New Life to E-waste

NOVEMBER 2016

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20	21	22	23	24	25	26
27	28	29	30			

PUBLIC HOLIDAY

6 Nov Hari Hol Almarhum Sultan Iskandar *Johor only
11 Nov Sultan of Kelantan's Birthday * Kelantan only
12 Nov Sultan of Kelantan's Birthday * Kelantan only
27 Nov Sultan of Perak's Birthday * Perak only

PLEASE GIVE US NEW LIFE Recycle Your **E-waste** Responsibly

Technical Cooperation Project on Development of Mechanism for Household E-waste Management in Malaysia

Hazardous Substances Division,
Department of Environment, Ministry of Natural Resources and Environment,
Level 2, Podium 2, Wisma Sumber Asli, No.25, Persiaran Perdana, Precinct 4,
62574 Putrajaya, Malaysia.
Telephone: +603-8871 2000 / 2200 Fax: +603-8888 9107
Email: enviro_jik@doe.gov.my Website: www.doe.gov.my/household-enviro

JICA

It's Your Choice... Act Now!!

DECEMBER 2016

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

PUBLIC HOLIDAY

11 Dec Sultan of Selangor's Birthday *Selangor only
12 Dec Prophet Muhammad's Birthday (Maulidur Rasul)
25 Dec Christmas

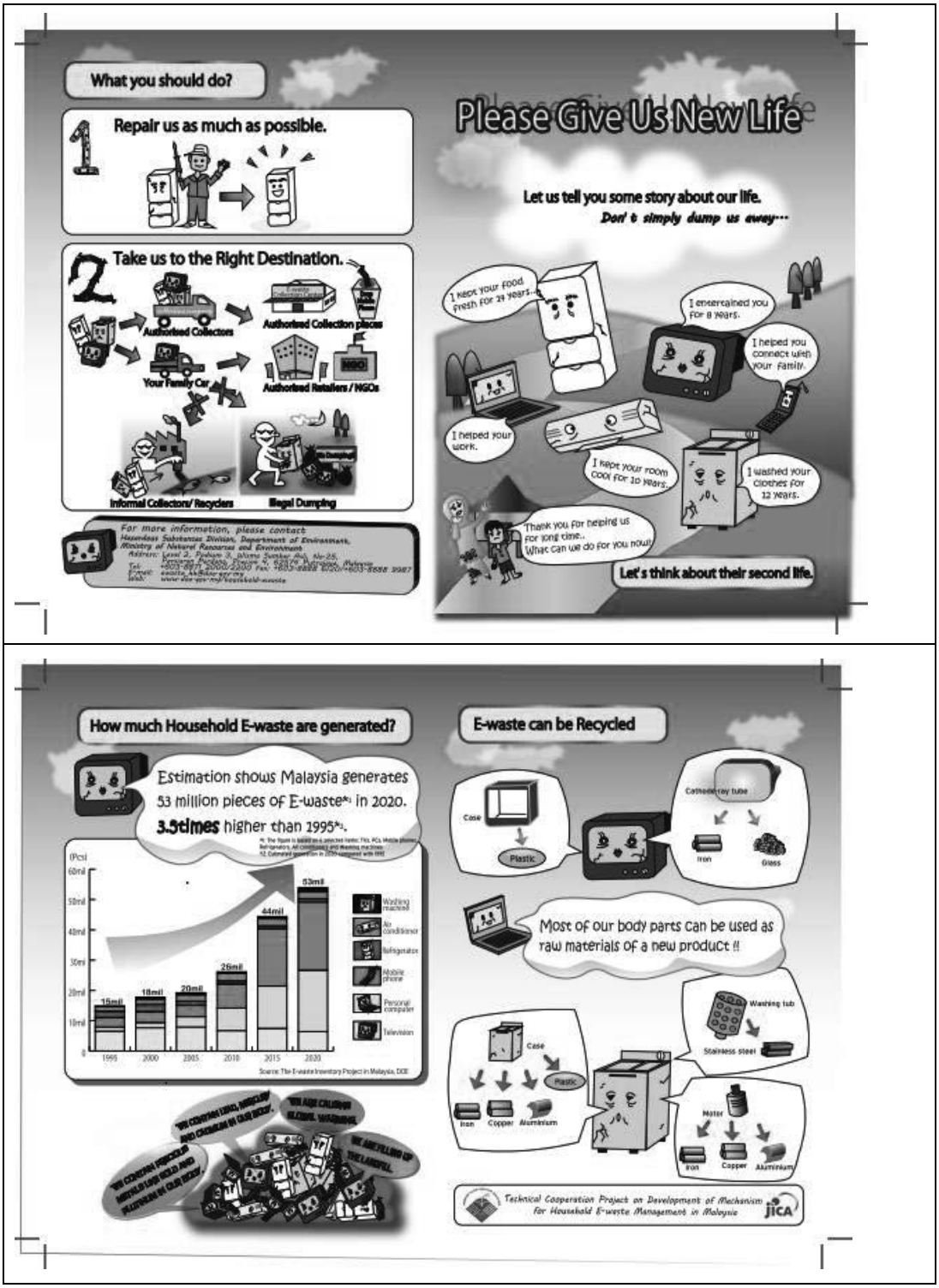
PLEASE GIVE US NEW LIFE Recycle Your **E-waste** Responsibly

Technical Cooperation Project on Development of Mechanism for Household E-waste Management in Malaysia

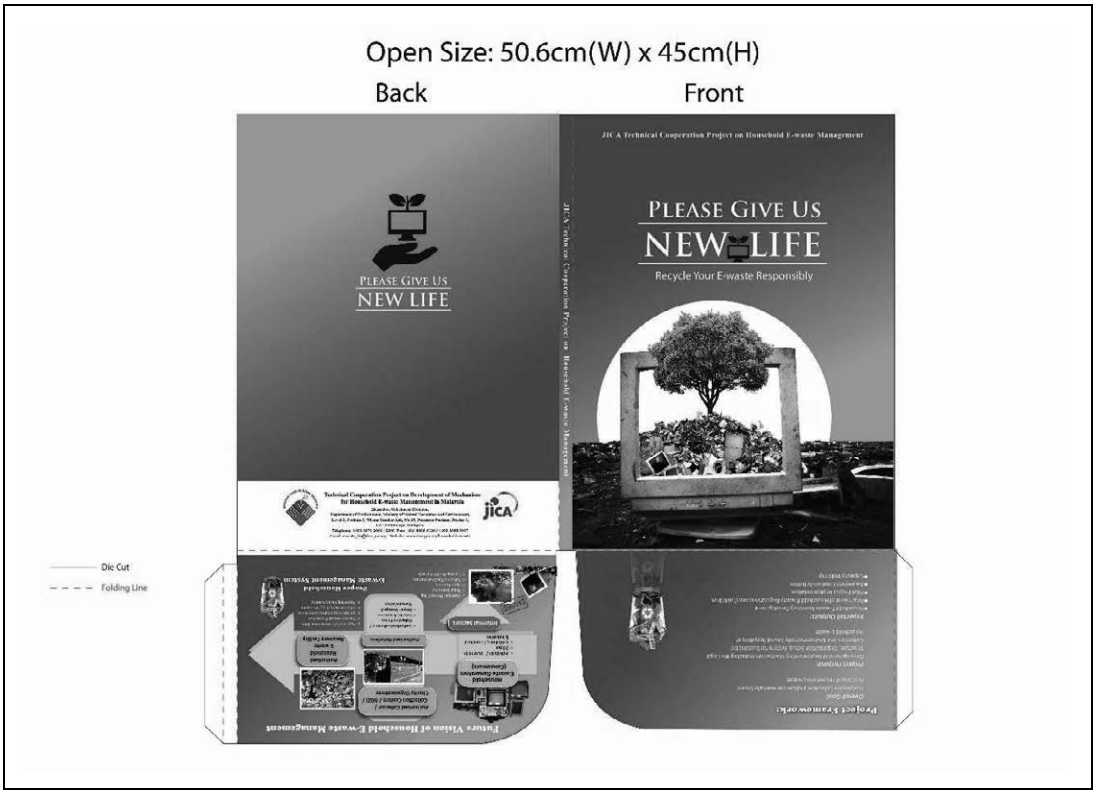
Hazardous Substances Division,
Department of Environment, Ministry of Natural Resources and Environment,
Level 2, Podium 2, Wisma Sumber Asli, No.25, Persiaran Perdana, Precinct 4,
62574 Putrajaya, Malaysia.
Telephone: +603-8871 2000 / 2200 Fax: +603-8888 9107
Email: enviro_jik@doe.gov.my Website: www.doe.gov.my/household-enviro

JICA

[フライヤー / Flyer]


What you should do?
1 Repair us as much as possible.
2 Take us to the Right Destination.
Authorised Collectors
Authorised Collection places
Your Family Car
Authorised Retailers / NGOs
Informal Collectors/ Recyclers
Illegal Dumping
For more information, please contact
Hazardous Substances Division, Department of Environment,
Ministry of Natural Resources and Environment
Please Give Us New Life
Let us tell you some story about our life.
Don't simply dump us away…
I kept your food fresh for 24 years.
I entertained you for 8 years.
I helped you connect with your family.
I helped your work.
I kept your room cool for 10 years.
I washed your clothes for 12 years.
Thank you for helping us for long time.. What can we do for you now!!
Let's think about their second life.
How much Household E-waste are generated?
Estimation shows Malaysia generates 53 million pieces of E-waste*1 in 2020.
3.5times higher than 1995*2.
(Pcs)
60mil
50mil
40mil
30mil
20mil
10mil
0
15mil
18mil
20mil
26mil
44mil
53mil
1995
2000
2005
2010
2015
2020
Washing machine
Air conditioner
Refrigerator
Mobile phone
Personal computer
Television
Source: The E-waste Inventory Project in Malaysia, DOE
E-waste can be Recycled
Case
Plastic
Cathode ray tube
Iron
Glass
Most of our body parts can be used as raw materials of a new product !!
Washing tub
Stainless steel
Case
Plastic
Iron
Copper
Aluminium
Motor
Iron
Copper
Aluminium
Technical Cooperation Project on Development of Mechanism for Household E-waste Management in Malaysia
JICA

[ホルダー / Folder]


Open Size: 50.6cm(W) x 45cm(H)
Back
Front
PLEASE GIVE US
NEW LIFE
JICA Technical Cooperation Project on Household E-waste Management
PLEASE GIVE US
NEW LIFE
Recycle Your E-waste Responsibly
Die Cut
Folding Line

Annex 8

Tools for Trainings

TECHNICAL COOPERATION PROJECT
FOR
DEVELOPMENT OF MECHANISM FOR HOUSEHOLD E-WASTE MANAGEMENT
IN MALAYSIA

Findings from Household E-waste Inventory Survey

JICA Expert Team

CONTENTS

1. Scope of Inventory Survey
2. Results and Findings

1. Scope of Inventory Survey

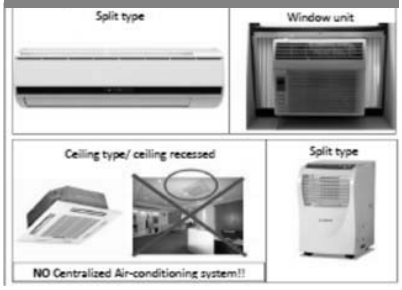
BASIC SCOPE OF SURVEY

Purpose	① **Identifying the current possession of E-appliances** ② **Identifying the current flow of E-waste from generators to its final destinations** ③ **Estimating the current and future E-waste generation**
Target E-waste	TV, Washing Machine, Refrigerator, Air Conditioner, Personal Computer, Mobile Phone
Survey method	Questionnaire and Interview Survey to: ■ Household ■ Office ■ Commercial and Institutional Premises ■ E-waste Collectors and Recyclers (Formal and informal)
Survey Period	November 2015-April 2016

Target E-waste

1. Television

2. Air-conditioner



3. Personal Computer

4. Refrigerator

5. Washing Machine & Dryer

6. Mobile Phone

Sampling Area

Sampling Distributions by Region

Northern Region

	HH	Office	Inst.	Others	RP
KEDAH					
Jitra	17	3	3	3	3
Alor Setar	30	4	4	4	4
Baling	10	3	3	3	3
PENANG					
Seberang Prai	32	8	8	8	10
PERAK					
Setiawan	18	3	3	3	4
Tanjung Malim	5	2	2	2	3
Gopeng	8	2	2	2	3
Total	120	25	25	25	30

East Coast Region

	HH	Office	Inst.	Others	RP
KELANTAN					
Kemanan	15	3	3	5	5
Marang	9	2	2	3	3
TERENGGANU					
Gua Musang	7	3	3	3	4
Kota Bahru	27	4	4	4	7
Pasir Mas	15	3	3	3	4
PAHANG					
Kuala Lipis	8	2	2	3	3
Maran	9	3	3	4	4
Total	90	20	20	25	30

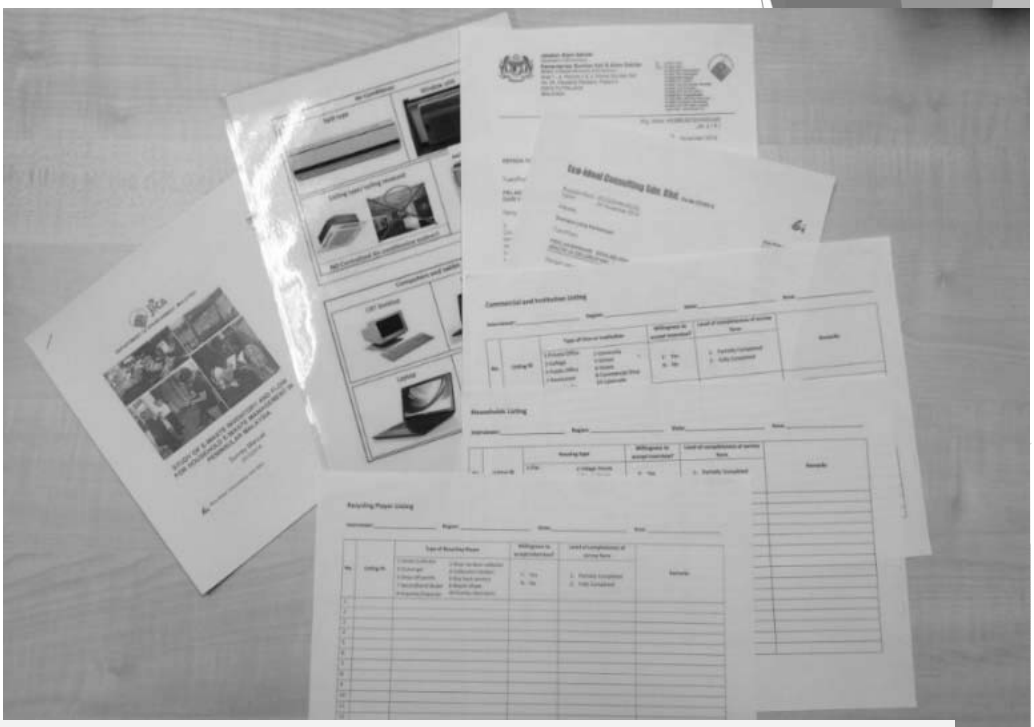
Central Region

	HH	Office	Inst.	Others	RP
KUALA LUMPUR					
Cheras	19	5	5	2	13
Setiawangsa	18	5	5	2	12
Kepong	19	5	5	2	13
Bukit Bintang	18	5	5	4	12
SELANGOR					
Kuala Selangor	9	3	3	2	8
Hulu Selangor	9	3	3	2	8
Hulu Langat	30	3	3	2	10
Kuala Langat	10	3	3	2	9
PUTRAJAYA/ CYBERJAYA					
Putrajaya	9	4	4	3	7
Cyberjaya	9	4	4	4	8
Total	150	40	40	25	100

Southern Region

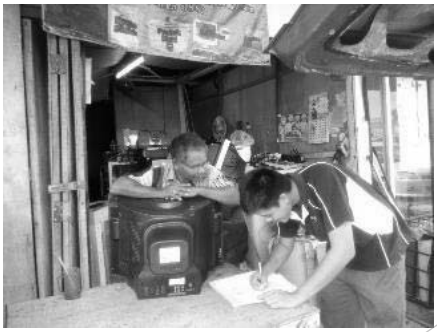
	HH	Office	Inst.	Others	RP
NEGERI SEMBILAN					
Port Dickson	13	4	4	4	6
Jelebu	7	3	3	3	4
MELAKA					
Jasin	18	4	4	4	5
Masjid Tanah	20	4	4	4	5
JOHOR					
Muar	24	3	3	3	10
Kluang	21	3	3	3	4
Mersing	7	2	2	2	3
Kota Tinggi	10	2	2	2	3
Total	120	25	25	25	40

Survey Method



3 set of questionnaire forms been prepared

Survey Method



Surveyed Households

Low cost: Flat & village house

High cost: Bungalow, semi-detach, condominium

Medium cost: Terrace, town house & apartment

Surveyed Collectors

Domestic waste collector

Street collector

Scrap dealer

Door-to-door collector

- *Recyclers (One collects recyclable item)*
- *NGO*
- *scrap dealer*
- *repair shop*

Other Players Surveyed

Collection center

Buy-back center

Drop-off point

2nd hand dealer

Repair shop

E-waste treatment facility

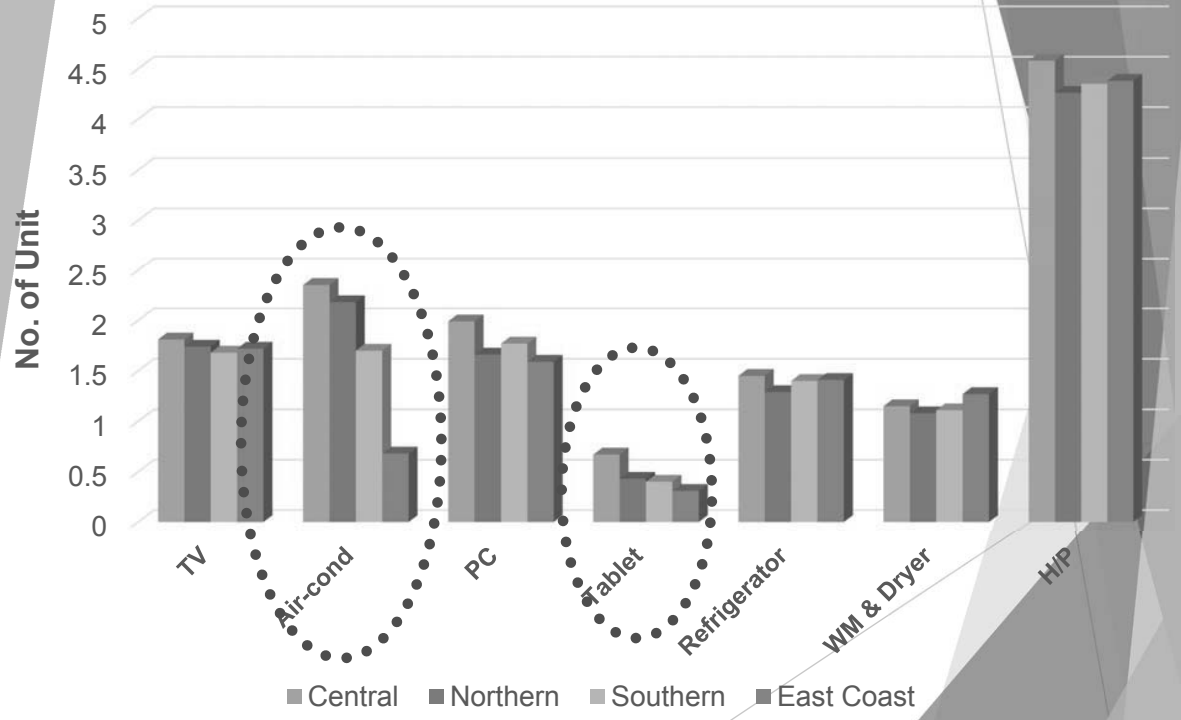
2. Results and Findings

Average Lifespan of HH EEEs

Type of E-waste	Estimated Average Lifespan of EEE per Household (years)			
	This Study (Peninsular Malaysia)	Sabah E-Waste 2014	JICA E-waste Study 2013 (Penang)	JICA E-waste Study 2007 (Nationwide)
Television	10.4	11.5	12.1	10.1
Air Conditioner	12.1	9.5	14.1	7. 8
Personal Computer	9.5	4.5	9.2	3.6
Laptop	7.8	6.5	5.9	
Tablet	6.5	-	-	-
Refrigerator	12.8	14	9.8	9.3
Washing Machine and Dryer	10.8	11.5	11.0	7.4
Mobile Phone	6.0	2.0	4.1	3.2

- The lifespan of EEEs calculated in this study corresponds with previous studies except for laptop and mobile phone

Ownership of HH EEEs (units/HH)

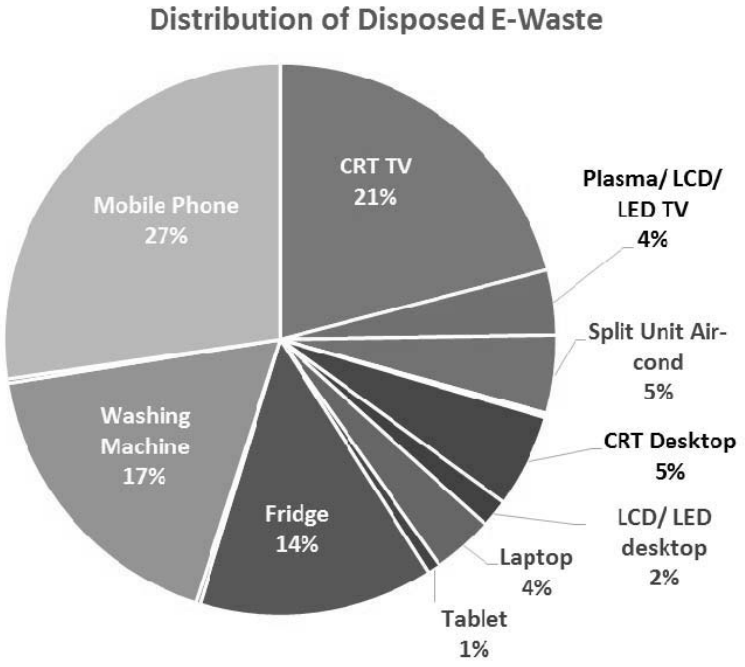


Ownership of HH EEEs

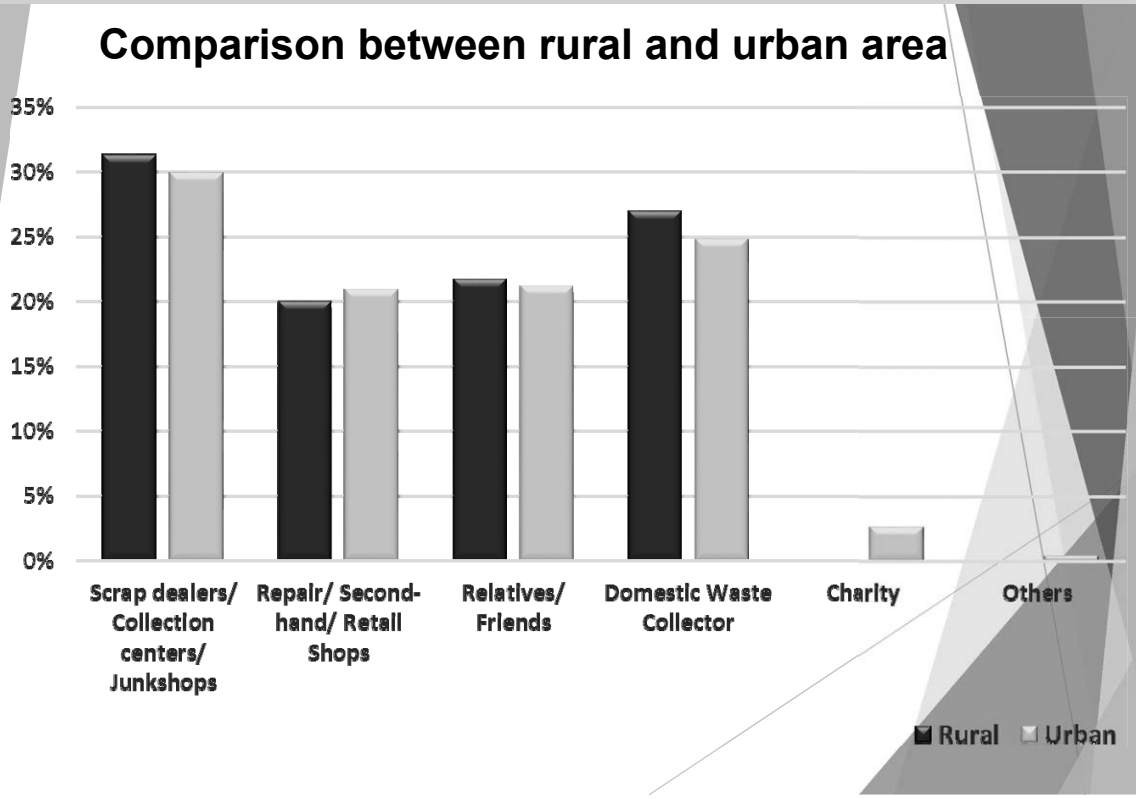
Comparison between rural and urban area (Units/HH)

	Rural	Urban
TV	1.65	1.76
Air-conditioner	1.19	1.94
Personal Computer	1.37	1.85
Tablet	0.35	0.49
Refrigerator	1.29	1.41
Washing Machine & Dryer	1.14	1.14
Mobile phone	3.75	4.52

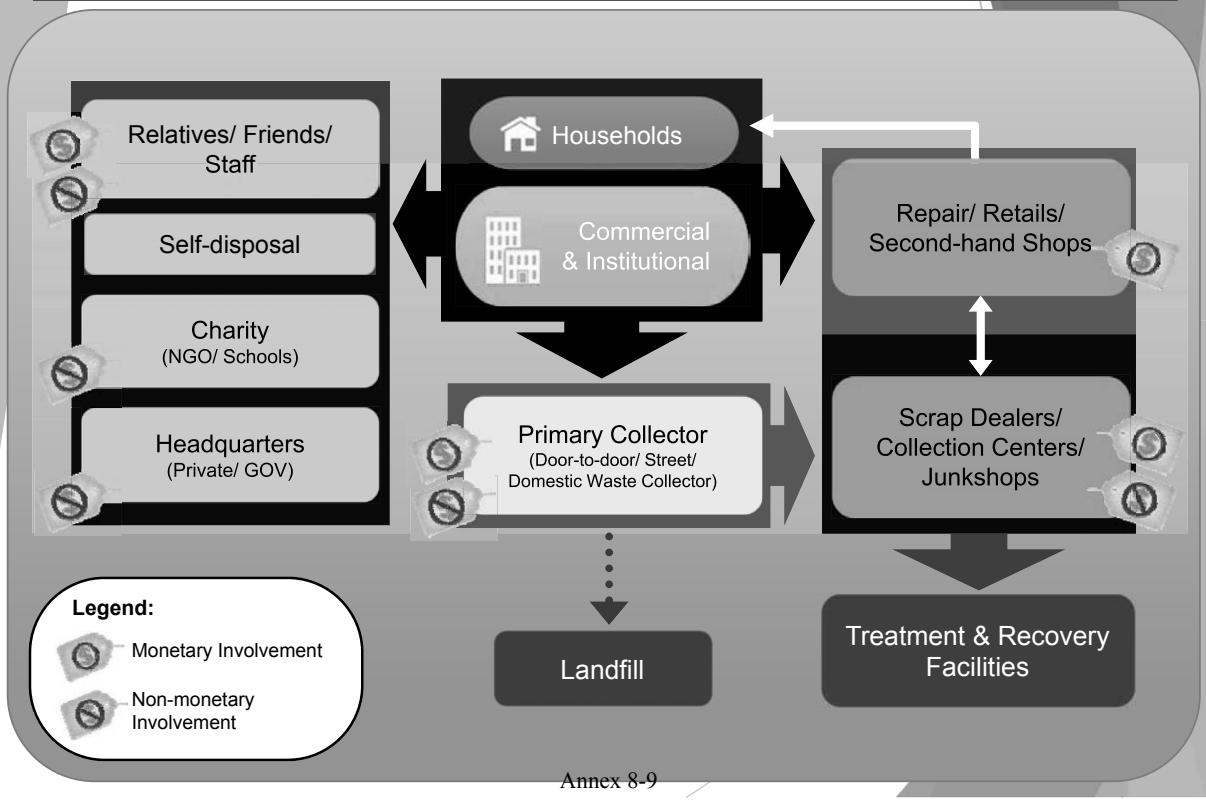
E-waste Disposal Unit by Types in Past 3 years (data derived from 505 samples, total 788 units)



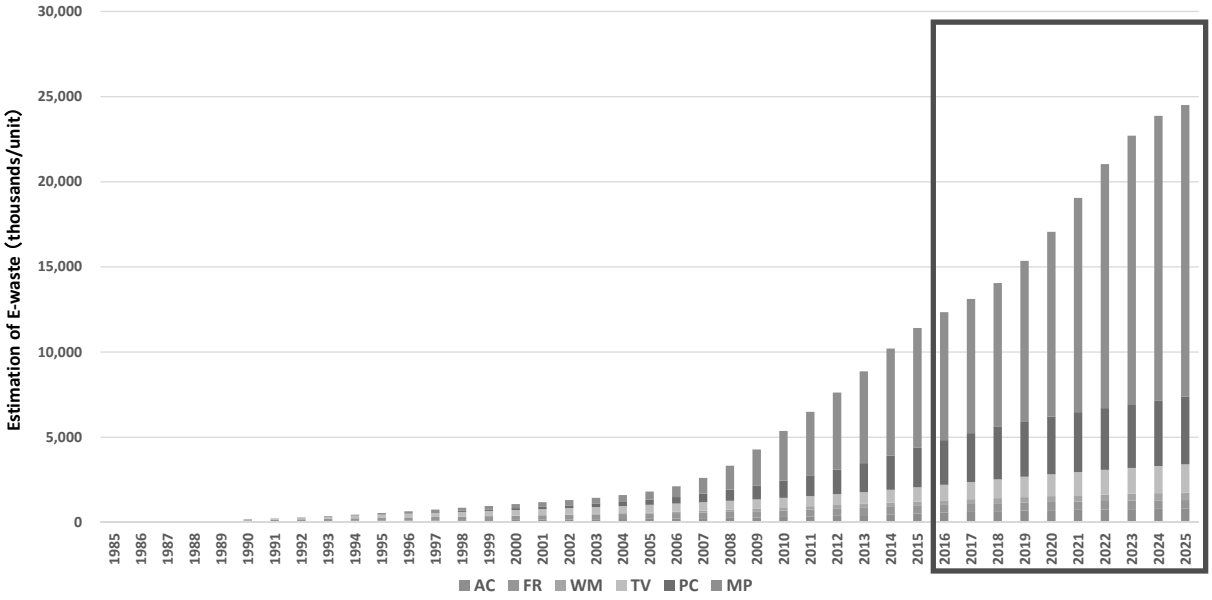
E-waste Handling Method



Overall E-waste Flow



Estimated Generation of E-waste



(unit: thousands)

	AC	RF	WM	TV	PC	MP	Total
2016	572	457	264	919	2,617	7,515	12,344
2025	804	505	444	1,654	3,985	17,112	24,504

AC - Air Conditioner
FR - Refrigeration
WM- Washing Machine
TV - Television
PC - Personal Computer
MP - Mobile Phone

JICA Technical Cooperation Project
Development of Mechanism for Household E-waste Management in Malaysia

Findings from the Pilot Project on Implementation of Recycling Guidelines



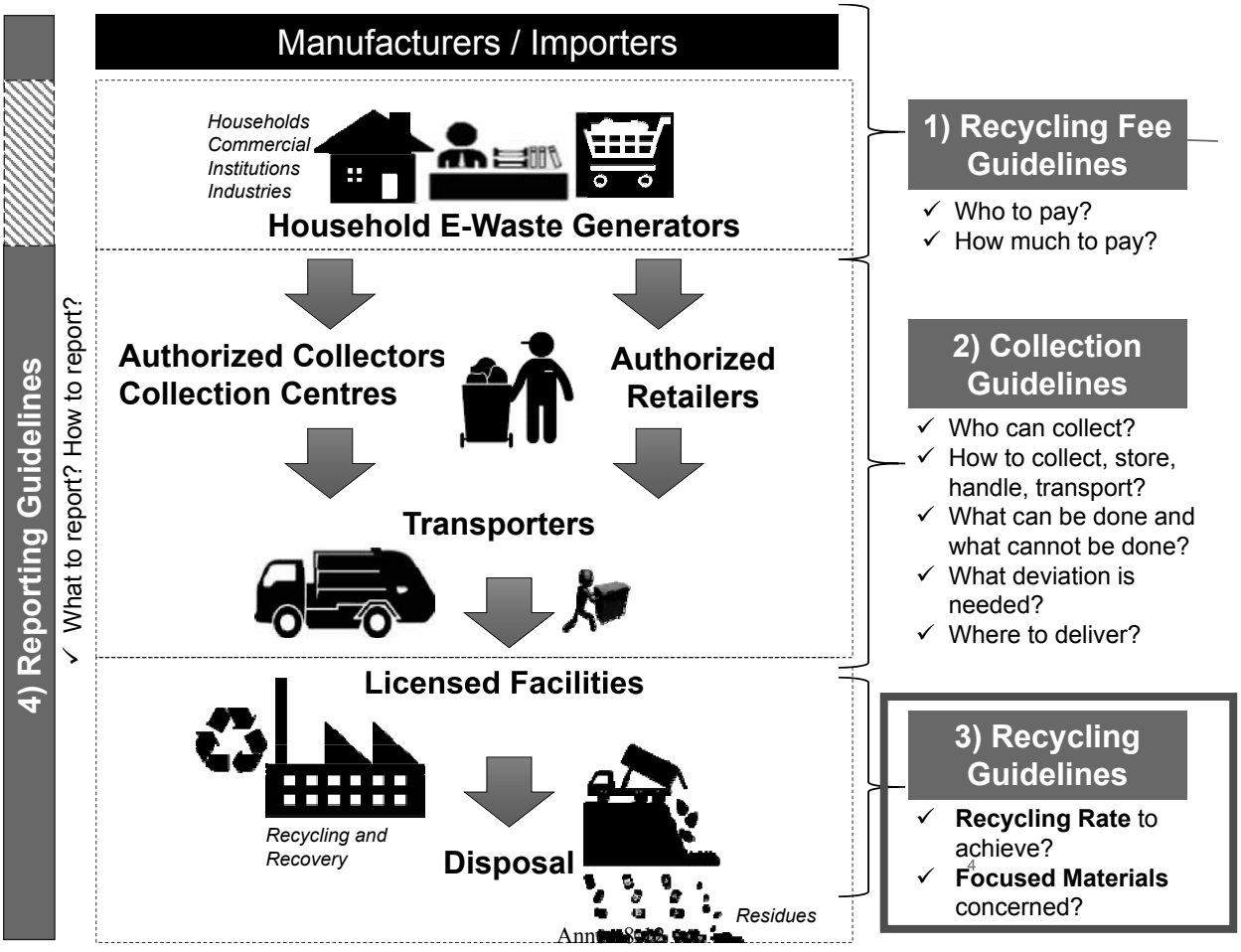
OUTLINES

1. Objective of the Pilot Project for the Recycling
2. Stages of the Pilot Project for the Recycling
3. Stakeholders Involvement of the Pilot Project
4. Quantity of Household E-waste Units Tested In The Pilot Projects
5. Methodology of the Recycling Test
6. Findings and Outcome of The Pilot Project

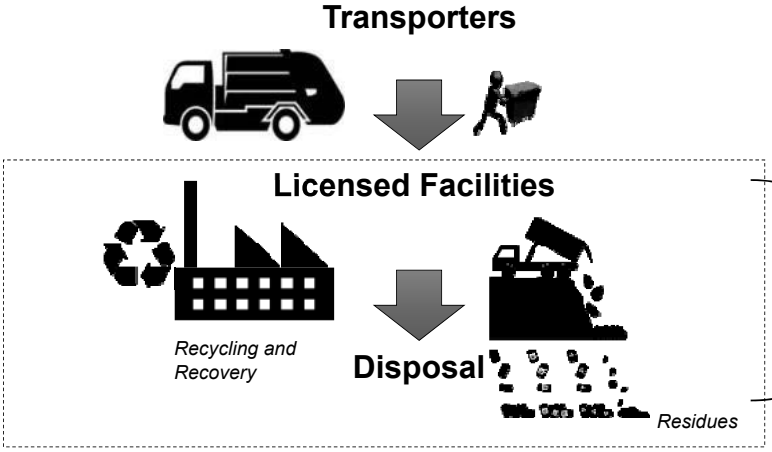
1. Objective of the Pilot Project for the Recycling

To determine the National Recycling Rate

To evaluate the feasibility of requirements in the Recycling Guidelines



6 main categories of household E-waste tested in pilot project



3) Recycling Guidelines

- ✓ **Recycling Rate** to achieve?
- ✓ **Focused Materials** concerned?

2. Stages of the Pilot Project for the Recycling

1st Stage: Preparation for Pilot Project for Recycling

- Pre-recycling test - Feb 2017 & May 2017

2nd Stage: Invitation to the Full & Partial E-waste Licensed Facility for Pilot Project for Recycling

- Screening of the qualified licensed facilities that involved in the pilot project.
- Screening on the household e-waste type that carried out by the licensed facilities.
- 10 facilities

3rd Stage: Pilot Project for Recycling test commenced from 10 July 2017 – end September 2017.

2. Stages of the Pilot Project for the Recycling

4th Stage: Data compilation, verification and analysis for each type household e-waste

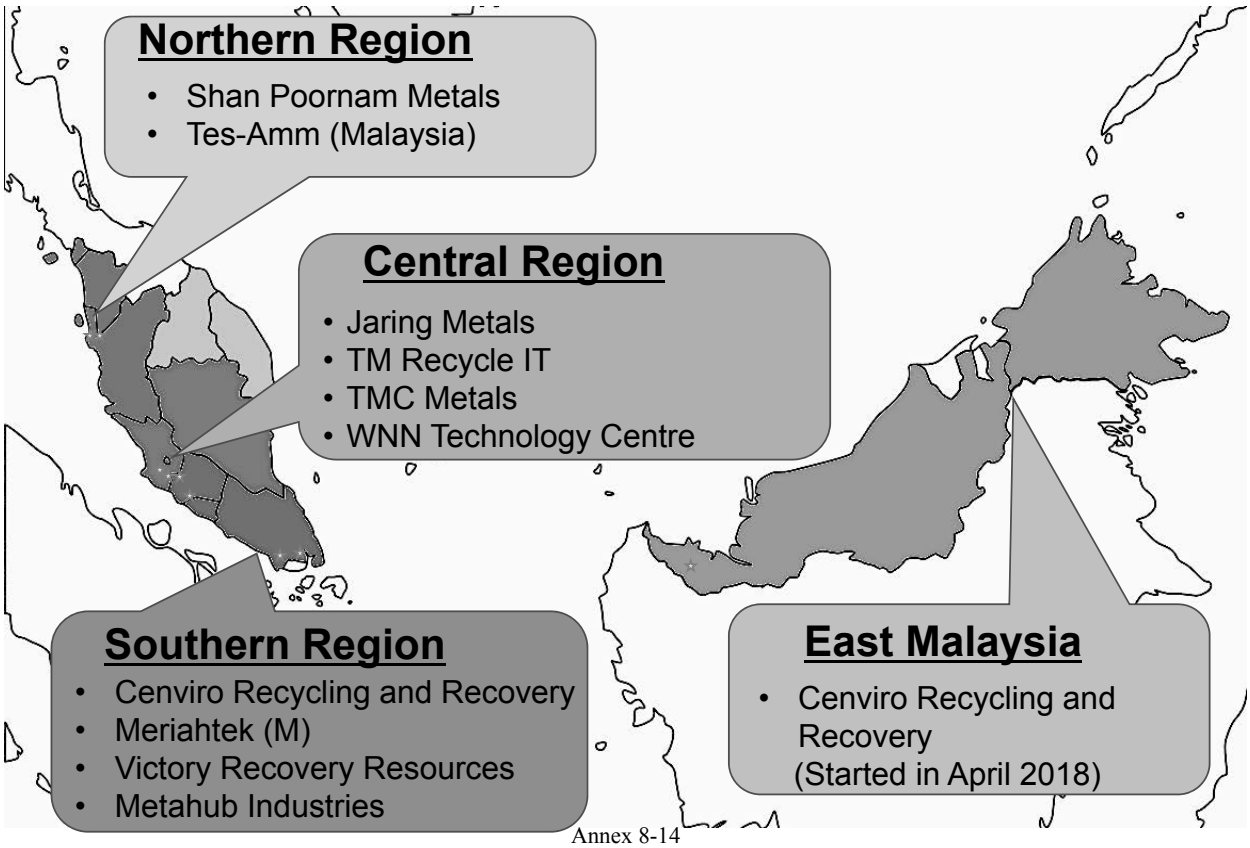
5th Stage: Site visit to the downstream vendors
– glass recycling and plastic recycling industry

6th Stage: Evaluation of the data

Fraction: Recycling (R) Or Waste(w)
Individual Recycling Rate ,%
Each Material Value (R & W) (RM/Kg or RM/Pcs)
Name of The Downstream Facility (R & W)

7th Stage: Finalized the proposed National Recycling Rate

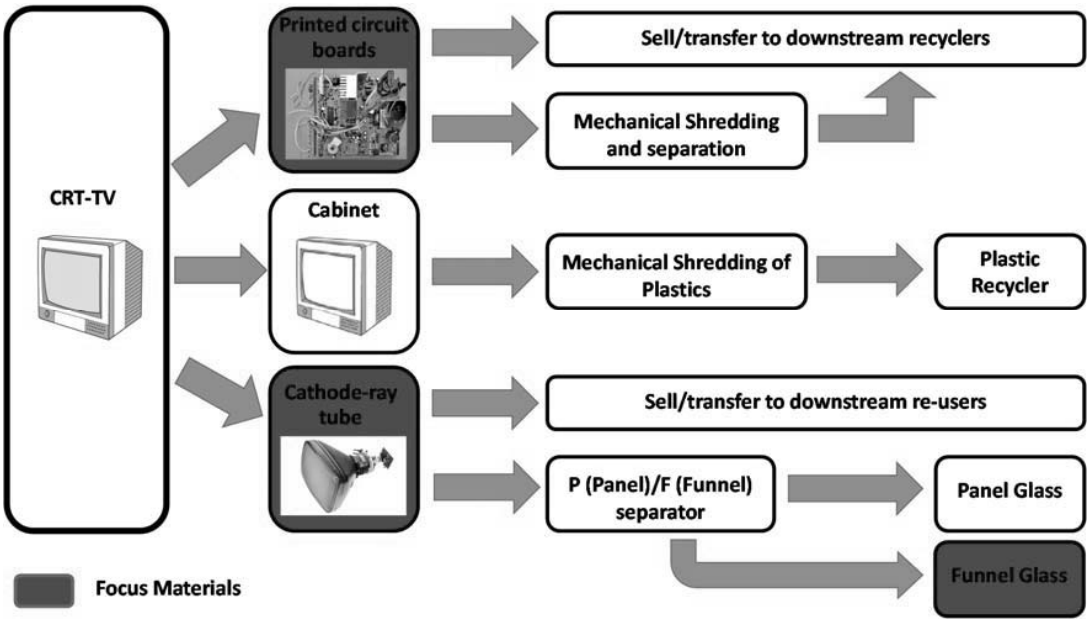
3. Participating Stakeholders



4. Quantity of household E-waste units tested in the pilot projects

Item		Quantity (unit)
Television (TV)	CRT	110
	Flat Screen	90
Washing machine (currently top/front loading type combined)		31
Air-conditioning		25
Refrigerator		60
Desktop PC	CPU	118
	CRT monitor	120
	Flat screen	132
Notebook PC		137
Mobile phone	smart phone	115
	old type	85

5. Methodology of the Recycling Test



Step 1: Preparation of the household e-waste items, tools and storage boxes /jumbo bags




Step 2: Weighing and labelling the household e-waste items and the storage boxes (tara weight)



Step 3: Start with manual dismantling, sorting, and separation of its major components (focused material, hazardous substances, recyclable material & residue)







Step 4: Weighing, labelling and record the data



Recycling Form

INPUT

Recycling Rate
Total weight of recyclable fractions ÷ Total weight of input x 100

TYPES OF APPLIANCES	INPUT WEIGHT(a) (kg)	QUANTITY (b)	AVERAGE WEIGHT (c=a/b) (kg)
TV (CRT)			

OUTPUT

NO.	FRACTION	TARA WEIGHT (kg)	GROSS WEIGHT (kg)	NETT WEIGHT, (kg) (D)	FRACTION RATIO, % (E=D/a x 100)	RECYCLING (R) or WASTE (W)	RECYCLING RATE ,% (F=D/a x 100)	EACH MATERIAL VALUE (RM/kg OR RM/pcs)	TOTAL MATERIAL VALUE (RM)	NAME & ADDRESS OF THE DOWNSTREAM FACILITY	REMARKS
1	Plastic (back cover and front cover)										
2	Metal										
3	Power Cable										
4	Shield Cable										
5	Printed circuit boards										
6	Differential York (coil)										
7	Speaker box										
8	Wood										
9	Residue										
	WEIGHT SUBTOTAL(A)										
	(After further process of CRT)										
	Panel and funnel separation										
10	Steel band										
11	Electric gun										
12	Metal										
13	Funnel Glass										
14	Panel										
15	Mask → Steel										
16	Phosphor (vacuum cleaner)										
17	(Pin) → Steel										
	WEIGHT SUBTOTAL (B)										
	WEIGHT TOTAL (C=A+B)										
	ORPHAN / RESIDUE ((a)-(C))										
	INPUT WEIGHT (a)										

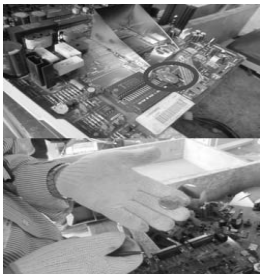
Recycling Rate (%)

Note: The power cable need to be included as a complete set.

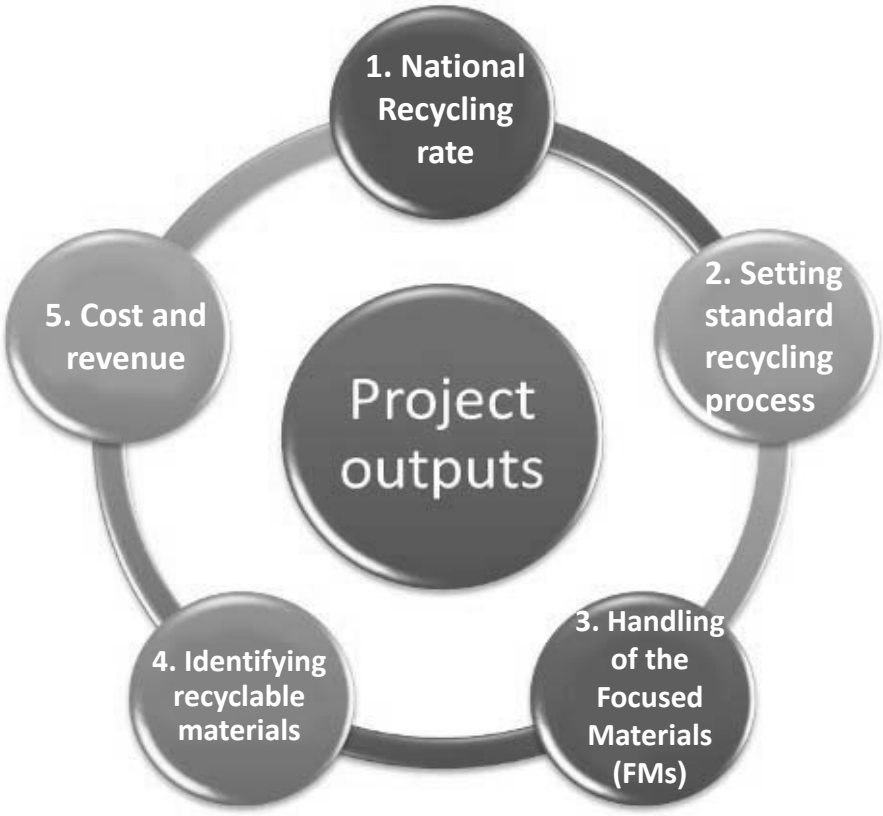
6. Findings & Output in the pilot projects

KEY FINDINGS

- **Handling of the focused materials** (back light, lithium ion battery)
- **Lack of Equipment** (Fluorocarbon gas sucking) , **tools and safety equipment.**
- **Identifying recyclable materials** (e.g. type of plastic PP, PS, ABS. PCB grade : high grade, medium grade & etc.)
- **Downstream facility** (plastic, panel glass and etc.)
- **Record & analysis of data**



6. Findings & Output in the pilot projects



Recycling rate

- All the licensed recyclers are required to comply with the minimum recycling rate targets for each regulated item
- Recycling rate is calculated in accordance with the equation below

$$RR(x) = \frac{WR(x)}{TW(x)} * 100$$

Where:

RR(x):	Recycling rate of E-waste type x (%)
WR (x):	Total weight of materials recycled from E-waste type x (tons)
TW (x):	Total weight of E-waste x received (tons)

- To demonstrate its compliance with the recycling rate , every licensed recycler shall measure and make periodical report on the total weight of E-waste received and materials recycled through the recycling operations by applying the equation above.

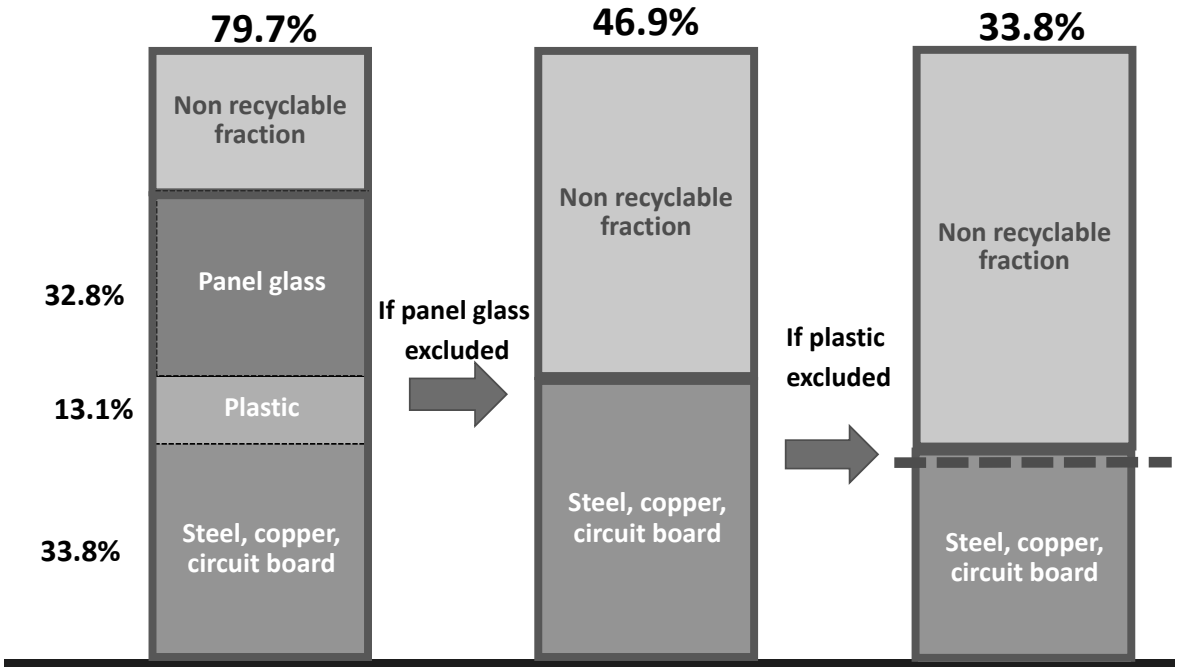
The Summary of the Recycling Rate

Item		Recycling rate	Recycling rate (without plastic)	Recommendable Recycling rate (80%)
Television (TV)	CRT	79.7%	33.8%	**30%**
	Flat Screen	76.6%	52.3%	**45%**
Washing machine (currently top/front loading type combined)		81.4%	52.8%	**45%**
Air-conditioning		98.9%	85.1%	**70%**
Refrigerator		92.6%	76.5%	**65%**
Personal Computer (PC)				
Desktop PC	CPU + monitor (CRT monitor & flat screen)	85.8%	57.2%	**50%**
	CPU	88.0%	81.7%	**65%**
	CRT monitor	79.7%	36.3%	**30%**
	Flat screen	75.9%	46.4%	**40%**
Notebook PC		64.3%	43.6%	**35%**
Mobile phone	smart phone	59.6%	38.3%	**35%**
	old type	66.6%	39.7%	

TV-CRT

Total input weight: 2,760kg/ 110pcs

Recommendable Recycling rate = 30% (33.8* ~0.8)



- **CRT glass should be separated from CRT monitor and disposed separately.**
- **Plastic recycling market is only limitedly available for PP and TV plastic is excluded.**

Setting standard recycling process

■ Standard recycling process is set for each item to fulfill recycling rate and to ensure environmentally sound management for Focused Materials

Item	Recycling process
CRT TV	•CRT monitor panel funnel part separation—(A) •CRT brushing, roller conveyer, air screwdriver •Phosphor vacuum cleaner
Flat TV	•Back light mercury dust collecting chamber—(B) •Roller conveyer, air screwdriver
WM	•Roller conveyer, air screwdriver, tool for washing tub •Shredder –(C) •Salt water collection equipment—(D)
AC	•Refrigerant fluorocarbon gas and oil capturing devise—(E) •Fluorocarbon gas pipe severance •Roller conveyer, air screwdriver •Shredder for heat exchanger shredding and segregation
Fridge	•Refrigerant fluorocarbon gas and oil capturing devise—(F) •Fluorocarbon gas pipe severance •Roller conveyer, air screwdriver •Shredder (G) +fluorocarbon gas capturing equipment—(H)
PC (desktop)	•Roller conveyer, air screwdriver •Monitor processing equipment
Laptop	•Roller conveyer, air screwdriver, manual dismantling—(I)
MP	•Dismantling table •Roller conveyer, air screwdriver •Shredder—(J)

Setting standard recycling process

(A)CRT PF cutting

(B)Back light separation

(C)Shredder

(D)Salt water collection

(E)Fluorocarbon gas sucking

(F)Refrigerant fluorocarbon gas collection

(G)Fridge shredder

(H)Fluorocarbon insulation capturing

(I)Manual dismantling

(J)Shredder

Focused Materials (FMs) in Household E-waste

E-waste Items	Focused Materials	Hazardous Substances
Television	CRT monitor	▪ Lead (Pb)
	Printed circuit board	▪ Lead (Pb), Cadmium (Cd), etc.
	Capacitor (old type)	▪ Polychlorinated biphenyl (PCB)
	Florescent tube (flat TV)	▪ Mercury (Hg)
	Liquid-crystal display	▪ Antimony (Sn), Arsenic (As)
	Plasma display	▪ Lead (Pb)
Refrigerator	Refrigerant (in compressor)	▪ Fluorocarbon
	Foaming agent for heat insulating material	▪ Fluorocarbon
	Printed circuit board	▪ Lead (Pb), Cadmium (Cd), etc.
Air conditioner	Refrigerant	▪ Fluorocarbon
	Printed circuit board	▪ Lead (Pb), Cadmium (Cd), etc.
	Capacitor (old type)	▪ Polychlorinated biphenyl (PCB)
Washing machine/dryer	Refrigerant (heat pump type dehumidifier or dryer)	▪ Fluorocarbon
	Printed circuit board	▪ Lead (Pb), Cadmium (Cd), etc.
	Capacitor (old type)	▪ Polychlorinated biphenyl (PCB)
Personal computer	Printed circuit board	▪ Lead (Pb), Cadmium (Cd), etc.
	CRT monitor	▪ Lead (Pb)
	Florescent tube (flat TV)	▪ Mercury (Hg)
	Liquid-crystal display	▪ Antimony (Sn), Arsenic (As)
	Plasma display monitor	▪ Lead (Pb)
	Rechargeable battery	▪ Cadmium (Cd), Lead (Pb)
	Button batteries	▪ Mercury (Hg)
Mobile Phone	Printed circuit board	▪ Lead (Pb), Cadmium (Cd), etc.
	Rechargeable battery	▪ Cadmium (Cd), Lead (Pb)
	Florescent tube	▪ Mercury (Hg)
	Liquid-crystal display	▪ Antimony (Sn), Arsenic (As)

- "Recycling rate" can be a tool to ensure the proper recycling.
- This is done because all the detail of technical process cannot be standardized except minimum pollution controlling requirements.
- To enhance the recycling rate for the targeted items the recycling test is require to be continued due to changes in technology, market survey, changes in the material in the products and others.

GIVE US
NEW LIFE

Pilot Project on New Mechanism for Household E-waste Management (Collection and Reporting)

(October 2017 to March 2018)

Pilot Project on Mechanism for Household E-waste Management

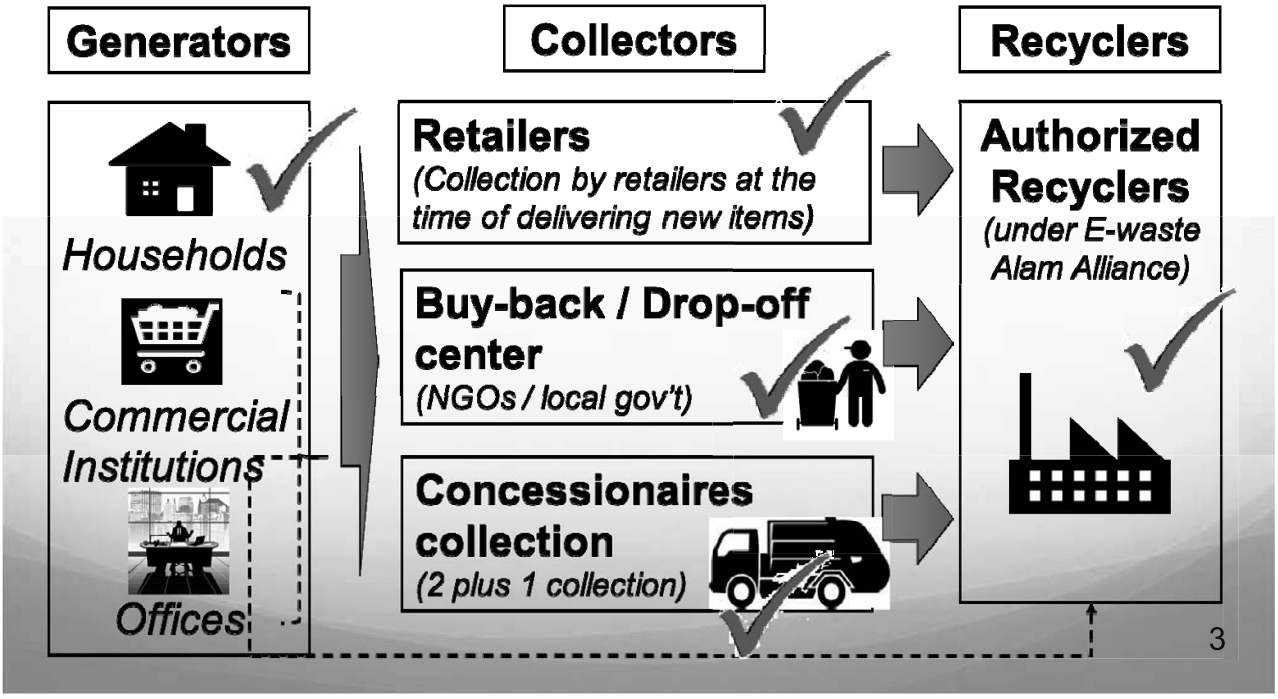
Objectives of the Pilot Project

- To carry out trial on the feasibility of requirements on storage, handling, collection and transportation of household E-waste --> Collection Guidelines
- To carry out trial on the feasibility of reporting requirements by following the manifest system along with the household E-waste collection --> Reporting Guidelines

Registration – Collection – Storage – Transport – Reporting
(Test on the procedures and flow; NOT the collection quantity)

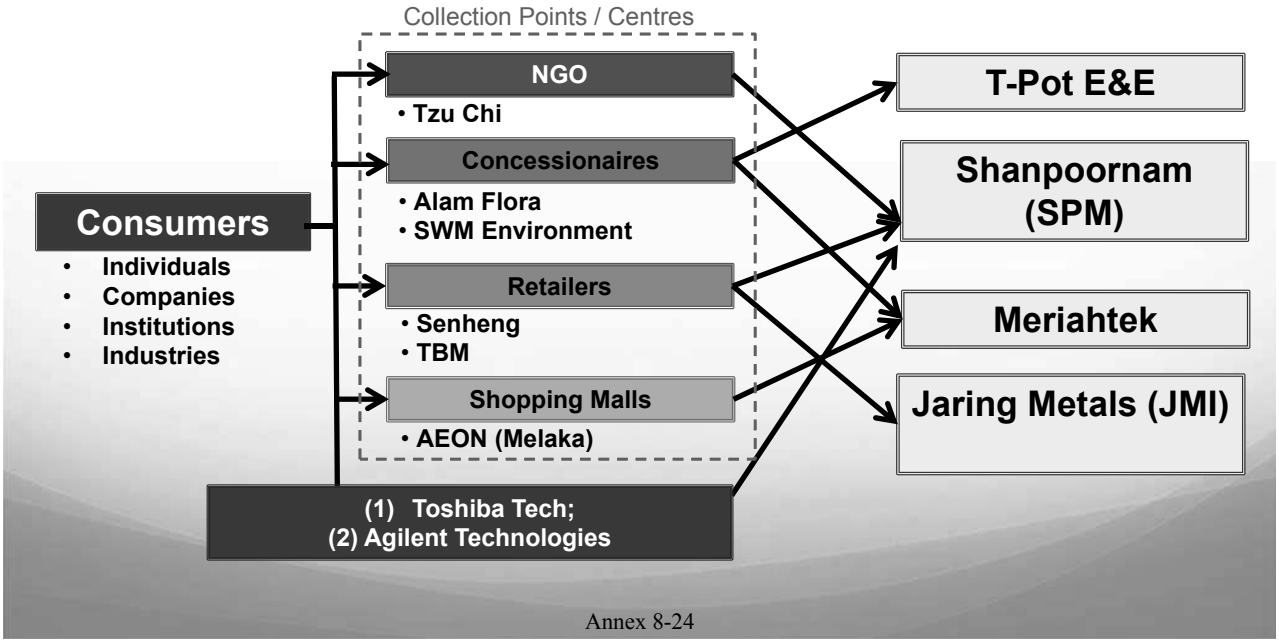
Pilot Project on Mechanism for Household E-waste Management

The Key Components



Pilot Project on Mechanism for Household E-waste Management

Started from October 2017 – 31st March 2018
(6 months)

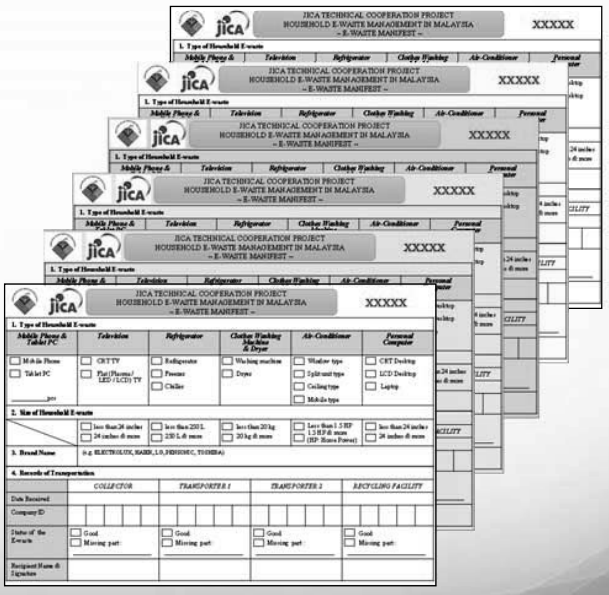


Pilot Project on Mechanism for Household E-waste Management

Test of Manifest

Manifest:

- Consists of 6 ply
- 1 form for each piece of E-waste (except for mobile phones and tablet PCs)



Manifest Reporting System

- Collectors (including Retailers of E-appliances)

Collectors should fill in
1. Type of E-waste
2. Size
3. Brand Name
4. Date Received
5. Company ID
6. Status of E-wastes

Then, sign it, stick the last ply to the E-waste, send White ply (original) to DOE, and keep the Yellow ply for own record.

JICA TECHNICAL COOPERATION PROJECT
HOUSEHOLD E-WASTE MANAGEMENT IN MALAYSIA
~ E-WASTE MANIFEST ~

XXXXX

1. Type of Household E-waste

Mobile Phone & Tablet PC	*Television*	*Refrigerator*	*Clothes Washing Machine & Dryer*	*Air-Conditioner*	*Personal Computer*
☐ Mobile Phone ☐ Tablet PC _____pcs	☑ CRT TV ☐ Flat (Plasma / LED / LCD) TV	☐ Refrigerator ☐ Freezer ☐ Chiller	☐ Washing machine ☐ Dryer	☐ Window type ☐ Split unit type ☐ Ceiling type ☐ Mobile type	☐ CRT Desktop ☐ LCD Desktop ☐ Laptop

2. Size of Household E-waste

	☑ less than 24 inches ☐ 24 inches & more	☐ less than 250 L ☐ 250 L & more	☐ less than 20 kg ☐ 20 kg & more	☐ Less than 1.5 HP ☐ 1.5 HP & more (HP: Horse Power)	☐ less than 24 inches ☐ 24 inches & more

3. Brand Name: (e.g. ELECTROLUX, HAIER, LG, PENSONIC, TOSHIBA) Panasonic

4. Records of Transportation

	COLLECTOR	*TRANSPORTER 1*	*TRANSPORTER 2*	*RECYCLING FACILITY*
Date Received	Feb 12, 2017			
Company ID	C P 0 0 1			
Status of the E-waste	☑ Good ☐ Missing part :	☐ Good ☐ Missing part :	☐ Good ☐ Missing part :	☐ Good ☐ Missing part :
Recipient Name & Signature	John Wein			

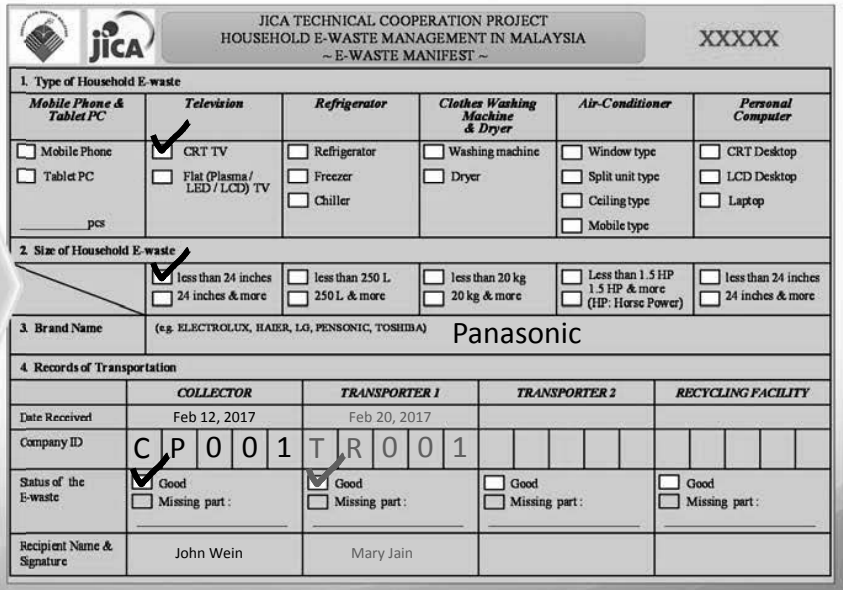
Manifest Reporting System

- Transporters

Transporters should fill in
1. Date Received
2. Company ID
3. Status of E-wastes

Then, pass the manifest to a recycling facility (or transporter).

Caution: transporters do not keep any ply of the manifest.



JICA TECHNICAL COOPERATION PROJECT
HOUSEHOLD E-WASTE MANAGEMENT IN MALAYSIA
~ E-WASTE MANIFEST ~

XXXXX

1. Type of Household E-waste

Mobile Phone & Tablet PC	Television	Refrigerator	Clothes Washing Machine & Dryer	Air-Conditioner	Personal Computer
☐ Mobile Phone ☐ Tablet PC _____pcs	☑ CRT TV ☐ Flat (Plasma / LED / LCD) TV	☐ Refrigerator ☐ Freezer ☐ Chiller	☐ Washing machine ☐ Dryer	☐ Window type ☐ Split unit type ☐ Ceiling type ☐ Mobile type	☐ CRT Desktop ☐ LCD Desktop ☐ Laptop

2. Size of Household E-waste

	☑ less than 24 inches ☐ 24 inches & more	☐ less than 250 L ☐ 250 L & more	☐ less than 20 kg ☐ 20 kg & more	☐ Less than 1.5 HP ☐ 1.5 HP & more (HP: Horse Power)	☐ less than 24 inches ☐ 24 inches & more

3. Brand Name (e.g. ELECTROLUX, HAIER, LG, PENSONIC, TOSHIBA) Panasonic

4. Records of Transportation

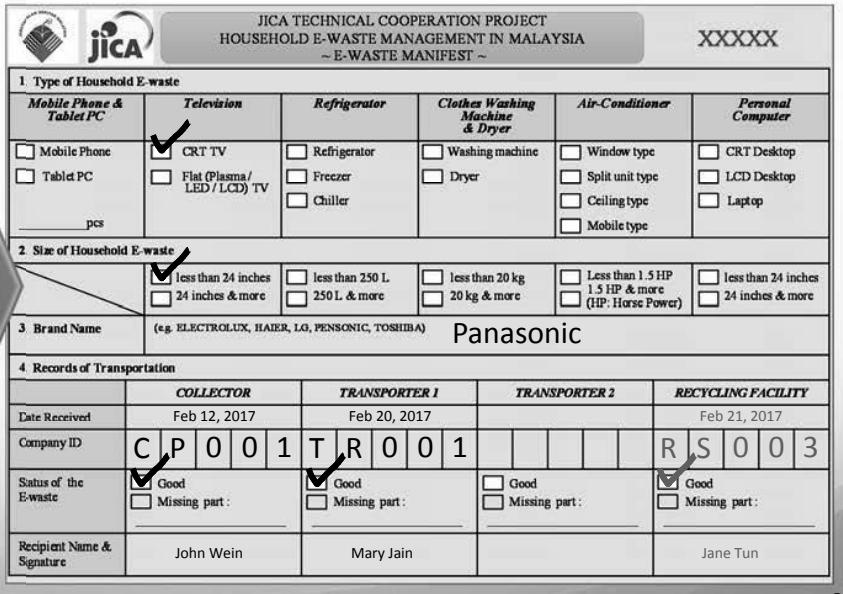
	COLLECTOR	TRANSPORTER 1	TRANSPORTER 2	RECYCLING FACILITY
Date Received	Feb 12, 2017	Feb 20, 2017		
Company ID	C P 0 0 1	T R 0 0 1		
Status of the E-waste	☑ Good ☐ Missing part :	☑ Good ☐ Missing part :	☐ Good ☐ Missing part :	☐ Good ☐ Missing part :
Recipient Name & Signature	John Wein	Mary Jain		

Manifest Reporting System

- Recycling facilities:

Recycling facilities should fill in
1. Date Received E-wastes
2. Company ID
3. Status of E-wastes

Then, sign it, send GREEN ply to DOE, send PINK ply to collector, and keep the BLUE ply for own record.



JICA TECHNICAL COOPERATION PROJECT
HOUSEHOLD E-WASTE MANAGEMENT IN MALAYSIA
~ E-WASTE MANIFEST ~

XXXXX

1. Type of Household E-waste

Mobile Phone & Tablet PC	Television	Refrigerator	Clothes Washing Machine & Dryer	Air-Conditioner	Personal Computer
☐ Mobile Phone ☐ Tablet PC _____pcs	☑ CRT TV ☐ Flat (Plasma / LED / LCD) TV	☐ Refrigerator ☐ Freezer ☐ Chiller	☐ Washing machine ☐ Dryer	☐ Window type ☐ Split unit type ☐ Ceiling type ☐ Mobile type	☐ CRT Desktop ☐ LCD Desktop ☐ Laptop

2. Size of Household E-waste

	☑ less than 24 inches ☐ 24 inches & more	☐ less than 250 L ☐ 250 L & more	☐ less than 20 kg ☐ 20 kg & more	☐ Less than 1.5 HP ☐ 1.5 HP & more (HP: Horse Power)	☐ less than 24 inches ☐ 24 inches & more

3. Brand Name (e.g. ELECTROLUX, HAIER, LG, PENSONIC, TOSHIBA) Panasonic

4. Records of Transportation

	COLLECTOR	TRANSPORTER 1	TRANSPORTER 2	RECYCLING FACILITY
Date Received	Feb 12, 2017	Feb 20, 2017		Feb 21, 2017
Company ID	C P 0 0 1	T R 0 0 1		R S 0 0 3
Status of the E-waste	☑ Good ☐ Missing part :	☑ Good ☐ Missing part :	☐ Good ☐ Missing part :	☑ Good ☐ Missing part :
Recipient Name & Signature	John Wein	Mary Jain		Jane Tun

Pilot Project on Mechanism for Household E-waste Management

Registration of Participating Partners

- ✓ The pilot project partners were requested to register some details before the pilot project:
  - Company information
  - Details of Collection Points / Centres – address, operating hour, types of household E-waste received
  - Destination of collected household E-waste
  - Information on vehicles used to transport household E-waste

Examples:

No	Vehicle Brands	Capacity	Car Number	ID Number
1	Nissan	16 ton	BLB 8891	T0100
2	Isuzu	8 ton	BGC 9333	T0101
3	Nissan	10 ton	BJY 1993	T0102
4	Nissan	10 ton	BJT 5128	T0103
5	Nissan	10 ton	BPE 6893	T0104

Pilot Project on Mechanism for Household E-waste Management

Allocation of ID Numbers

No	Collector ID	Name
1	C 0100	AEON Bandaraya Melaka
2	C 0200	ALAM FLORA – Kajang (Selangor)
3	C 0201	ALAM FLORA – Kuala Lumpur
4	C 0300	SENHENG Warehouse Prai
5	C 0301	SENHENG Warehouse Shah Alam
6	C 0302	SENHENG Warehouse Kota Kinabalu
7	C 0400	SWM Melaka (Sungai Udang)
8	C 0401	SWM Negeri Sembilan Sembilan (Bkt Palong)
9	C 0500	TBM Warehouse Subang HI-TECH
10	C 0600	TZU CHI (Cheras Utama)
11	C 0601	TZU CHI (Kepong Metro Perdana)
12	C 0602	TZU CHI (Puchong Bandar Puteri)
13	C 0603	TZU CHI (Melaka)
14	C 0700	WNN (Port Klang)
15	C 0701	WNN (Kuching)
16	C 0800	TOSHIBA Sales & Services
17	C 0801	TOSHIBA Tech Malaysia Sdn Bhd
18	C 0900	Agilent Technologies

No	Recycler ID	Name
1	R 0100	JARING METALS
2	R 0200	KUALITI KITAR ALAM
3	R 0300	MERIAHTEK
4	R 0400	SHAN POORNAM METALS
5	R 0500	T-POT

ID numbers were allocated to each participating partner, for the purpose of filling out the manifest forms:

Collectors / Collection Centres / Retailers – ID of **C XXXX**

Transporters – ID of **T XXXX**

Recyclers – ID of **R XXXX**

Pilot Project on Mechanism for Household E-waste Management

Allocation of ID Numbers

No	Transporter ID	Name
1	T 0100	JARING METALS (1)
2	T 0101	JARING METALS (2)
3	T 0102	JARING METALS (3)
4	T 0103	JARING METALS (4)
5	T 0104	JARING METALS (5)
6	T 0105	JARING METALS (6)
7	T 0106	JARING METALS (7)
8	T 0107	JARING METALS (8)
9	T 0108	JARING METALS (9)
10	T 0109	JARING METALS (10)
11	T 0200	KUALITI KITAR ALAM (1)
12	T 0201	KUALITI KITAR ALAM (2)
13	T 0202	KUALITI KITAR ALAM (3)
14	T 0203	KUALITI KITAR ALAM (4)
15	T 0204	KUALITI KITAR ALAM (5)
16	T 0205	KUALITI KITAR ALAM (6)
17	T 0206	KUALITI KITAR ALAM (7)
18	T 0207	KUALITI KITAR ALAM (8)
19	T 0208	KUALITI KITAR ALAM (9)
20	T 0209	KUALITI KITAR ALAM (10)

No	Transporter ID	Name
21	T 0300	MERIAHTEK (1)
22	T 0301	MERIAHTEK (2)
23	T 0302	MERIAHTEK (3)
24	T 0303	MERIAHTEK (4)
25	T 0304	MERIAHTEK (5)
26	T 0305	MERIAHTEK (6)
27	T 0306	MERIAHTEK (7)
28	T 0307	MERIAHTEK (8)
29	T 0400	SHAN POORNAM METALS (1)
30	T 0401	SHAN POORNAM METALS (2)
31	T 0402	SHAN POORNAM METALS (3)
32	T 0403	SHAN POORNAM METALS (4)
33	T 0404	SHAN POORNAM METALS (5)
34	T 0405	SHAN POORNAM METALS (6)
35	T 0406	SHAN POORNAM METALS (7)
36	T 0407	SHAN POORNAM METALS (8)
37	T 0408	SHAN POORNAM METALS (9)
38	T 0409	SHAN POORNAM METALS (10)
39	T 0500	T-POT (1)
40	T 0501	T-POT (2)

Pilot Project on Mechanism for Household E-waste Management

Instructions / Briefing Sessions

c) Television

The size of television is determined by the following way:

d) Personal Computer

The size of computer is determined by the following way (on the monitor):

a) Cloth Washing / Drying Machines

The capacity of the washing machine is normally shown on the body of the washing machine. Examples are shown as follows:

b) Refrigerator / Chiller

The capacity of the refrigerator is normally shown on the sticker inside the refrigerator / Chiller. Examples are shown as follows:

Pilot Project on Mechanism for Household E-waste Management

Instructions / Briefing Sessions

Categories	Complete Set	How to Check
Television	• Whole television without any dismantling or still in good shape. • Does not include antenna, remote control and other attached devices. • With or without electric cables.	• Observe physically. • Example of incomplete set: 
Air-conditioner	• Whole air-conditioner without any dismantling • Include both the compressor unit (outdoor) and blower unit (indoor). • Does not include the remote control	• Observe physically. • Example of incomplete set:  *In case the copper coil of the air conditioner is missing / removed*
Cloth washing Machine / Dryer	• Whole washing machine without any dismantling • With or without electric cables.	• Observe physically. • Example of incomplete set:  *In case the washing machine is opened / dismantled*
Personal Computer	• Complete set includes both the CPU and monitor (for desktop computer). • In case the hard disk and/or the CD-ROM are removed, it is considered as incomplete set. • Does not include keyboard, mouse or any other attached devices. • With or without electric cables.	• Observe physically. In case either monitor or CPU is missing, mark the missing part. • Observe physically. In case the CD-ROM is missing, mark the missing part. • Open the CPU for checking purpose is allowed. Check if the hard disk is missing, mark the missing part. • Example of incomplete set:  *In case the computer hard disk is missing / removed*  *In case the computer CPU is dismantled and parts missing*

Pilot Project on New Mechanism for Household E-waste Management

Distribution of Awareness Creation / Publicity Materials

Buntings	Placed at the collector premises, such as the buy back centers of the Concessionaire Companies, collection points of the NGOs, retailer shops and participating shopping malls etc.
Banners	Placed at the participating recycling facilities. Placed on the collection vehicles.
Posters	Displayed for the public, especially in the participating shopping malls, in the retailer shops to the customers etc. Also distributed to collection centres and recycling facilities.
Car stickers	Displayed on the transport vehicles, showing the public and stakeholders about the pilot project implementation.
Online Information	Uploaded into the DOE Household E-waste Website for dissemination of information about the pilot project.

Examples of Awareness Creation / Publicity Materials

AEON Mall (Melaka)

Examples of Awareness Creation / Publicity Materials

TBM (Subang Hi-Tech)

Examples of Awareness Creation / Publicity Materials

T-Pot (Shah Alam)

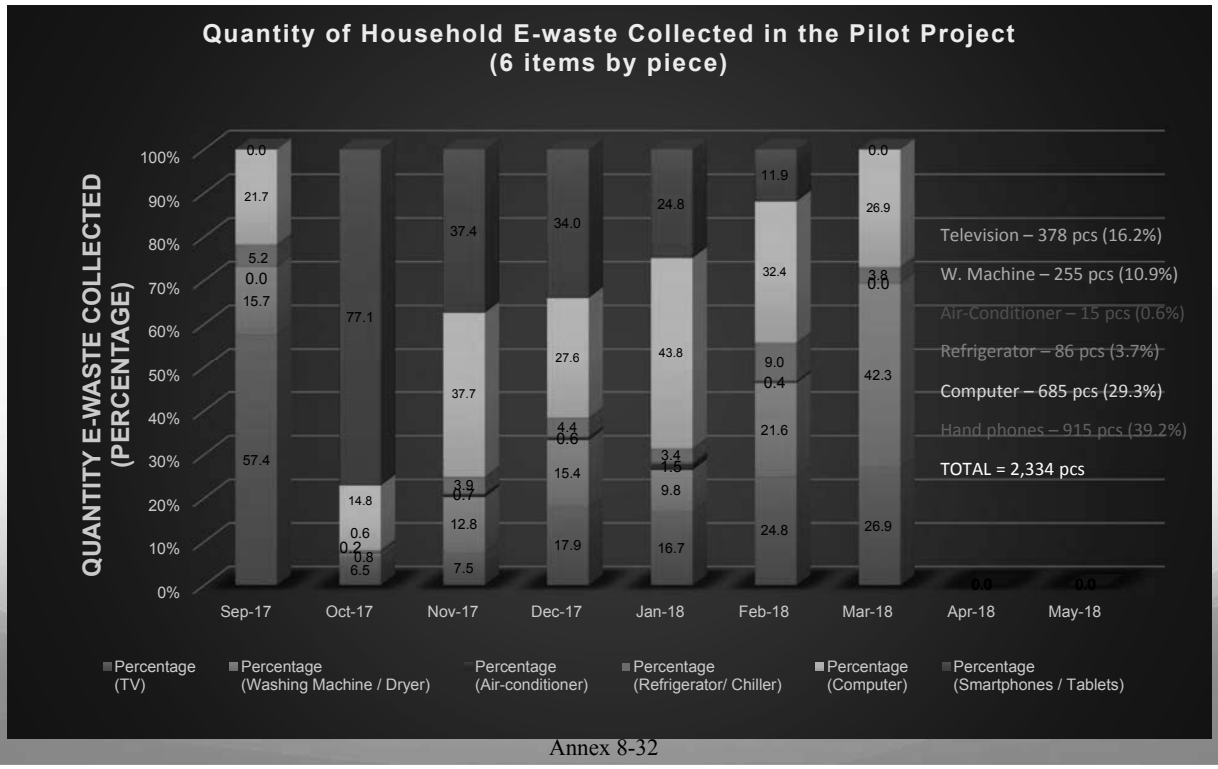
Examples of Awareness Creation / Publicity Materials

Car Sticker & Banner on Transport Vehicles

Findings

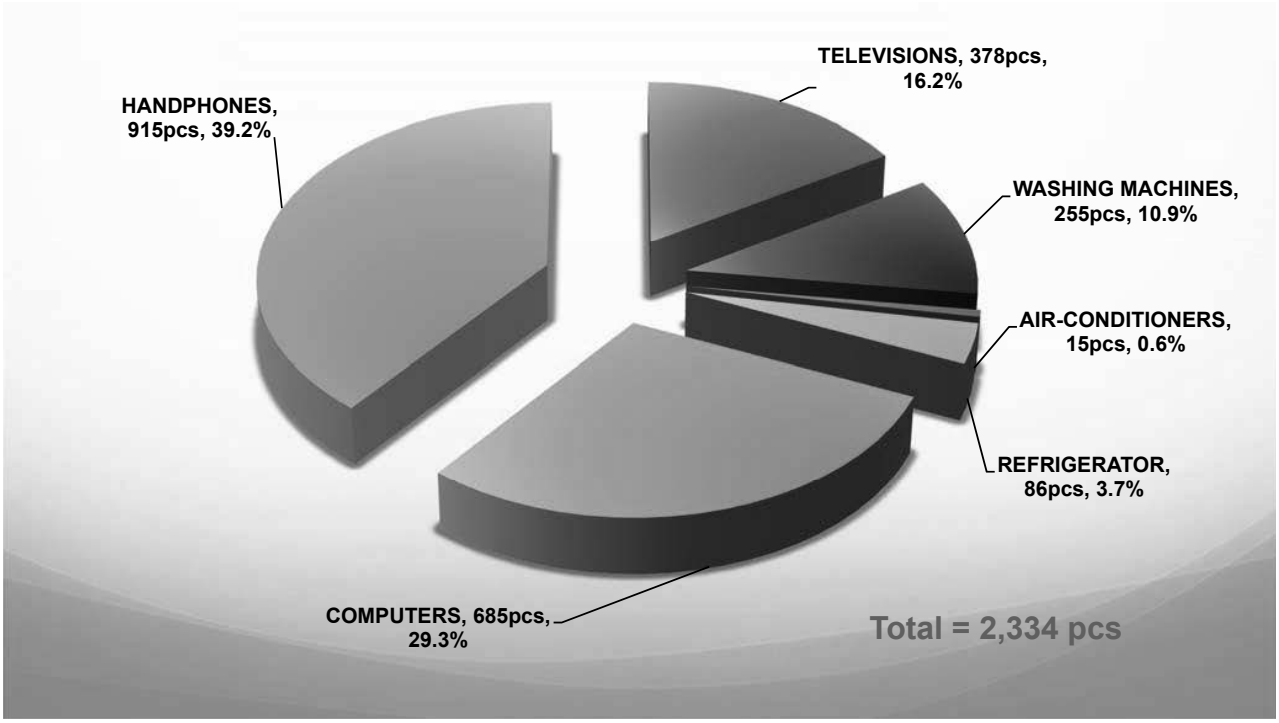
(October 2017 ~ 31st March 2018)

Pilot Project on Mechanism for Household E-waste Management

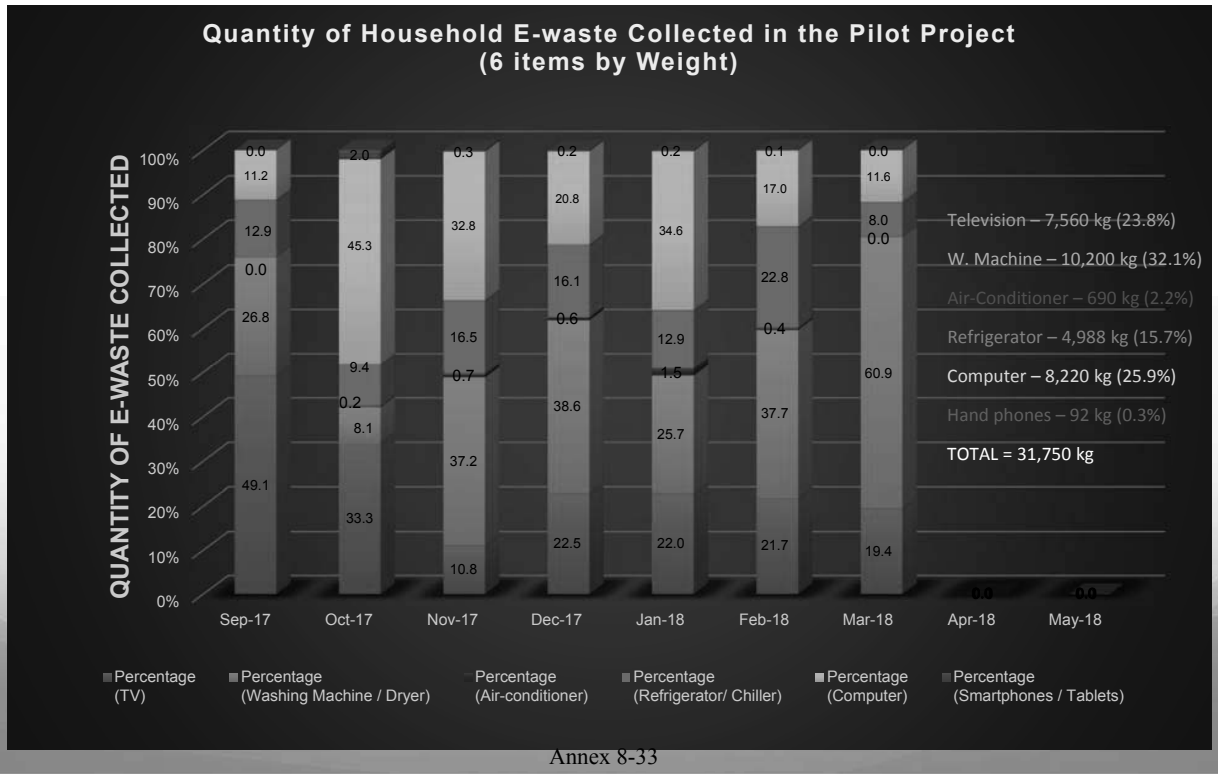


Pilot Project on Mechanism for Household E-waste Management

Quantity of Household E-waste Collected (By Piece)

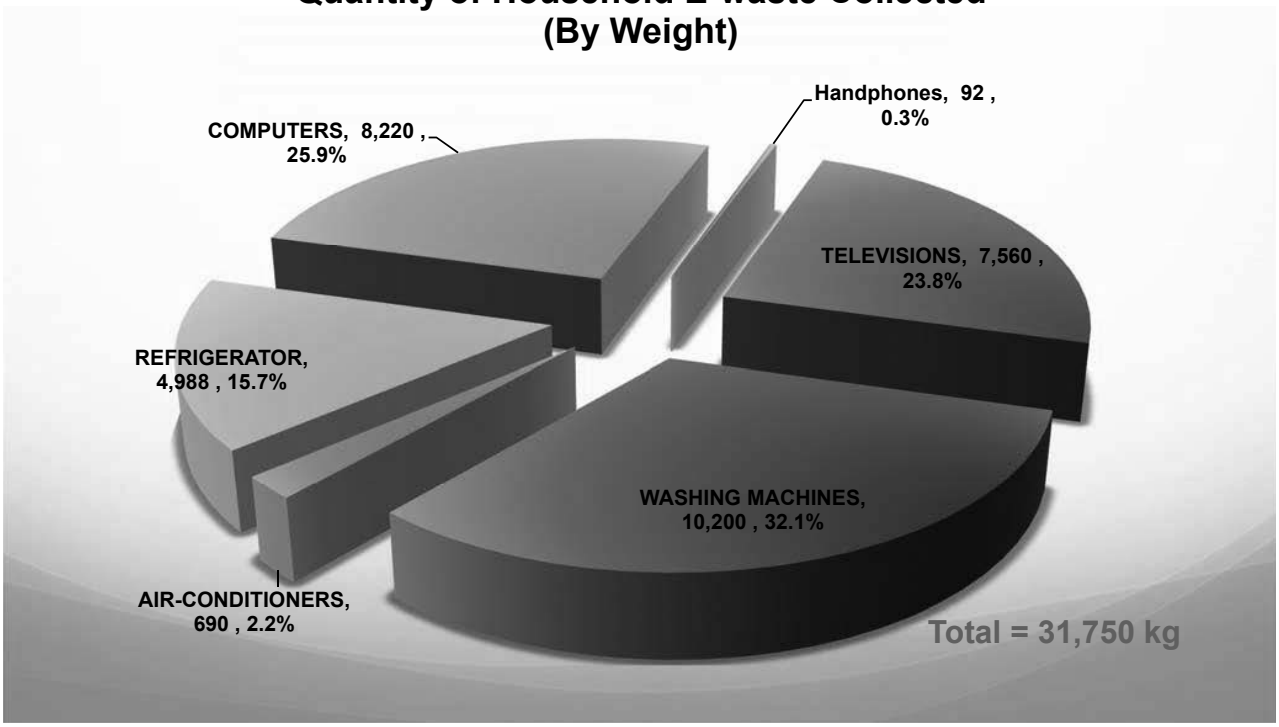


Pilot Project on Mechanism for Household E-waste Management



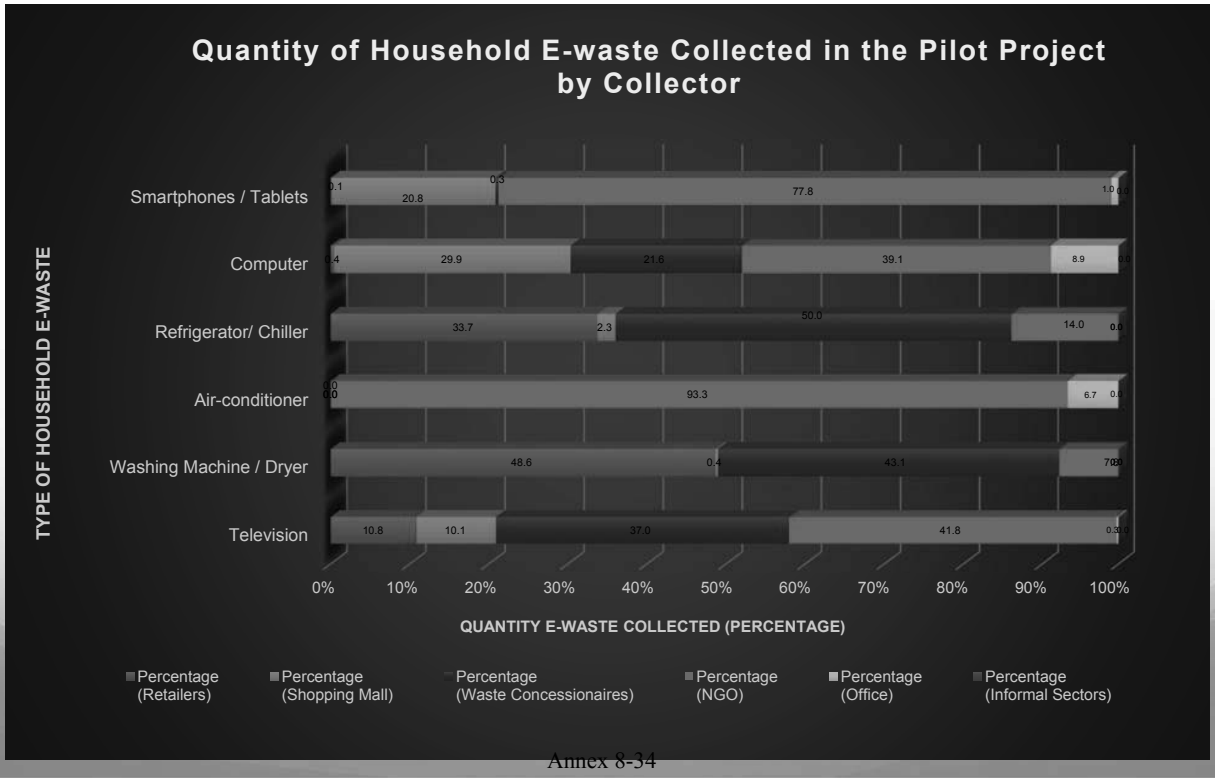
Pilot Project on Mechanism for Household E-waste Management

Quantity of Household E-waste Collected (By Weight)



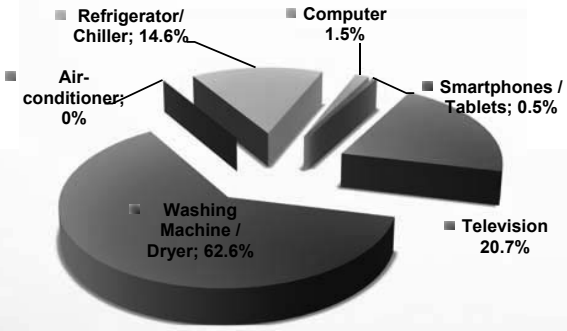
Pilot Project on Mechanism for Household E-waste Management

Quantity of Household E-waste Collected in the Pilot Project by Collector

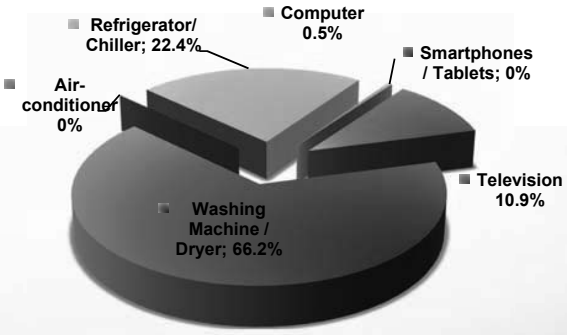


Pilot Project on Mechanism for Household E-waste Management

RETAILERS



Collection of Household E-waste by the Retailers (by Piece)

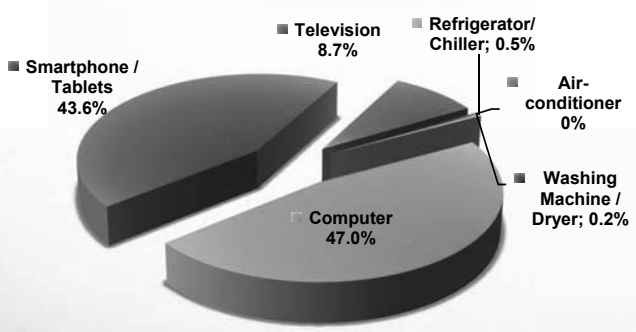


Collection of Household E-waste by the Retailers (by Weight)

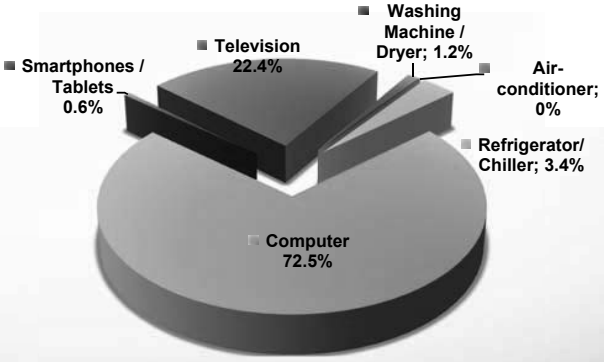
- ✓ Bulky items are common types of household E-waste collected by the retailers (washing machines, televisions and refrigerators).
- ✓ No air-conditioner was collected by the retailers – installation by contractors.

Pilot Project on Mechanism for Household E-waste Management

SHOPPING MALL



Collection of Household E-waste by the Shopping Mall (by Piece)

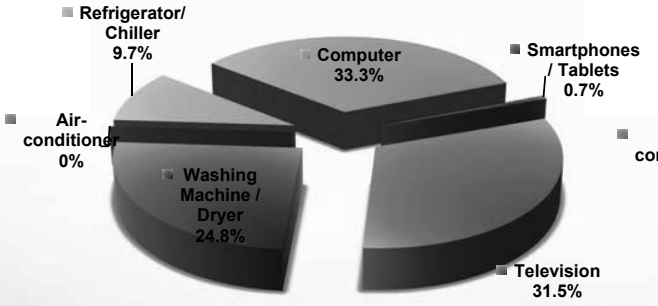


Collection of Household E-waste by the Shopping Mall (by Weight)

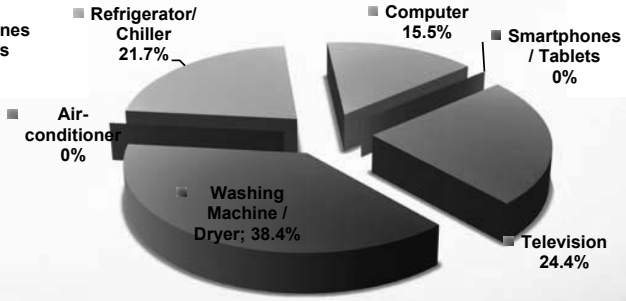
- ✓ Shoppers are only able to bring in smaller items of E-waste to the collection points in malls, such as handphones and computers.

Pilot Project on Mechanism for Household E-waste Management

CONCESSIONAIRE COMPANIES



Collection of Household E-waste by the Waste Concessionaire Companies (by Piece)

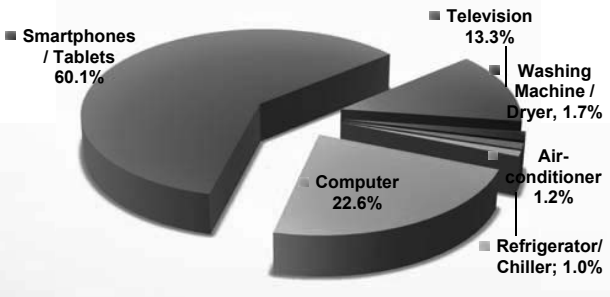


Collection of Household E-waste by the Waste Concessionaire Companies (by Weight)

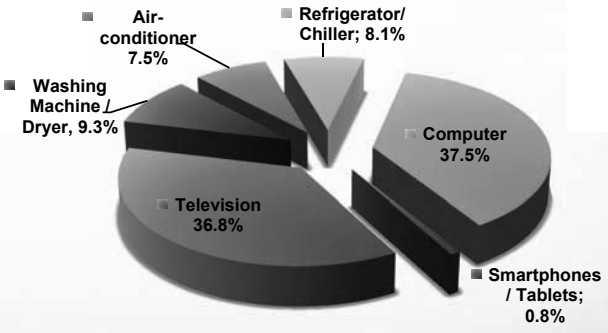
- ✓ Concessionaire companies are collecting household E-waste from the source separation programme – place at the roadside for collection.
- ✓ No air-conditioner and very few handphones were collected by the concessionaire companies.

Pilot Project on Mechanism for Household E-waste Management

NGOs



Collection of Household E-waste by the NGOs (by Piece)

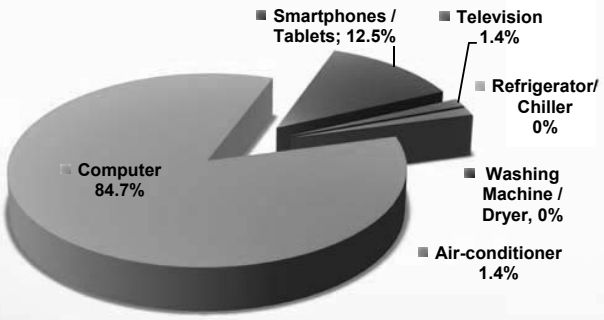


Collection of Household E-waste by the NGOs (by Weight)

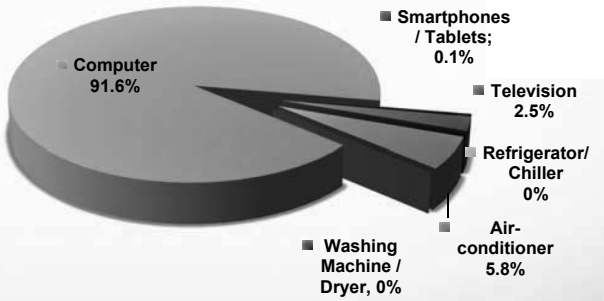
- ✓ Donation of household E-waste to NGOs of all categories – collection center, collection point and collection by truck.
- ✓ The only channel that collected more units of air-conditioners.

Pilot Project on Mechanism for Household E-waste Management

OFFICES



Collection of Household E-waste by the Offices (by Piece)



Collection of Household E-waste by the Offices (by Weight)

✓ E-waste generated from office – computers and some handphones (employees)

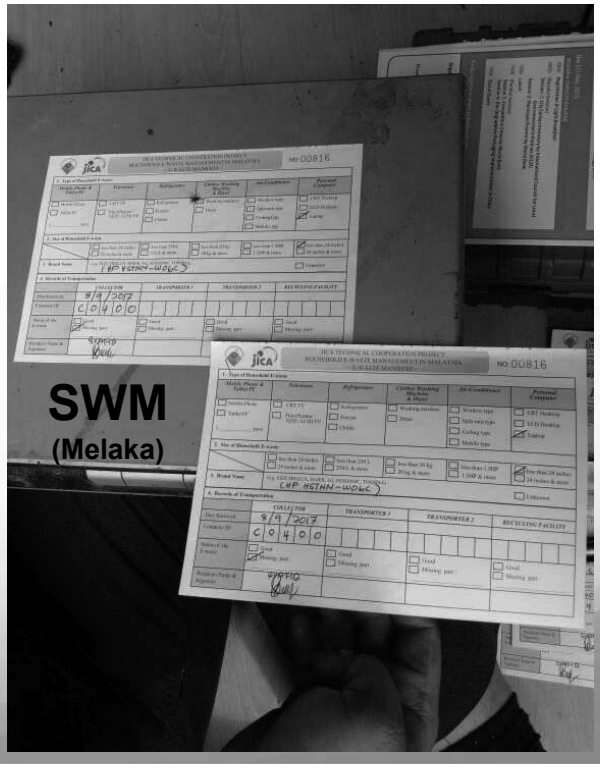
Pilot Project on Mechanism for Household E-waste Management

Estimation of Subsidies for Quantity of E-waste Collected from the PP

Categories	Quantity (pcs)	Subsidies by the FMB			
		Collectors		Recycling Facility	
		RM/pcs	Total (RM)	RM/pcs	Total (RM)
Television	378	5.00	1,890	25.00	9,450
Washing machine	255	15.00	3,825	20.00	5,100
Air-conditioner	15	10.00	150	5.00	75
Refrigerator	86	20.00	1,720	40.00	3,440
Computer	685	10.00	6,850	10.00	6,850
Handphone	915	0.50	457.5	3.00	2,745
TOTAL	**2,334**	**-**	**14,893**	**-**	**27,660**

*Note: Subsidies per unit is **NOT** actual rate, subject to fee analysis*

Pilot Project on Mechanism for Household E-waste Management



Pilot Project on Mechanism for Household E-waste Management

Pilot Project on Mechanism for Household E-waste Management

Pilot Project on Mechanism for Household E-waste Management

Pilot Project on Mechanism for Household E-waste Management

SWM

Pilot Project on Mechanism for Household E-waste Management

SWM (Bkt Palong, N. Sembilan)

Pilot Project on Mechanism for Household E-waste Management

SWM (Sg Udang, Melaka)

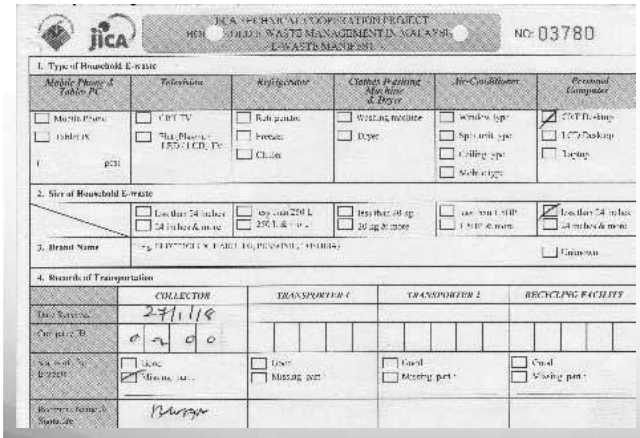
Pilot Project on Mechanism for Household E-waste Management

Tzu Chi (Cheras Utama)

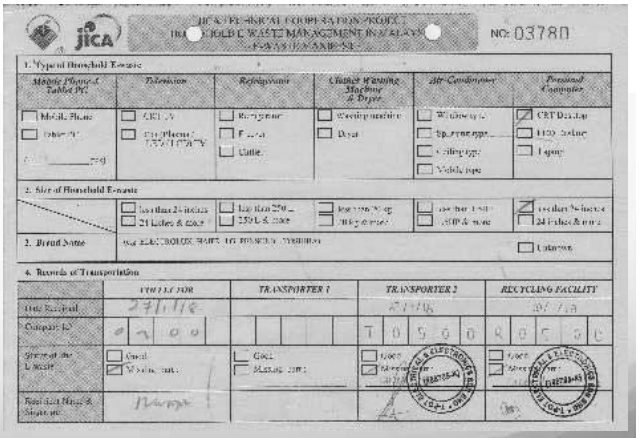
Pilot Project on Mechanism for Household E-waste Management

Alam Flora → T-pot

Alam Flora Kajang
Collector ID: C 0200



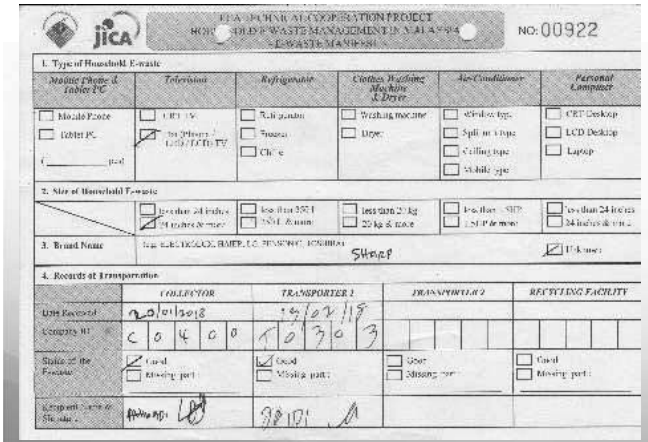
T-pot
Recycler ID: R 0500



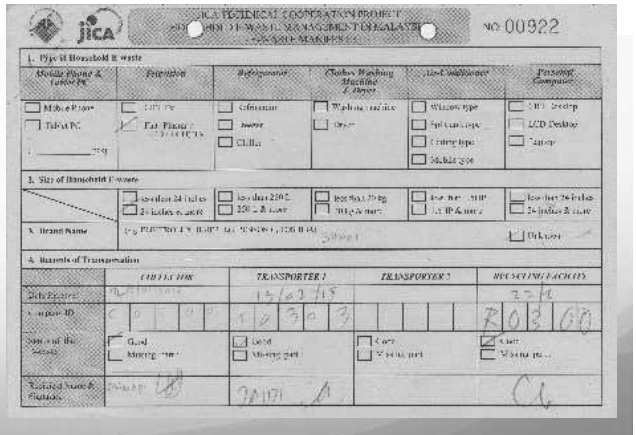
Pilot Project on Mechanism for Household E-waste Management

SWM (Sg Udang) → Meriahtek

SWM (Sg.Udang, Melaka)
Collector ID: C 0400



Meriahtek
Recycler ID: R 0300

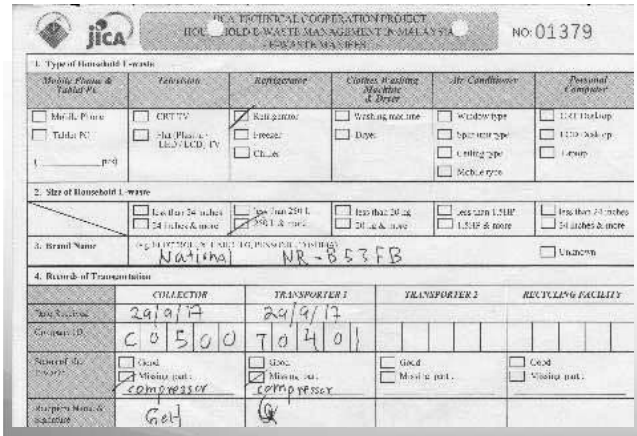


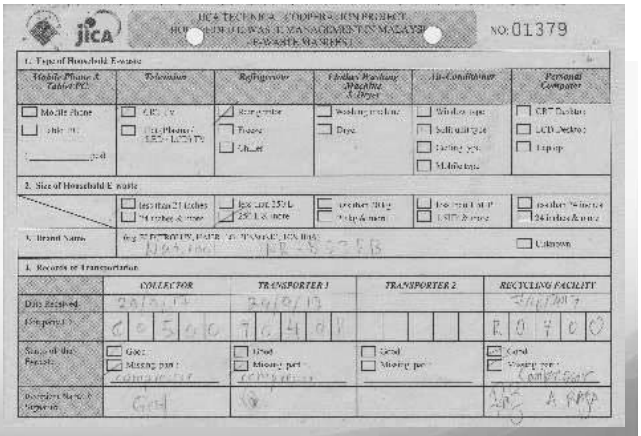
Pilot Project on Mechanism for Household E-waste Management

TBM (Subang Hi-Tech) → SPM

TBM Subang Hi-Tech
Collector ID: C 0500

SPM
Recycler ID: R 0400



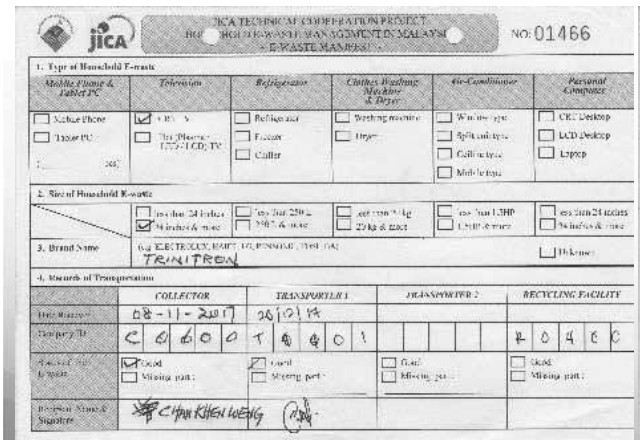


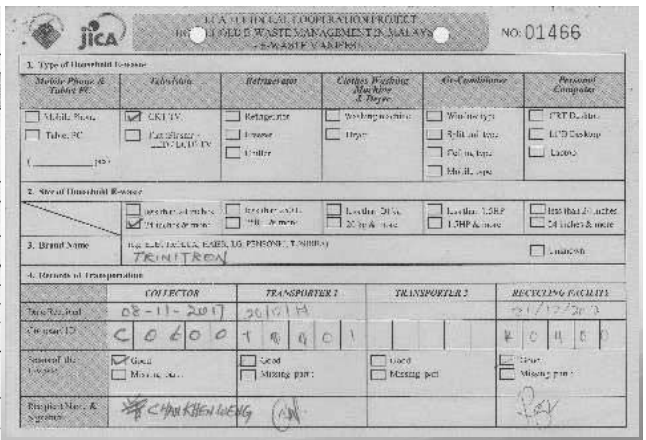
Pilot Project on Mechanism for Household E-waste Management

Tzu Chi (Cheras Utama) → SPM

Tzu Chi (Cheras Utama)
Collector ID: C 0600

SPM
Recycler ID: R 0400

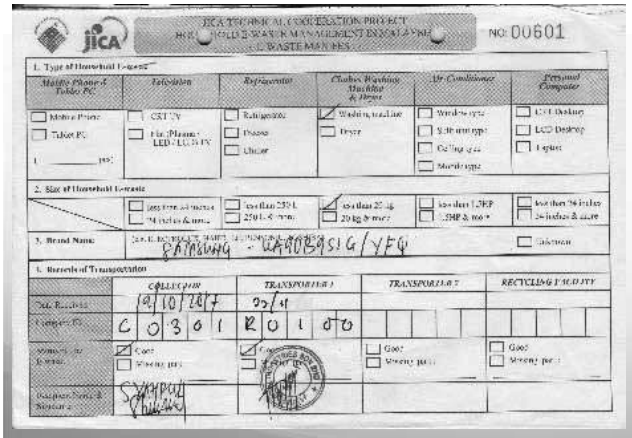




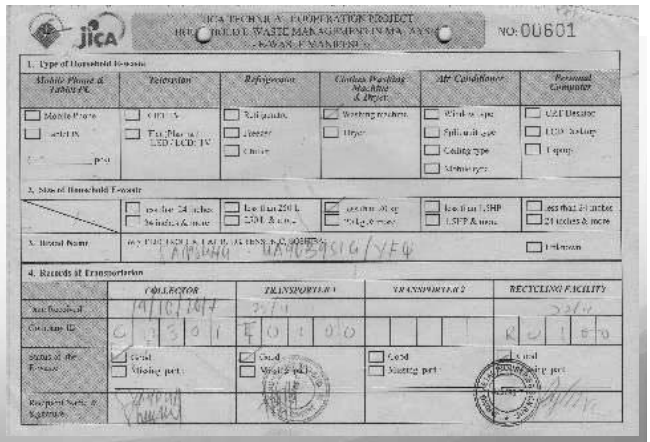
Pilot Project on Mechanism for Household E-waste Management

Senheng (Shah Alam)→ Jaring Metal

Senheng (Shah Alam)
Collector ID: C 0301



Jaring Metal
Recycler ID: R 0100



Pilot Project on Mechanism for Household E-waste Management

DISCREPANCIES FORM

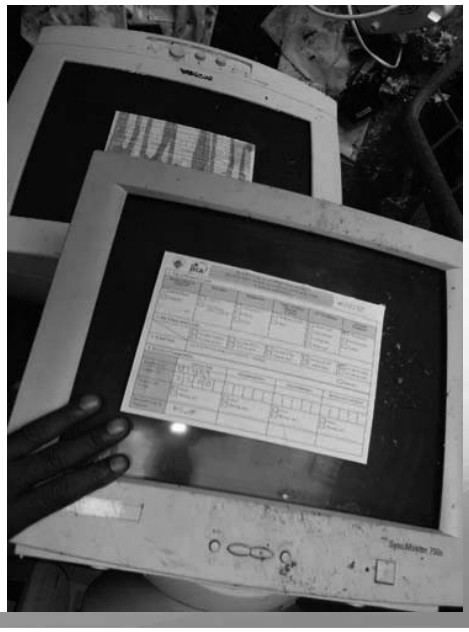
Pilot Project on the Household E-waste Management (Collection and Reporting)

If there are any discrepancies in the manifest form, please fill out and send this discrepancies form together with the manifest form (first week of each month) to Department of Environment (DOE) HQ:

A. Company's Information	
Company Name:	T-POT ELECTRICAL & ELECTRONICS SDN BHD
Name (person in-charge):	MS CHAN HOI FEI
Month	OCTOBER 2017

No	Manifest Form No.	Description
1.	00285	Television LCD Below 24"
2.	00286	Television CRT 24" & Above
3.	00287	Complete PC with Monitor CRT Below 24"
4.	00288	Television CRT Below 24" Collector marked as good but actual item is Incomplete due to Broken Cover.
5.	00289	Complete PC with Monitor CRT Below 24"
6.	00290	Collector marked as complete as PC come in set (CPU & Monitor CRT 24" & Above) but actual is CPU got missing part (CD ROM/HDD).
7.	00291	Collector marked as complete as PC come in set (CPU & Monitor CRT Below 24") but actual is CPU got missing part (CD ROM/HDD).
8.	00292	Collector marked as complete as PC come in set (CPU & Monitor CRT Below 24") but actual is CPU got missing part (CD ROM/HDD).
9.	00293	Complete PC with Monitor CRT Below 24"
10.	00294	Complete PC with Monitor CRT 24" & Above
11.	00295	Complete PC with Monitor CRT Below 24"
12.	00296	Complete PC with Monitor CRT Below 24"
13.	00297	Complete PC with Monitor CRT Below 24"
14.	00298	Complete PC with Monitor CRT Below 24"
15.	00299	Complete PC with Monitor CRT Below 24"
16.	00300	Complete PC with Monitor CRT Below 24"

Discrepancy report: Recycler A



Pilot Project on Mechanism for Household E-waste Management

Number of Collection : 7th COLLECTION
Collector ID : C 0600
Date collected : 20/12/2017
G/N number :

Discrepancy report: Recycler B

Num.	Serial Number	Categories	Brand name	Size	Correct size	Status	Missing part
1	01448	LCD Desktop	BENQ	Less than 24 inches		Complete	
2	01449	CRT Desktop	Acer			Incomplete	CRT Moniter
3	01450	CRT Desktop	Intel			Incomplete	CRT Moniter
4	01451	CRT Desktop	Unknown			Incomplete	CRT Moniter
5	01452	CRT Desktop	Intel			Incomplete	CRT Moniter
6	01453	CRT Desktop	Unknown	Less than 24 inches		Incomplete	CRT Moniter
7	01454	CRT TV	Panasonic	Less than 24 inches		Complete	
8	01455	CRT Desktop	View Sonic	Less than 24 inches		Complete	
9	01456	CRT Desktop	DELL	Less than 24 inches		Complete	
10	01457	FLAT (PLASMA/LED/LCD)TV	Haier	24 inches & more		Complete	
11	01458	CRT TV	Panasonic	24 inches & more		Complete	
12	01459	CRT TV	SONY	Less than 24 inches		Complete	
13	01460	Laptop	Compaq	Less than 24 inches		Complete	
14	01461	LCD Desktop	View Sonic	Less than 24 inches		Complete	
15	01462	LCD Desktop	Samsung	Less than 24 inches		Complete	
16	01463	Laptop	DELL	Less than 24 inches		Complete	
17	01464	LCD Desktop	Alienware	Less than 24 inches		Complete	
18	01465	FLAT (PLASMA/LED/LCD)TV	TOSHIBA	24 inches & more		Complete	
19	01466	CRT TV	TRINITRON	24 inches & more		Complete	
20	01467	LCD Desktop	PHILIPS	Less than 24 inches		Incomplete	Casing Broken
21	01468	CRT Desktop	Samtron	Less than 24 inches		Complete	
22	01469	LCD Desktop	LG	24 inches & more		Complete	
23	01470	CRT Desktop	TEC			Incomplete	Monitor
24	01471	LCD Desktop	View Sonic	Less than 24 inches		Complete	
25	01472	LCD Desktop	Samsung	Less than 24 inches		Complete	
26	01473	CRT Desktop	Samsung	Less than 24 inches		Complete	
27	01474	FLAT (PLASMA/LED/LCD)TV	Sharp	24 inches & more		Complete	
28	01475	Split unit type	York	1.5 HP & more		Complete	
29	01476	CRT Desktop	SINA	Less than 24 inches		Incomplete	Broken
30	01477	CRT Desktop	HITEC	Less than 24 inches		Complete	

Pilot Project on Mechanism for Household E-waste Management

Main Outcomes from the Pilot Project

No	Expected Outcomes
1	The procedures for registration of players were tested, inputs for improvement – registration and authorization of players will be required under the new mechanism.
2	Requirements on collection, storage and transportation were tested, inputs for improvement – practicality of the Guidelines on Storage, Handling and Transportation of Household E-waste.
3	Requirements on the use of manifest by different players were tested, inputs for improvement; future plan of electronic based manifest system – practicality of the Guidelines on Reporting.
4	Experiences learnt about the actual conditions of household E-waste collected in Malaysia; roles played by different players; common practice of E-waste disposal etc.

Pilot Project on Mechanism for Household E-waste Management

Findings (Brand Issue)

Brand Names					
1	Panasonic	11	Sony	1	AEG (washing machine)
2	National	12	Hestar	2	Dawa (television)
3	LG	13	Philip	3	Basstec (freezer)
4	ACSON	14	Haier	4	Kelvinator (Refrigerator)
5	Samsung	15	Dell	5	Viewsonic (Computer)
6	Elba	16	Compaq	6	Akira (Television)
7	Electrolux	17	BenQ	7	Targa (Computer)
8	Toshiba	18	Apple	8	Haisi View (Monitor)
9	FAGOR	19	Khind	9	Mega (Television)
10	Sharp	20	Pensonic	10	Triple Air (Washing machine)

Uncommon / Unknown brands (5~10%)

Pilot Project on Mechanism for Household E-waste Management

Findings (Other Issues / inputs from PP Players)

No	Issues Faced
1	Complaints about tedious paper works – filling out the manifest forms
2	Manifest forms – carbon paper quality no good – writing very hard
3	Some manifest forms are missing / running numbers not in order
4	Many manifest forms are not completely filled out (some person in charged who fill out the forms are senior citizens) – missing info
5	Suggest to include words “FMB copy” “own copy” “Recycler copy” on the manifest forms, instead of only differentiation by colors.
6	Hard to determine whether it is complete set or incomplete set (especially for computer CPU)
7	Some CPU or notebook originally come without CD rom, how to determine it as incomplete set?
8	Physically difficult to differentiate whether it is a washing machine or a cloth dryer.

Pilot Project on Mechanism for Household E-waste Management

Findings (Other Issues / inputs from PP Players)

No	Issues Faced
9	Hard to determine the capacities of some E-waste.
10	Not practical to include both the computer monitor screen and CPU as one complete set, it should be taken separately.
11	There is only one sticker with each manifest form, should the sticker be placed on monitor or CPU, what to do with the one without sticker.
12	If it possible to combine CPU and monitor of different brands to be a complete set?
13	Suggest to have a column on “Broken”, instead of only “missing”.
14	Some refrigerators in the markets are labeled with “Kg” instead of “Litre”.
15	Discrepancies happened between collection points and recycling facilities (final receiving points).

Pilot Project on Mechanism for Household E-waste Management

Findings (Other Issues / inputs from PP Players)

No	Issues Faced
16	Difficulty to determine the brands for some E-waste because it’s not clearly shown.
17	Small quantity of collected E-waste, recycling facility shows no interest to collect, but collector faced storage problem.
18	Buying price offered by the recycling facility not attractive.
19	Some capacities of E-waste are hard to be determined, and caused discrepancy when it reached the recycling facility.
20	Requirement for transportation vehicle of retailers should be more flexible, because the same vehicle is used for delivery of brand new e-appliance products.
21	Storage under shelter is sometimes not possible, depends on the premise. This requirement should be made more flexible.
22	Fully covered along transportation is not practical for some vehicle especially for retailers.

Pilot Project on Mechanism for Household E-waste Management

Implementation Schedule

June 2017	Discussions with the stakeholders involved / Briefing about the pilot project plan
July 2017	Preparatory works, printing of materials, explanatory to the workers, publicity and promotional activities etc.
October 2017	Kick off of the pilot projects
October 2017 – March 2018	Implementation of the pilot project
31st March 2018	Pilot project ended / Data analysis / Reporting
April onwards	Integration of findings / Finalization of the Collection and Reporting Guidelines

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Summary of Collection and Reporting Guidelines

JICA Expert Team

Draft: 11 JAN 2017

GUIDELINE

Reporting for Management of Household E-wastes in Malaysia

Published by:

Department of Environment (DOE) Malaysia

Supported by:

Japan International Cooperation Agency (JICA)

Draft: 11 OCT 2017

GUIDELINE

Collection, Storage, Handling and Transportation of Household E-waste in Malaysia

Published by:

Department of Environment (DOE) Malaysia

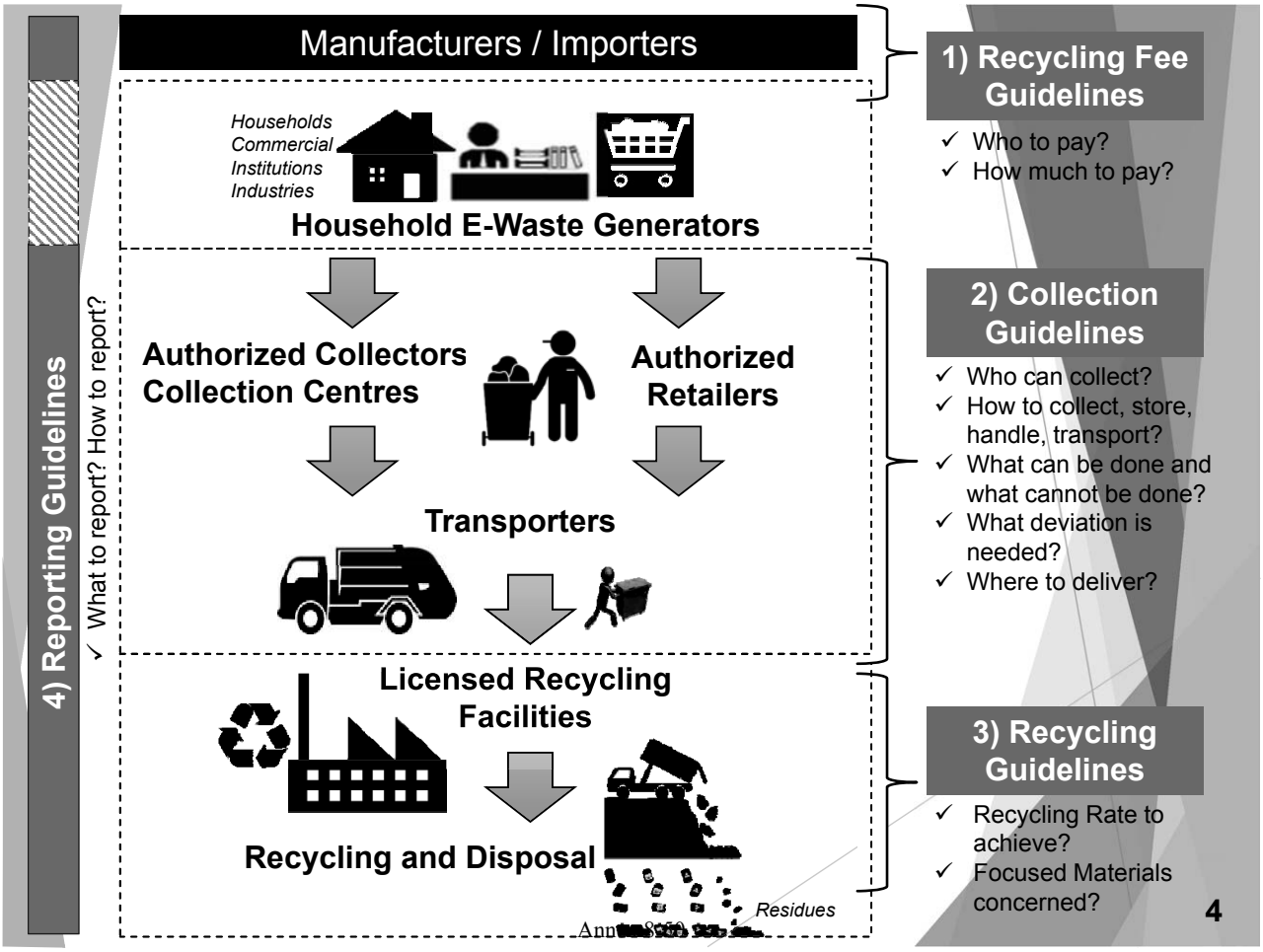
Supported by:

Japan International Cooperation Agency (JICA)

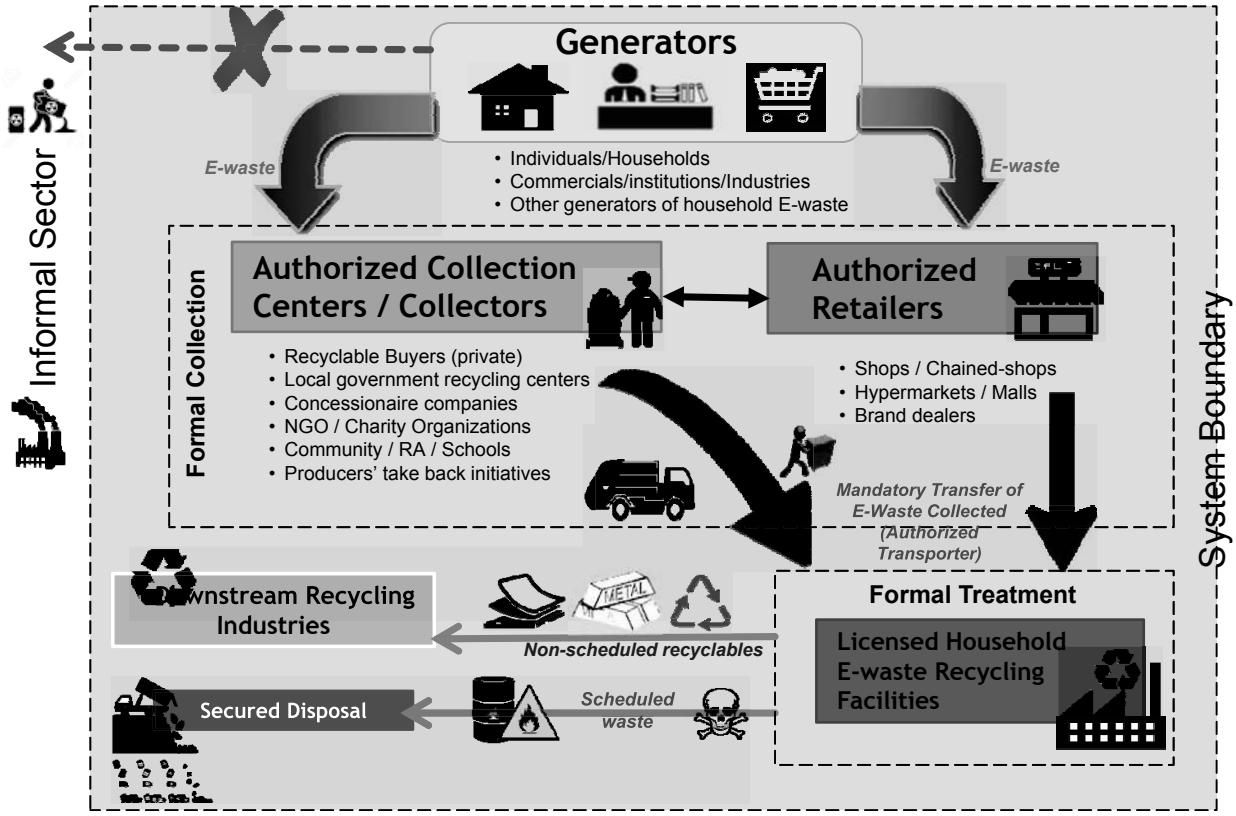
Series of Taskforce 1 Meetings

Chairperson: Puan Rosni Ismail

Date	Descriptions
8th December 2015	1st TF Meeting – Bilik Rafflesia, DOE
14th March 2016	2nd TF Meeting – Bilik Chempaka, DOE
9th June 2016	3rd TF Meeting – Bilik Chempaka, DOE
20th September 2016	4th TF Meeting / Workshop – Dorsett Hotel Putrajaya
8th December 2017	5th TF Meeting – Bilik Chempaka, DOE
September 2017 – January 2018	Implementation of pilot projects
4th April 2018 (Final)	6th TF Meeting – Bilik Meranti, DOE

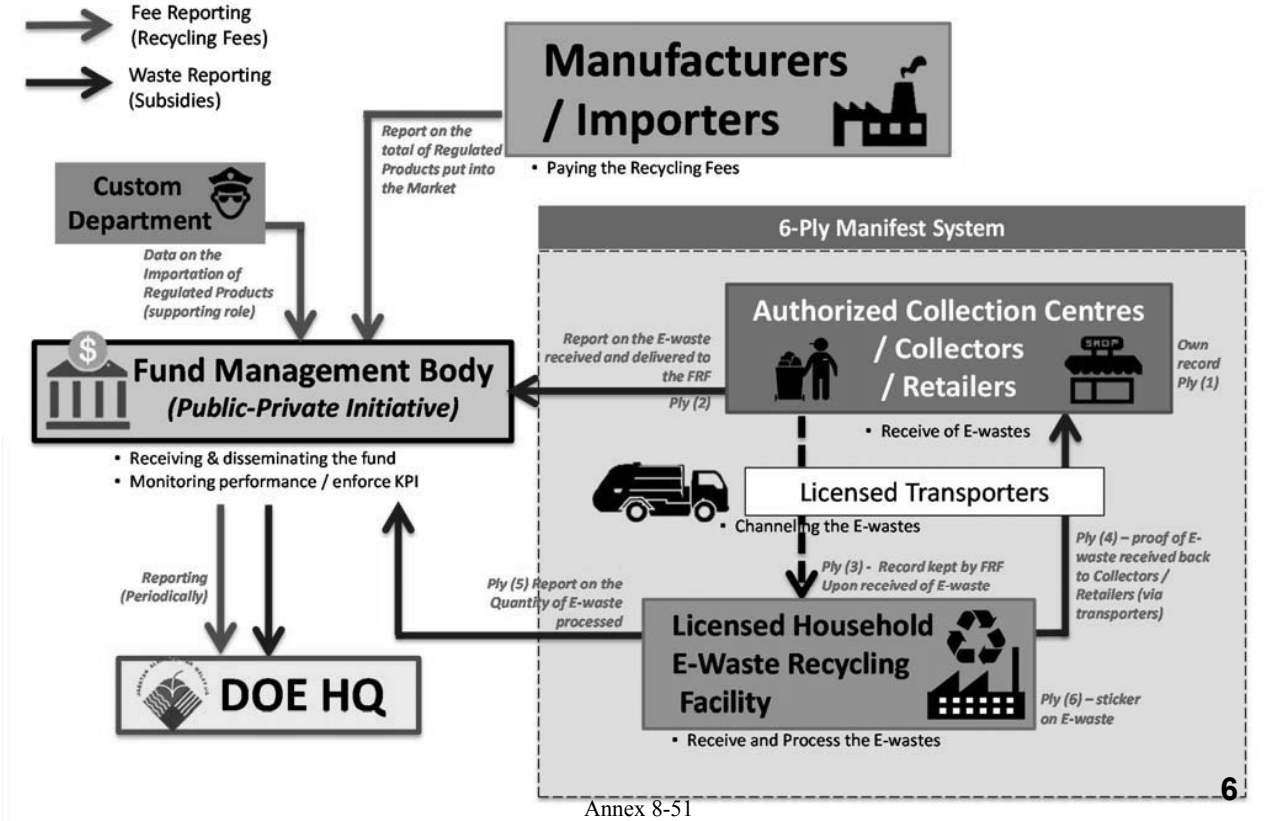


E-waste Flow



Reporting Flow

(updated 28 February 2017)



Collection Guidelines

Users of the Guidelines

Collectors, collection centres (private companies, NGOs, CBOs, charity organisations, concessionaire companies etc.); retailers (shops and shopping mall etc.)

Summary of Contents (2 main components):

Registration / Approval Procedures	✓ Eligibility of applicants ✓ Application procedures (with application forms) ✓ Supporting documents required ✓ Registration / Processing fees?
Requirements for Collection, Storage, Handling and Transportation	✓ Lists of requirements in terms of collection, storage, handling and transportation. ✓ Responsibility to do reporting ✓ Other specific requirements (e.g. for repair shops, de-installers for air-conditioners)

Collection Guidelines

Summary of Stakeholders' Responsibilities:

The roles and responsibilities of all relevant stakeholders are stipulated in this Guideline, which is summarized in the Table as follows:

No	Stakeholders	Summary of Responsibilities
1	Generators	• Do not dismantle any household E-waste • Give / donate / sell / discard household E-waste only to approved / authorized collectors or retailers. • Be responsible on the household E-waste generated; make sure it ends up at licensed facilities for proper treatment. • Do not discard / sell the household E-waste to the informal sectors.

Collection Guidelines

No	Stakeholders	Summary of Responsibilities
2	Collectors / Retailers	• Obtain approval / authorization from the DOE. • No dismantling of the household E-wastes. • Proper storage of household E-waste under shade, no exposure to direct sunlight and rainfall. • Store the lithium batteries and button batteries separately in containers at dry cool place. • Proper labeling at collection / storage areas. • Beware of creating mosquito breeding ground in E-waste storage area. • Deliver the collected household E-waste only to other authorized premises or licensed full recovery facilities / only use authorized transporter. • Fulfill reporting requirement (refer to the requirements in Reporting Guidelines).

Note: Requirements for E-waste collectors and retailers may be different

Collection Guidelines

No	Stakeholders	Summary of Responsibilities
3	Transporter	• Obtain approval / authorization from the DOE (Registration of transport vehicles). • Transport of collected household E-waste following all the SPAD requirements. • Registration of transport vehicles. • Avoid overload; make sure household E-waste transported is fully covered. • Temporary storage not allowed. • No dismantling of the household E-waste is allowed. • Proper labeling at the transport vehicle. • Deliver the household E-waste only to authorized premises or licensed recyclers. • Fulfill reporting requirements (refer to Reporting Guidelines).

Note: Requirements for E-waste collectors and retailers may be different

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Collection Guidelines

No	Stakeholders	Summary of Responsibilities
4	Licensed Recyclers	• Obtain approval / authorization from the DOE if involved in collection activities. • Fulfill requirements as collectors and transporters if involved in the collection and transportation activities. • Receive household E-waste only from authorized / approved sources. • Trading of household E-waste among different licensed full recovery facilities is allowed. • Fulfill reporting requirements (refer to the requirements in Reporting Guidelines). • Carry out recycling, recovery and disposal of household E-waste in an environmentally sound manner (refer to the requirements in Recycling Guidelines).

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Collection Guidelines

Summary of Key Contents

Waste Generators

- ✓ Discard, donate, give, sell the household E-waste ONLY to approved / authorized collectors or retailers or licensed recyclers.

Collectors / Retailers

- ✓ Obtain approval / authorization from the DOE.
- ✓ Collect / receive household E-waste -no dismantling.
- ✓ Store and transport in accordance to the requirements in the collection guidelines.
- ✓ Channel the collected household E-waste only to the licensed recyclers
- ✓ Fulfill reporting requirements – manifest system

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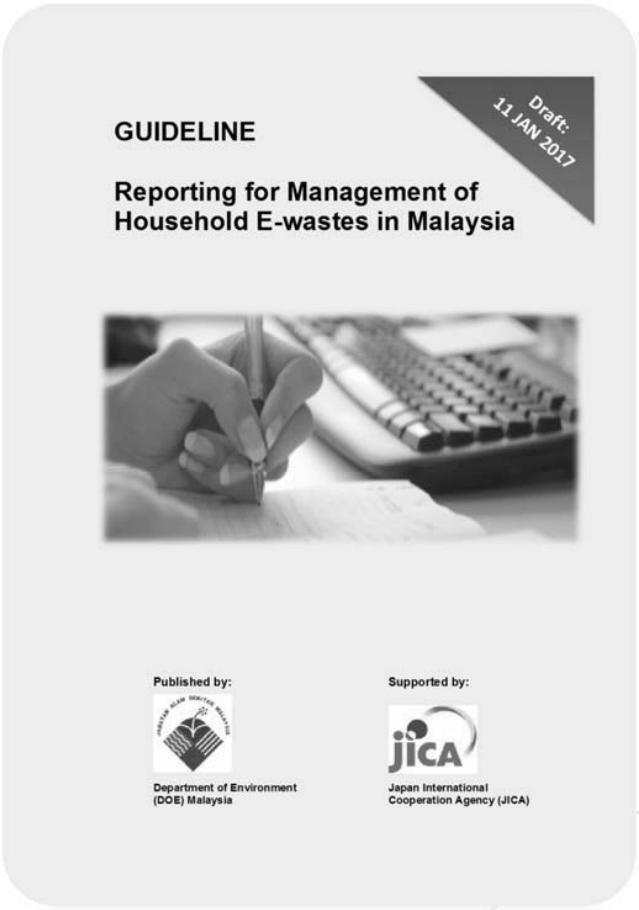

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Reporting Guideline

USERS:
Manufacturers / Importers, Retailers, Collectors and Household E-waste Recycling Facilities

Summary of Contents:

Requirements for Reporting by the Stakeholders

- ✓ Reporting by using manifest system
- ✓ Reporting requirements for Manufacturers / Importers
- ✓ Reporting requirements for Collectors
- ✓ Reporting requirements for Recycling Facilities
- ✓ Reporting forms

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Reporting Guideline

Summary of Stakeholders' Responsibilities:

The roles and responsibilities of all relevant stakeholders are stipulated in this Guideline, which is summarized in the Table as follows:

No	Stakeholders	Summary of Responsibilities
1	Manufacturers / Importers of E-appliances	• Required to report information on any component that contain hazardous substances in their E-appliances. • Required to report to FMB their put-on-market volume of the targeted items for the payment of recycling fee.

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Reporting Guideline

No	Stakeholders	Summary of Responsibilities
2	Retailers	• Required to report to FMB information of received WEEEs as collectors by using Manifest system.
3	Collectors / Transporters	• Required to report to FMB information of received WEEEs by using Manifest system.
4	Recycling Facilities	• Required to report to FMB information of received WEEEs by using Manifest system. • Required to report to FMB recycling information of received WEEEs in order to claim for the recycling subsidy. • Required to report to FMB information of residual wastes generated from processing received WEEEs.

Reporting Guideline

Paper-based Manifest tested in PP

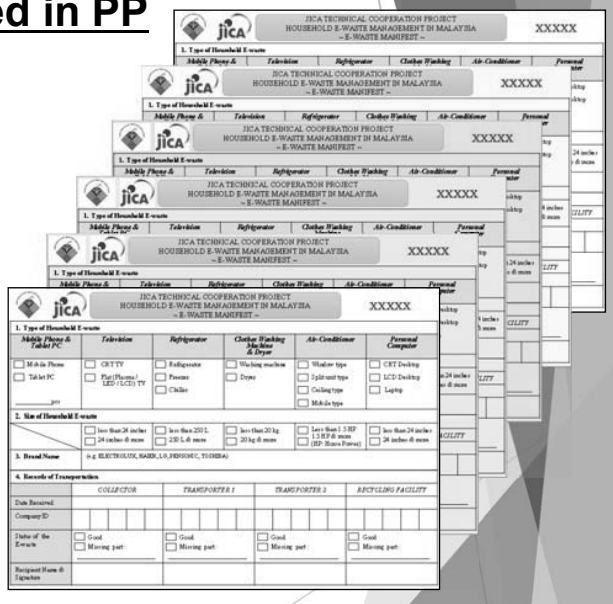
Manifest:

- consists of 6 ply.

- 1 form for 1 E-waste

(except for mobile phones and Tablet PCs)

-The last ply will be placed onto the E-waste



Reporting Guideline

Reporting form for Recycling Facilities:

Name of the RF	XYZ Recycling Bhd.			
Reporting Period	From 01/MM/YY to DD/MM/YY			
Items	Focused Materials	Weight recovered (kg)	Method of Treatment/Disposal	Destination(Full Recovery Facilities or Oversea)
TV(CRT)	CRT monitor			
	Printed circuit board			
	Capacitor (old type)			
	Plasma display			
TV(Flat Screen)	Printed circuit board			
	Florescent tube			
	Liquid crystal display			
	Plasma display			
Refrigerator	Refrigerant (in compressor)			
	Foaming agent for heat insulating material			
	Printed circuit board			
Air Conditioner	Refrigerant			
	Printed circuit board			
	Capacitor (old type)			
Washing Machine/Dryer	Refrigerant (heat pump type dehumidifier or dryer)			
	Printed circuit board			
	Capacitor (old type)			
Personal Computer(PC) CRT	Printed circuit board			
	CRT monitor			
Personal Computer(PC) Flat Screen monitor	Printed circuit board			
	Florescent tube			
	Liquid crystal display			
	Plasma display monitor			
Personal Computer(PC) Tower Unit	Printed circuit board			
	Rechargeable battery			
	Button batteries			
Personal Computer(PC) Notebook	Printed circuit board			
	Florescent tube			
	Liquid crystal display			
	Rechargeable battery			
	Button batteries			
Mobile Phone/Tablet PC	Printed circuit board			
	Rechargeable battery			
	Button batteries			
	Florescent tube			
	Liquid crystal display			
Person in Charge(Signature): Date(DD/MM/YY):				

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Reporting Guideline

Reporting form for Recycling Facilities:

Reporting Period	From 01/MM/YY to DD/MM/YY			
Name of RF	XYZ Recycling Bhd.			
Item	Subcategories	Weight (kg)	Destinations	Recycling Rate(%)
TV(CRT)	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
TV(Flat Screen)	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Refrigerator	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Air Conditioner	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Washing Machine/Dryer	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Personal Computer(PC) CRT monitor	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Personal Computer(PC) Flat Screen monitor	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Personal Computer(PC) Tower Unit	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Personal Computer(PC) Notebook	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Mobile Phone/Tablet PC	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Person in Charge(Signature): Date(DD/MM/YY):				

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TECHNICAL COOPERATION PROJECT
FOR
DEVELOPMENT OF MECHANISM FOR HOUSEHOLD E-WASTE MANAGEMENT
IN MALAYSIA

OUTLINE OF RECYCLING GUIDELINES

JICA Expert Team

CONTENTS

1. the Requirement for Recycler

Recycling Guideline

USERS:

Household E-waste Recyclers

Requirements for Recyclers

- ✓ Apply for license
- ✓ Comply with the rules of focused materials management
- ✓ Comply with the recycling rate targets
- ✓ Reporting requirements

Obligations of the recyclers

Requirements	What to do
Obtaining License	License shall be obtained from Department of Environment as a Household E-waste recycling facility
Focused Materials management	Shall manage the Focused Materials (FMs) which identified in this Guideline with the proper pollution controlling measures
Meeting Recycling rate	Shall meet the Recycling Rate target of each items specified in this Guideline
Reporting	Shall provide the relevant and sufficient data as the proof of the FMs management and Recycling rate achievement in accordance with Reporting Guideline

1. Outline of Recycler's Obligation

Compliance with the rules of handling focus materials

The licensed household E-waste recyclers must follow the requirement regarding the handling and management of **FOCUSED MATERIALS** defined in this Guideline for each E-waste item.

FOCUSED MATERIALS are:

the specific components or parts of or substances contained in E-waste items that are defined as potentially hazardous to human health and/or environment if they are improperly handled.

The Guideline provides the rules of handling these focused materials in each targeted E-waste item.

Compliance with the rules of handling focus materials

List of Focused Materials by item

E-waste	Focused Materials
TV	■ Cathode Ray Tube (CRT-TV) ■ Printed Circuit Board ■ Capacitor containing Polychlorinated Biphenyls ■ Mercury containing lamps (Flat TV) ■ Plasma screen front panel glass
Refrigerator	■ Fluorocarbon gas (Fluorocarbon type) ■ Printed Circuit Board
Air Conditioner	■ Fluorocarbon gas (Fluorocarbon type) ■ Printed Circuit Board ■ Capacitor containing Polychlorinated Biphenyls
Washing Machine	■ Fluorocarbon gas (Fluorocarbon type) ■ Printed Circuit Board ■ Capacitor containing Polychlorinated Biphenyls
Personal Computer	■ Printed Circuit Board ■ Cathode Ray Tube (CRT monitor) ■ Mercury containing lamps (Flat monitor) ■ Lithium ion battery
Mobile Phone	■ Printed Circuit Board ■ Lithium ion battery

Compliance with the rules of handling focus materials

(Mercury containing lamp)

- Hg backlight shall be segregated in the minus pressurized chamber to prevent from escaping of Hg vapor in case backlight tube is broken.

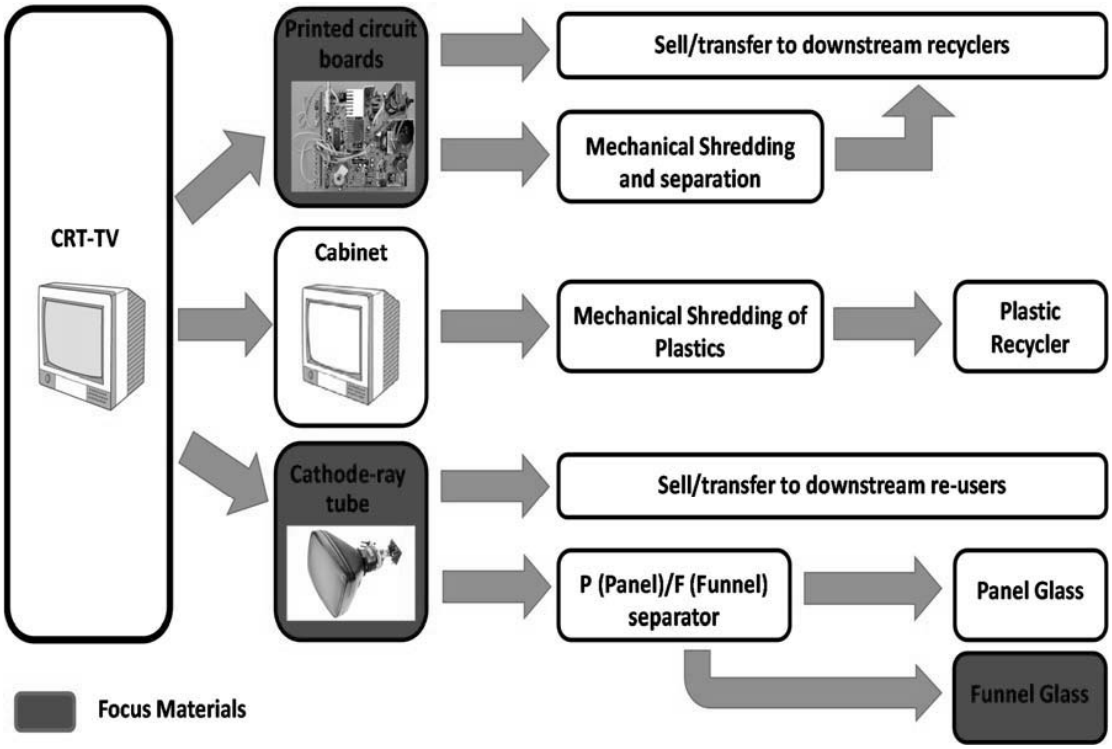
- After the segregation, it shall be sent to an environmentally sound downstream facility for further treatment.

Compliance with the rules of handling focus materials

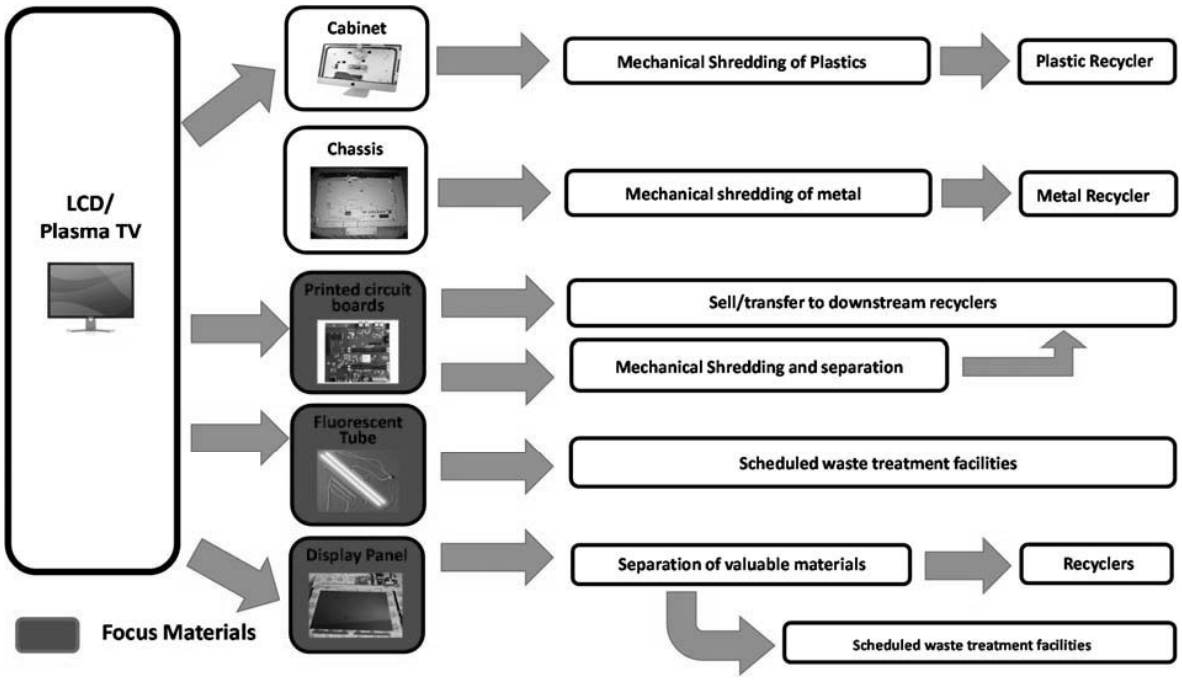
(CRT glass)

- CRT monitor shall be removed from the TV cover.
- Funnel and panel glass shall be separated and funnel part containing lead shall be treated environmentally sound manner.
- Vacuum phosphor powder from back side of panel part.
- After the separation, funnel part shall be sent to an environmentally sound downstream facility for further treatment or disposal.

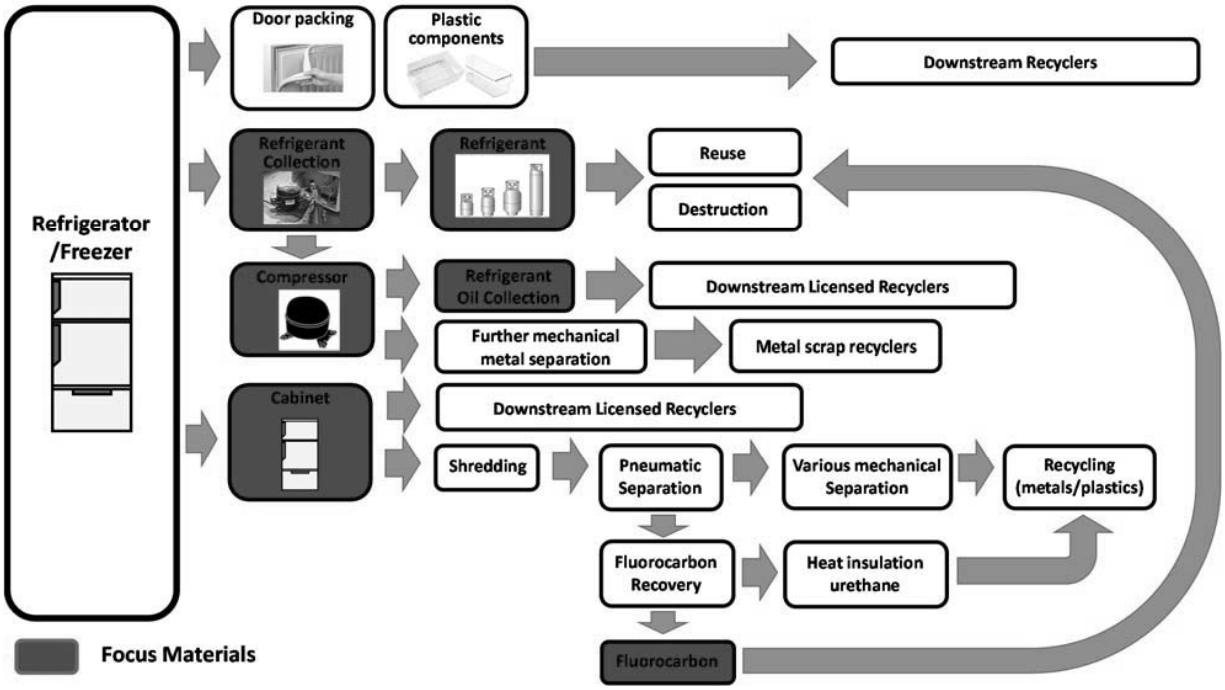
Standard Recycling Process for CRT-TV



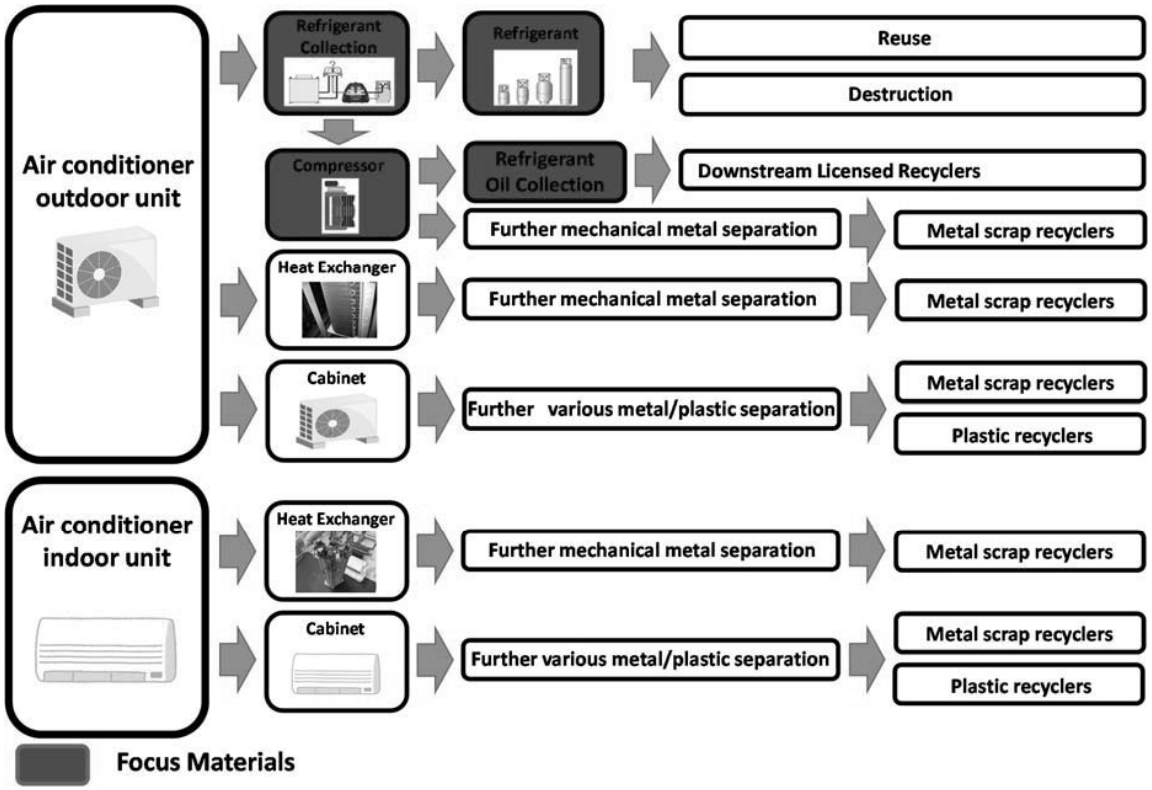
Standard Recycling Process for CRT-TV



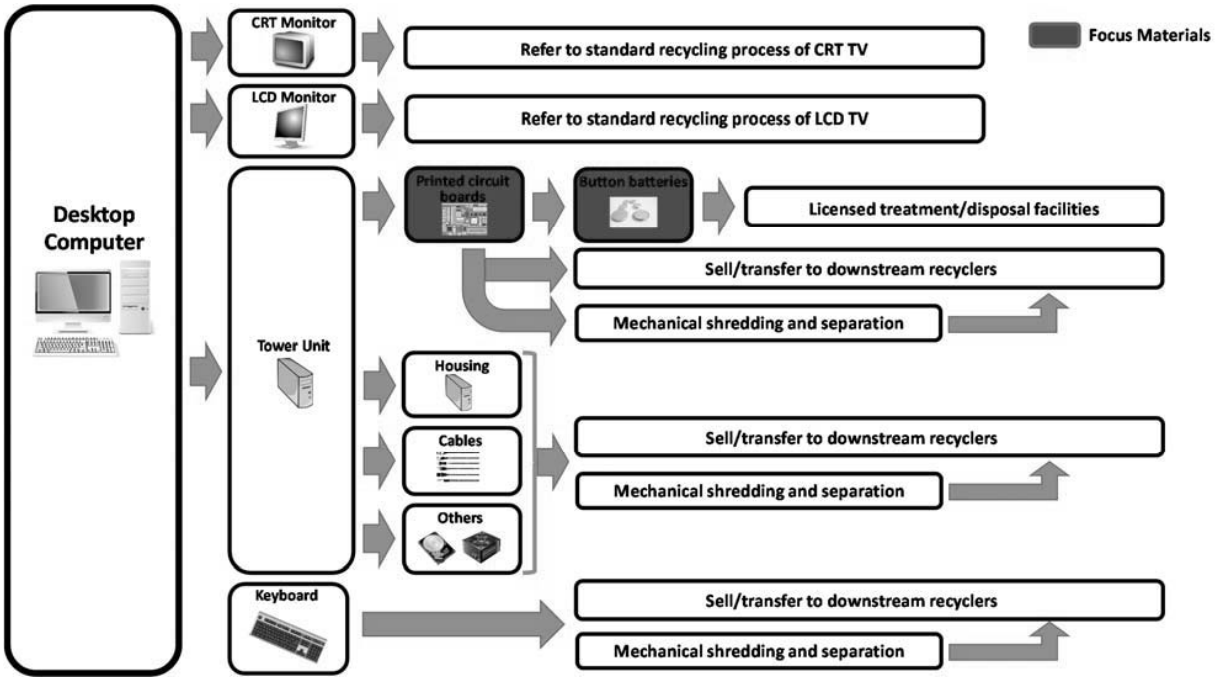
Standard Recycling Process for CRT-TV



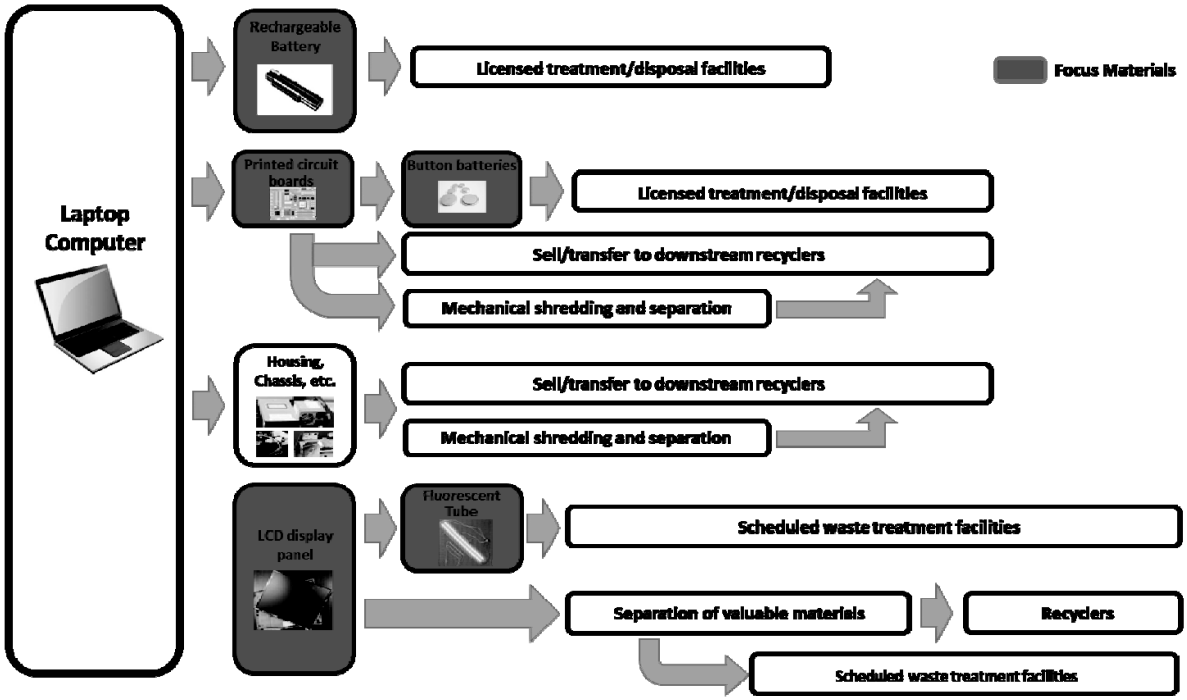
Standard Recycling Process for CRT-TV



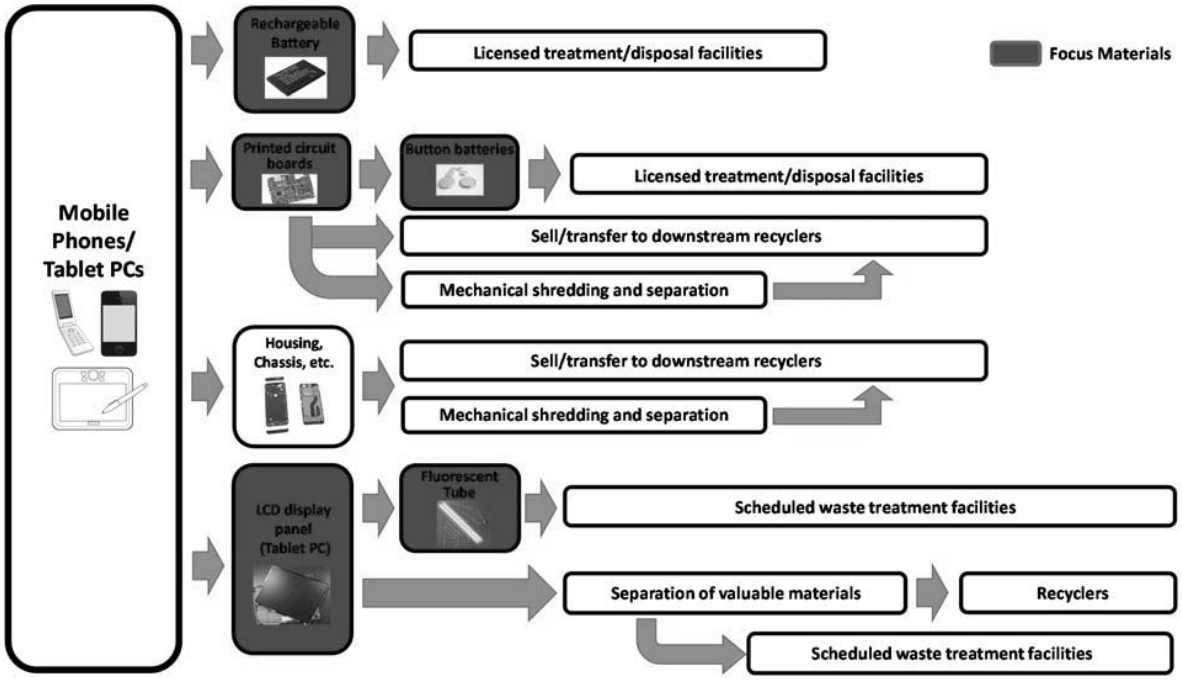
Standard Recycling Process for CRT-TV



Standard Recycling Process for CRT-TV



Standard Recycling Process for CRT-TV



Compliance with Recycling Rate Targets

- All the licensed recyclers are required to comply with the minimum recycling rate targets for each regulated item
- Recycling rate is calculated in accordance with the equation below

$$RR(x) = \frac{WR(x)}{TW(x)} * 100$$

Where:

RR(x):	Recycling rate of E-waste type x (%)
WR (x):	Total weight of materials recycled from E-waste type x (tons)
TW (x):	Total weight of E-waste x received (tons)

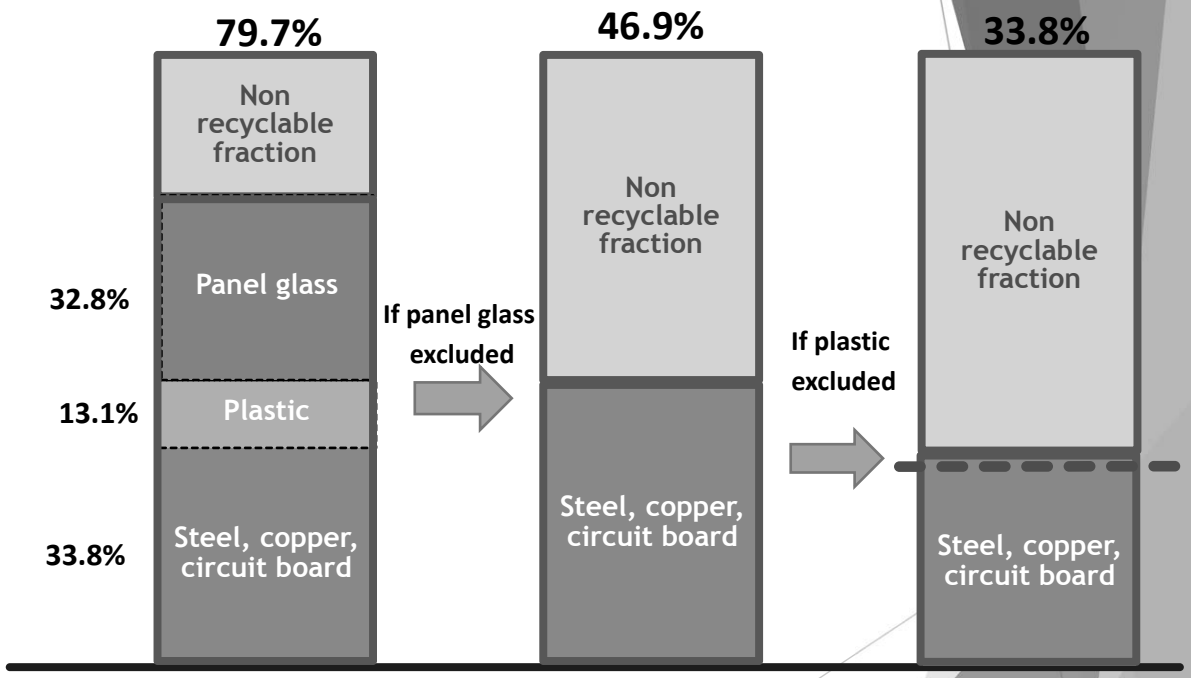
- To demonstrate its compliance with the recycling rate , every licensed recycler shall measure and make periodical report on the total weight of E-waste received and materials recycled through the recycling operations by applying the equation above.

Item		Recycling rate	Recycling rate (without plastic)	Recommendable Recycling rate (80%)
Television (TV)	CRT	79.7%	66.5%	**50%**
	Flat Screen	76.6%	52.3%	**45%**
Washing machine (currently top/front loading type combined)		81.4%	52.8%	**40%**
Air-conditioning		98.9%	85.1%	**65%**
Refrigerator		76.2%	75.8%	**60%**
Desktop PC	CPU	89.9%	83.6%	**65%**
	CRT monitor	80.9%	66.9%	**50%**
	Flat screen	75.9%	46.4%	**35%**
Notebook PC		65.9%	45.2%	**35%**
Mobile phone	smart phone	68.3%	46.9%	**35%**
	old type	73.4%	46.3%	**35%**

TV-CRT

Total input weight: 2,760kg/ 110pcs

Recommended Recycling rate = 30% (33.8*0.8)

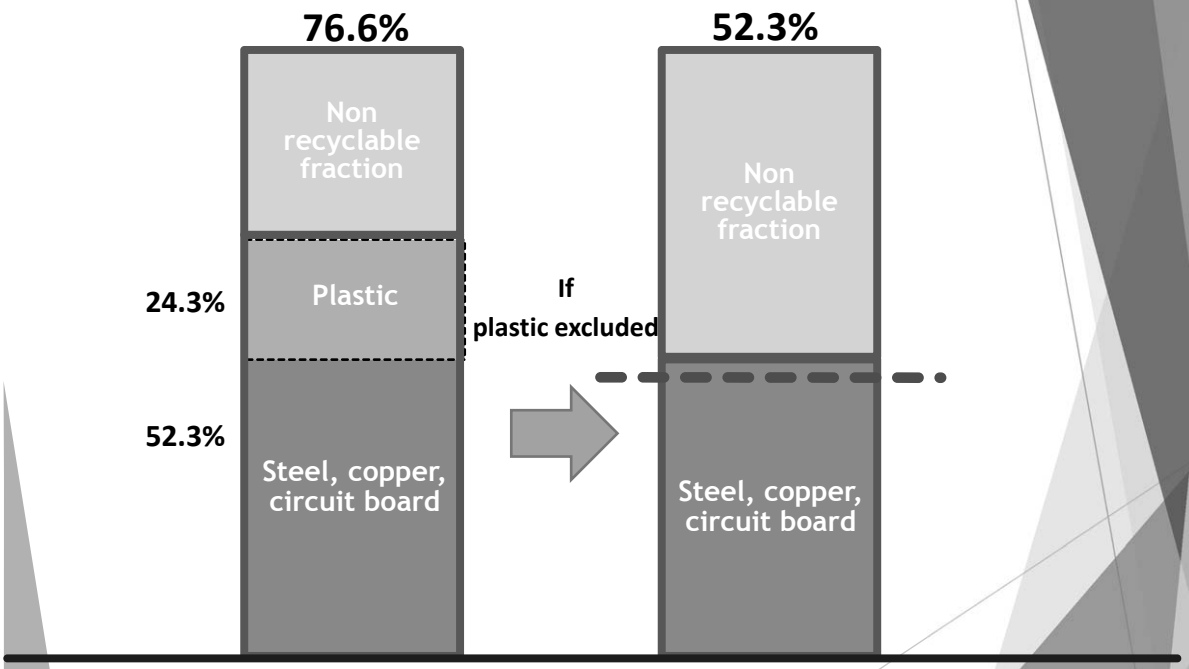


- **CRT glass should be separated from CRT monitor and disposed separately.**
- **Plastic recycling market is only limitedly available for PP and TV plastic is excluded.**

Flat TV

Total input weight: 959kg/ 90pcs

Recommended Recycling rate = 40% (52.3*0.8)

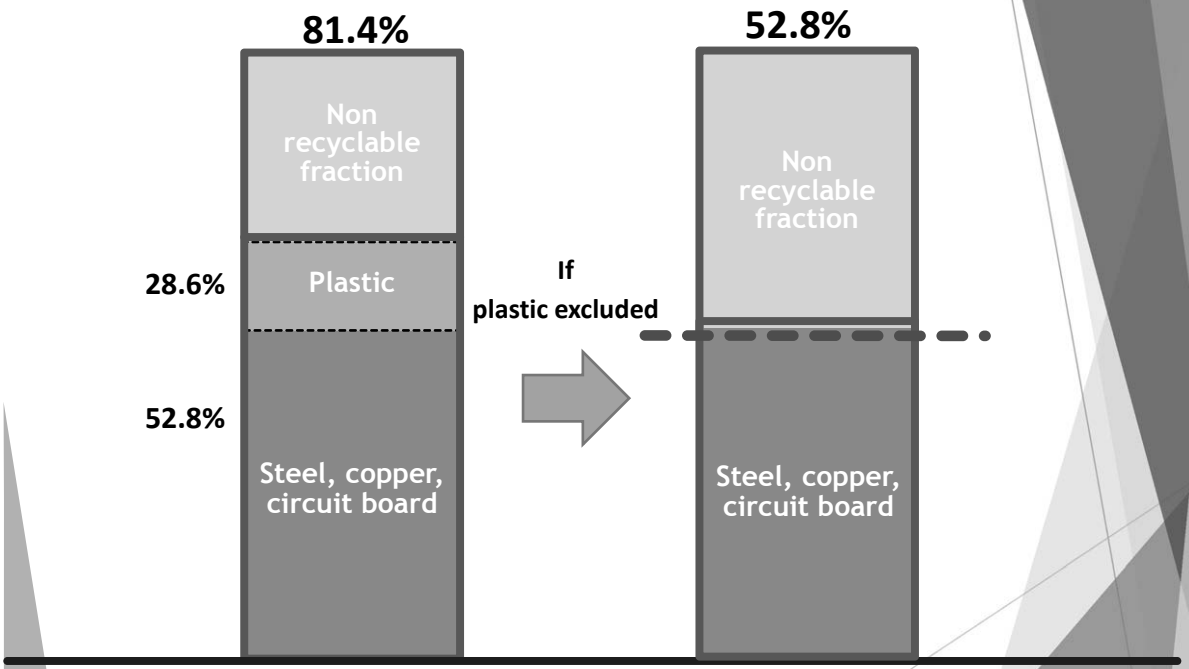


- Plastic recycling market is only limitedly available for PP and TV plastic is excluded.
- LCD panel recycling is not widely possible.

Washing machine

Total input weight: 1,259kg/ 31pcs

Recommended Recycling rate = 45% (52.8*0.8)

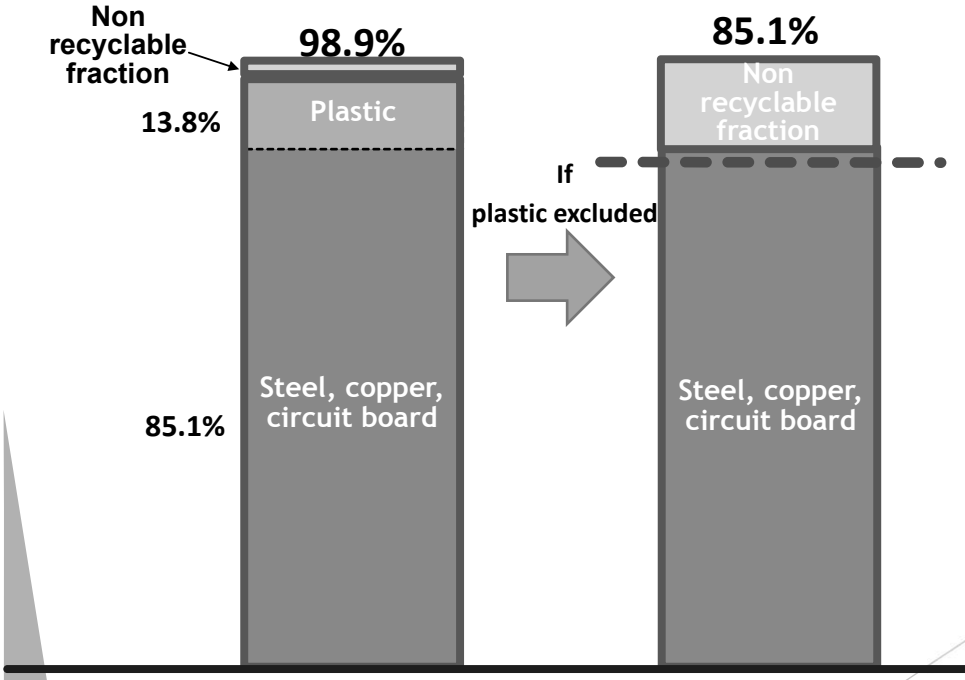


- Plastic recycling is only available for PP in Malaysia and market is small yet. Some WM originating PP can be recycled.
- Segregating efficiency can be increased.

Air conditioner

Total input weight: 1,258kg/ 25pcs

Recommended Recycling rate = 70% (85.1*0.8)



- **Plastic recycling market is only limitedly available for PP and air conditioner plastic is excluded.**

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JICA Technical Cooperation Project
Development of Mechanism for Household E-waste Management in Malaysia

Recycling Fee Guidelines


Contents

1. Purpose of Recycling Fee

- Household E-waste Recycling Fee is the financial source to support the sustainable household E-waste management mechanism in Malaysia.
- It is to ensure the hazardous substances in E-products to be treated and disposed in an environmentally sound manner with proper pollution controlling measures without harming the environment and human health.
- To cover the collection and transportation of the household E-waste channeled to licensed household scheduled waste (E-waste) recyclers.
- RCMB (Recycling Contribution management Body) to manage the mechanism of the household E-waste in Malaysia with the financial resources from Recycling fee.

Fee and Subsidy Guideline

USERS:

- **Manufacturers and importers of regulated E-appliances (as the payers of recycling fee)**
- **Household E-waste collectors and recyclers (as the receivers of subsidy)**

Summary of Contents:

- Recycling Fee Collection Mechanism
- Collection/Recycling Subsidy Disbursement Mechanism
- Methodology of Making Calculation of Recycling Fee and Subsidy Rate

Fee and Subsidy for Household E-waste Management in Malaysia

Published by: Department of Environment (DOE) Malaysia

Supported by: JICA Japan International Cooperation Agency (JICA)

OF CONTENTS

2. Recycling Fee collection and disbursement mechanism

Recycling Fee collection (Source of the Recycling Fee)

- Recycling Fee is collected from manufacturers and importers of the E-appliances (designated 6 items) who put them into the Malaysian domestic market. In this way, the manufacturers and importers fulfill their EPR(Extended Producers' Responsibilities).
- It is Malaysia policy not to directly charge recycling fees to consumers.
- All manufacturers and importers are required to register at DOE and report the POM(Put On Market) volume of each designated E-appliance annually and requested to pay recycling fee based on POM.

3. Basic methodology to estimate the recycling fee by item

Basic Formula

Recycling Fee (RM/unit)
= (Total logistic cost (RM/year) + Total recycling cost (RM/year)) x ***collected and recycled units*** **+ RFMB management cost (RM/year) /** ***POM amount (item wise)***

(Recycling Fee)

- Recycling Fee is to be set by types of items taking into account all the above mentioned cost at 1st year, initial implementing phase. These costs are based on the assumed collection volume.
- Second year onwards when actual collection volume data is available, total logistical cost and recycling cost can be reviewed based on the actual quantity.
- Fee is to be reviewed periodically considering the factors like market trend of recyclable materials, relevant technology development, change in the components and materials used in the designated E-appliances.

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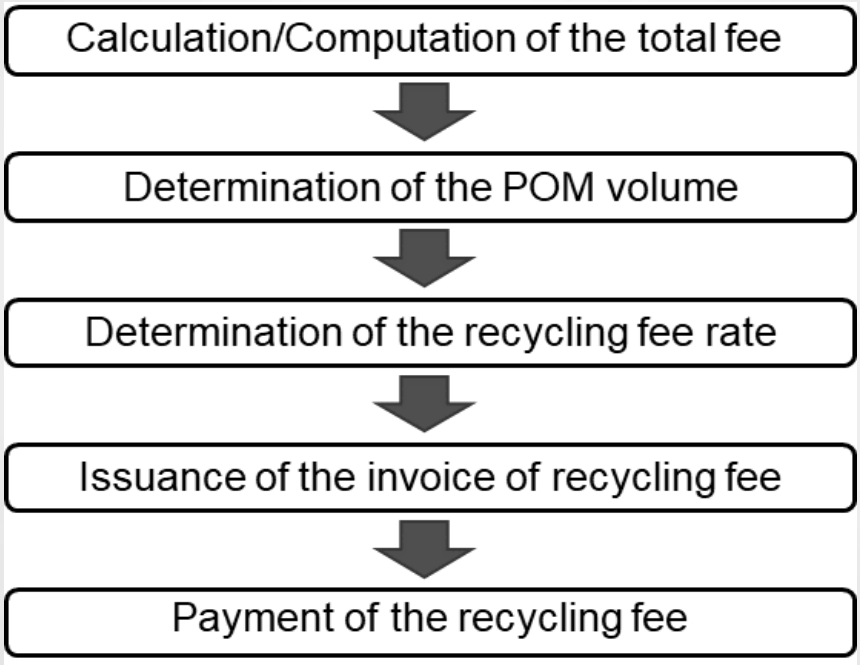
Recycling Fee Collection Procedure



Calculation and computation of the total fee

-Total logistic cost (RM/year)-

4. How to estimate the collection cost by item

Determining collection rate and collection volume

- Collection volume is assumed to determine the E-waste to be collected and transported and scale of recycling facility.
- Assumption is made based on the Household E-waste Inventory conducted in 2016 to estimate the potential household E-waste generation in Malaysia.
- It is assumed the collection rate out of the generation volume becomes 40% at 5th year (2024) after the implementation(2019).

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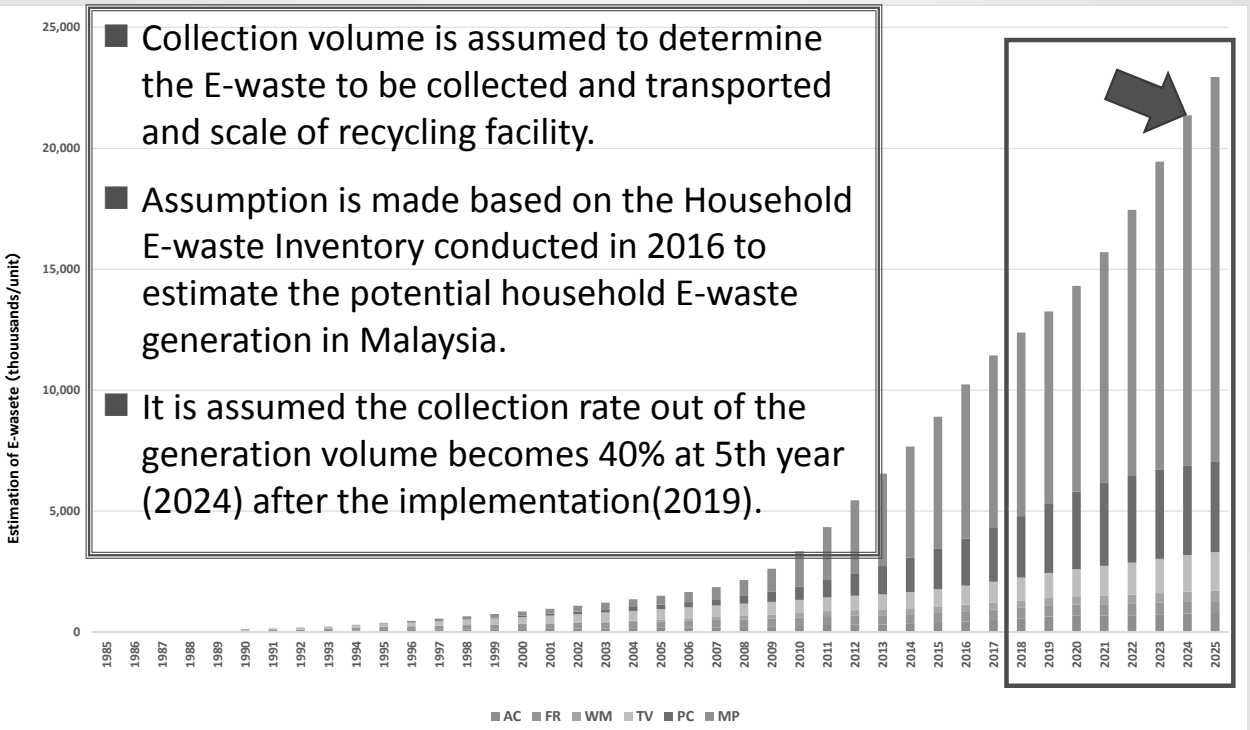

Logistical cost estimation(region wise)

- Assumed collection volume is divided regionally to know the state wise volume. By knowing the state wise volume, logistical cost is calculated.
- Basically E-waste transported and treated at recycling facilities in major regions(Penang, Klang Valley, N Sembilan, Melaka, and Johor) except East Malaysia. Initially all generated E-wastes shipped to Peninsular Malaysia.
- E-wastes generated in other regions are assumed to be transported and treated also at the recycling facilities.

Total assumed E-waste collection volume **X**

Region wise population

Region wide population	2010 Census Population	
Region	mil	Ratio
Penang	1.9	6.8%
Klang Valley	7.2	26.0%
(KL)	(1.6)	(5.7%)
Melaka	0.82	3.0%
N Sembilan	1.02	3.6%
Johor	3.6	12.7%
Sabah/Sarawak	5.6	20.0%

Region wise assumed collection volume in 2024

(Unit)

	CRT TV	Flat TV	WM	AC	FR	PC (Desktop)	PC (Note)	MP
Penang	20,441	20,441	11,533	20,808	13,138	55,292	45,239	394,182
Klang Valley (KL+ Selangor)	78,156	78,156	44,096	79,560	50,232	211,411	172,973	1,507,168
N Sembilan	10,822	10,822	6,106	11,016	6,955	29,272	23,950	208,685
Melaka	9,018	9,018	5,088	9,180	5,796	24,394	19,958	173,904
Johor	38,176	38,176	21,539	38,862	24,536	103,266	84,491	736,194
Other states	83,867	83,867	47,318	85,374	53,903	226,860	185,613	1,617,307
Sub TOTAL	**240,480**	**240,480**	**135,680**	**244,800**	**154,560**	**650,495**	**532,224**	**4,637,440**
Sabah & Sarawak	60,120	60,120	33,920	61,200	38,640	162,624	133,056	1,159,360
TOTAL	**300,600**	**300,600**	**169,600**	**306,000**	**193,200**	**813,119**	**665,280**	**5,796,800**

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Logistical cost estimation : formula

- Logistical cost is for the collection and transportation of Household E-waste. It covers the cost from the generators to recycling facility.
- Logistical cost is calculated by following parameters to know unit cost for carrying **1 ton for 1 km so-called ton kilo unit cost** of both land and sea freight
  - RM/ton, km: carryable quantity by truck or container
  - Collection and transportation ton, km: regional assumed collection quantity by population distribution ratio
- Basic formula is
  - Logistical cost= RM/ton,km x collection and transportation ton,km.
- This is the source for subsidizing registered collectors.
- Logistical cost is to be set by considering the transaction activity in the market.

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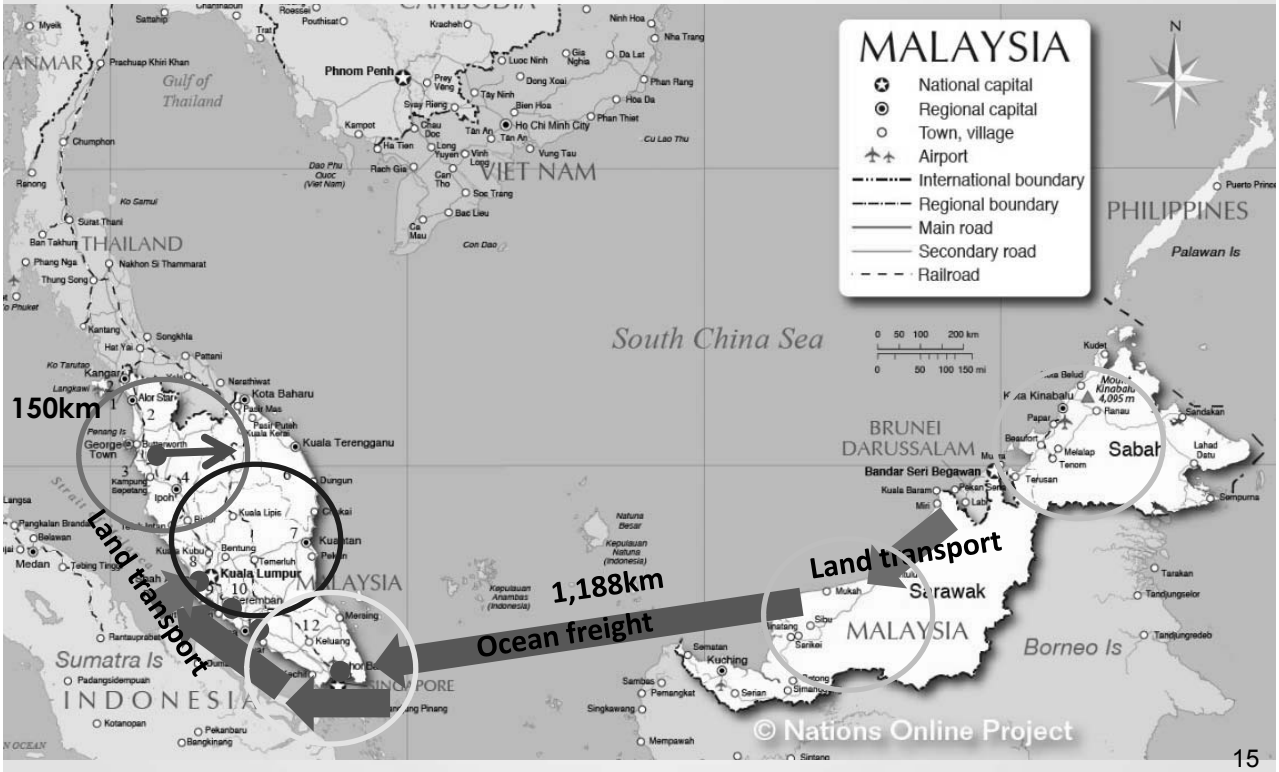
Household E-waste logistical flow to cover entire Malaysia

■Household E-waste are **transported to Peninsular to be treated** at recycling facility in major populated area such as Klang Valley, Melaka, Penang, etc



Assuming collection cost

■ West Malaysia

- Assumed 5 ton truck can make 300km trip/day(8 hours) and calculated loadable amounts for each item by that size of truck
- Logistical cost: RM 550/ 1day(5 ton truck, 8 hour land transportation fee) (Source: Standard transport rates)

Loadable E-waste amount

Item	Average weight (kg/unit)	Loadable amount (unit/truck)
CRT TV	25	50
Flat TV	10	100
WM	40	20
AC	46 (Outdoor 36kg, indoor 10kg)	30
Fridge	58*1	13
PC*2 (desktop)	21.7	20
Laptop	2.3	120
MP	0.1	4,000

Assumed loadable amount on truck

***1: Used the average weight obtained in the pilot project on recycling except fridge as most of received fridge lacking compressor. Instead used the average weight from Japan home appliance recycling data**

***2: For desktop PC, CPU weight is 12kg, CRT type monitor is 14kg and flat type is 5.4kg. Thus used average weight of CPU + average weight of both CRT and flat type monitors**

- East Malaysia
  - Assumed how much 40 ft container from East Malaysia to Peninsular can accommodate following amount per trip
  - Included land transportation in East Malaysia and Peninsular after and before the sea freight
  - Logistical cost: RM 12,611/trip (40 ft container sea freight fee) (Source: Average sea freight fare)

Loadable E-waste amount

Item	Average size(cm)	Loadable amount (unit/container)
CRTTV	55 x 80 x 55	240
Flat TV	50 x 90 x 5	2,000
WM	1040 x 58 x 70	120
AC	80 x 80 x 30	360
Fridge	150 x 66 x 66	100
PC(desktop)*1	38 x 53 x 38 38 x 39 x 38	860
Laptop	4 x 28 x 21	29,000
MP	120 x 90 x 90*2	210,600

Assumed loadable amount in container

***1: For desktop PC, CPU and monitor combined size considered. For monitor, CRT and flat type ration is 1:1. Upper and lower figure shows CPU+CRT and CPU and flat monitor respectively**

***2: For mobile phone, jumbo bag is used and 8,100 pcs accommodated per bag and 26 bags assumed to be loaded per container**

Unit cost calculation

- **Ton kilo cost** for Peninsular is 1.47(550/1.25=440/300)
  - x weight and average transporting distance per trip
  - Total collection cost is RM 19,846K as shown below

	Logistics rate(RM)	Carry amount(unit)	Distance (km)	(0) ton km(RM)	(1) Collection amount(unit)	(2) Weight (t)	(3) Average distance(km)	(0)x(1)x(2)x(3) Total collection cost(RM)
CRTTV	550	50	300	1.47	240,480	0.025	150	1,322,640
Flat TV	550	100	300	1.83	240,480	0.01	150	661,320
WM	550	20	300	2.29	135,680	0.04	150	1,865,600
AC	550	30	300	1.33	244,800	0.046	150	2,244,000
Fridge	550	13	300	2.43	154,560	0.058	150	3,269,538
PC(desktop)	550	20	300	4.17	650,495	0.022	150	8,944,306
Laptop	550	120	300	6.64	532,224	0.0023	150	1,219,680
MP	550	4,000	300	4.58	4,637,440	0.0001	150	318,824
					6,836,159	0.2034		**19,845,909**

- **Ton kilo cost** for East Malaysia is 1.77(12,611/6=2,101/1,198)
  - x weight and average transporting distance per trip
  - Total collection cost is RM 101,462K as shown below

	Logistics rate(RM)	Carry amount(unit)	Distance (km)	Sea freight	Land(A)	Land(B)	(0) ton km(RM)	(1) Collection amount(unit)	(2) Weight (t)	(3) Average distance (km)	(0)x(1)x(2)x(3) Total collection cost(RM)
CRTTV	12,611	240	1,188	1.77	1.47	1.47	4.7	60,120	0.025	1,338	9,456,901
Flat TV	12,611	2000	1,188	0.53	1.83	1.83	4.2	60,120	0.01	1,338	3,376,438
WM	12,611	120	1,188	2.21	2.29	2.29	6.8	33,920	0.04	1,338	12,335,375
AC	12,611	360	1,188	0.64	1.33	1.33	3.3	61,200	0.046	1,338	12,422,801
Fridge	12,611	100	1,188	3.03	2.43	2.43	7.9	38,640	0.035	1,338	14,287,723
PC(desktop)	12,611	860	1,188	0.56	4.17	4.17	8.9	162,624	0.022	1,338	42,577,478
Laptop	12,611	29,000	1,188	0.16	6.64	6.64	13.4	133,056	0.0023	1,338	5,504,939
MP	12,611	210,600	1,188	0.504	4.58	4.58	9.67	1,159,360	0.0001	1,338	1,501,345
								1,709,040	0.18		**101,462,709**

Total collection cost estimation result

■ Following is the total and unit collection cost required both for Peninsular and East Malaysia

Total collection cost

	Total collection cost(RM)	per unit(RM)	per ton(RM)	Total collection cost(RM)	per unit(RM)	per ton(RM)
CRTTV	1,322,640	5.5	220.0	9,456,901	157.3	6,292
Flat TV	661,320	2.75	275.0	3,376,438	56.2	5,616
WM	1,865,600	13.75	343.8	12,335,375	363.7	9,092
AC	2,244,000	9.17	199.3	12,422,801	203.0	4,413
Fridge	3,269,538	21.15	364.7	14,287,723	369.8	10,565
PC(desktop)	8,944,306	13.75	625.0	42,577,478	261.8	11,901
Laptop	1,219,680	2.29	996.4	5,504,939	41.4	17,988
MP	318,824	0.07	687.5	1,500,145	1.3	12,939

Assumed logistical cost for Peninsular

Assumed logistical cost for East Malaysia

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Calculation and computation of the total fee

-Total Recycling cost (RM/year)-

5. How to estimate recycling cost by item

Recycling cost formula

- Recycling cost covers the followings;
  - Cost for proper dismantling and segregation of hazardous substances in E-waste(a)
  - Cost for proper treatment and disposal for hazardous substances(b)
  - Cost for dismantling and segregation of recyclables in E-waste(c)
  - Cost for proper disposal of the residual materials(d)
  - Revenue to be obtained by selling recyclable fractions will be deducted to have net cost of recycling which becomes the source of the subsidy for licensed E-waste recycling facility(e).
- **Basic formula is Recycling cost = (a)+(b)+(c)+(d)-(e)**
- Recycling cost is to be determined as RM/unit and also converted to RM/ton by using the standard weight of the E-waste, obtained in the pilot recycling test.

Setting recycling facility scale

- Considering the E-waste collection amount, scale of the facility is assumed to treat each item hourly, daily and yearly
- Treating capacity data is based on the pilot project on recycling conducted in July 2017
- Assumed recycling facility basically operates 8 hours/day, 20 days /month, 240 days /year. Following is the units to be treated per facility

Scale of E-waste quantity recycled

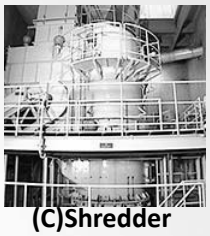
Item	Hourly treating units	Daily treating units	Yearly treating units
CRT TV	20	160	38,400
Flat TV	20	160	38,400
WS	50	400	96,000
AC	15	120	28,800
Fridge	50	400	96,000
PC(desktop)	60	480	115,200
PC(Laptop)	60	480	115,200
Mobile phone	90	720	172,800

Setting standard recycling process

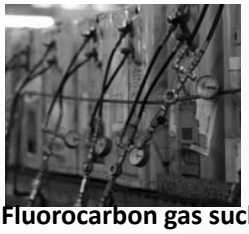
■Standard recycling process is set for each item to fulfill recycling rate and to ensure environmentally sound management for Focused Materials


(A)CRT PF cutting


(B)Back light separation


(C)Shredder


(D)Salt water collection


(E)Fluorocarbon gas sucking


(F)Refrigerant fluorocarbon gas collection


(G)Fridge shredder


(H)Fluorocarbon insulation capturing


(I)Manual dismantling


(J)Shredder

Setting standard recycling process cost and # of workers estimation

- Estimation is made by collecting cost data from existing E-waste recyclers in Malaysia and overseas and quotations from suppliers according to the set standard recycling process
- Process cost covers the equipment with manual and mechanical process. Does not cover the asset property cost such as land, building, shed, etc

Equipment cost

Item	Equipment cost (RM)	Converted JPY (,000yen)
CRTTV	115,000	3,100
Flat TV	97,800	2,640
WM	2,564,520	69,240
AC	3,650,000	98,550
Fridge	13,770,000	371,800
PC(desktop)	105,600	2,850
Laptop	105,600	2,850
MP	210,000	5,670

Number of workers

Item	#of workers
CRT TV	7
Flat TV	12
WM	10
AC	17
Fridge	10
PC(desktop)	15
Laptop	15
MP	20

Operational cost estimation for the recycling process

- Operational cost covers workers cost and utilities
- Workers cost is RM9/hour by considering the workers monthly pay at existing recyclers
- For maintenance and spare parts, 10% of the equipment cost is included

Total workers cost

Item	Workers cost（RM）
CRT TV	120,960
Flat TV	207,360
WM	120,960
AC	293,760
Fridge	207,360
PC(desktop)	259,200
Laptop	259,200
MP	345,600

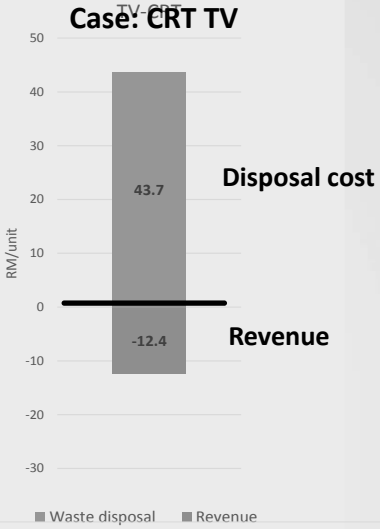
Utility cost

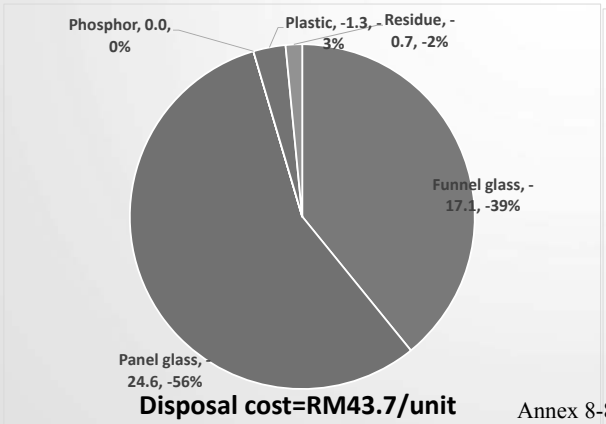
	Unit cost	Source	Usage
Electricity	0.334 MYR/KWh	Tenaga Nasional Berhad 「Tariff Rates」	For powering overall equipment
Fuel	2.18 MYR/liter	Diesel oil price as of April, 2018	For lifting devise in process
Water	2.28 MYR/m3	Suruhanjaya Perkhidmatan Air Negara 「Water Tariff」	For generating steam for activated carbon to capture insulation fluorocarbon

Cost and revenue for segregated fractions

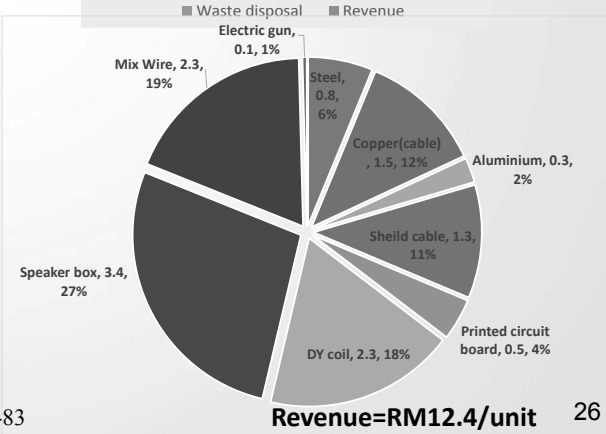
Cost and revenue for processed fractions

Item	Disposal cost (RM/unit)	Revenue (RM/unit)
CRT TV	43.7	12.4
Flat TV	9	5.4
WM	37	31
AC	11.3	65.3
Fridge	20	39
PC (desktop)	34	19.2
Laptop	2.7	3
MP	0.13	0.03





Disposal cost=RM43.7/unit



Revenue=RM12.4/unit

Cost and revenue for segregated fractions and general expense

- Cost for fractions treated at the recycling process is also estimated
- Disposal cost for non recyclable fractions is identified and revenue to be obtained by selling recyclable fraction such as metal and non-ferrous metal are deducted to estimate net recycling cost
- Composition of the fractions in each items is based on the pilot project on recycling
- General expense is also estimated to be used for bags, boxes and containers for proper segregation and storage, insurance and managing material balance data including downstream channel facilities

Total recycling cost estimation

- Following is the total recycling cost required for Malaysia. There is no difference between Peninsular and East Malaysia
- Recycling cost (Equipment cost + operational cost + disposal cost + general expense – revenue) is converted to the unit cost. For CRT TV case, 10 recycling facilities treating the set quantity are to be deployed. Meaning the total recycling cost is RM 15,560K.
- Unit recycling cost of CRT TV is RM 41/unit (15,560K/384K) and likewise other items are estimated

Total recycling cost

Item	Total recycling cost(RM)
CRT TV	1,555,966
Flat TV	475,857
WM	1,528,085
AC	1,019,245
Fridge	9,059,420
PC (desktop)	6,130,807
Laptop	2,408,045
MP	613,152

Recycling cost per unit

Item	Recycling cost per unit (RM/unit)
CRT TV	41
Flat TV	12
WM	16
AC	5
Fridge	49
PC (desktop)	8
Laptop	3
MP	3

6. RCMB cost

RCMB cost: administration cost of fund management body

- RCMB cost as shown below is to be used for proper household E-waste management and operation of the entire mechanism including license application evaluation on behalf of DOE and E-waste recyclers auditing
- POM Information obtained from manufacturers and importers is to be used for determining the fee rate after RFMB cross-examines the accuracy
- RCMB cost is converted to the unit cost by considering the ratio of the item in the estimated total collection volume

Total RCMB cost

Item	Budget (MYR/Yr)
Human resource	9,946,500
Office facilities	3,388,000
Audit expenses	7,051,340
Report, awareness raising	1,150,000
Fee and rate review committee related	48,400
Legal fee	109,000
General admin expenses	3,525,540
TOTAL	25,218,780

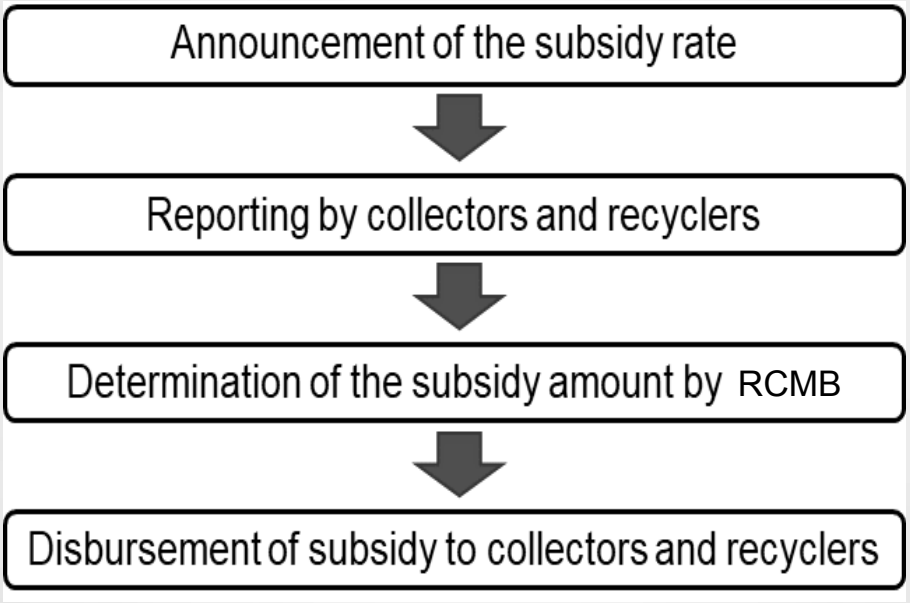
7. Basic Structure of Recycling Subsidy

- Recycling subsidy is for covering the logistics and recycling cost required for proper collection and recycling of the regulated E-waste.
- Amount of subsidy for registered collectors and licensed recyclers will be determined by applying the equation below.

Amount of subsidy (RM)
= Subsidy rate (RM/unit) x Number of units collected or recycled (Units)

- Subsidy rate is determined by type in accordance with the calculation of per unit logistic and recycling cost required.
- Number of units collected or recycled shall be determined based on the reporting by the collectors and recyclers in accordance with the collection, recycling, and reporting guidelines.
- Non-compliance with these guidelines may result in no or discounted provision of subsidy.
- False / disguised reporting may be subject to penalties in accordance with the laws and regulations depending upon its seriousness.

8. Recycling Subsidy Disbursement Procedure



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Factors to be considered when providing subsidy

- **Reducing rate** are applied when providing the subsidy to the collectors and recyclers. 100% of the Recycling Fee will not be provided. Because some collectors sell E-waste to recyclers especially for the E-waste in good conditions with the functionality.
- It also applies to collectors who bring E-waste missing valuable parts. This is to prevent so called "Cherry picking" activity.
- Different subsidy applies to the E-waste collection from East Malaysia where currently no E-waste recyclers.]
- Subsidy basically provided every month. RCMB receives the collected, received and treated quantity report from the licensed recyclers and collectors by the end of a month and verifies the accuracy of the data.
- Afterwards, the payment is done by the end of the next month.

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9. How to charge the Recycling Fee

- Recycling Fee is to be charged to the manufacturers and importers of E-products by product types based on their POM amount.
- Manufacturers and importers of E-products are requested to report the POM amount of the previous year(January through December) by the end of January.
- POM amount report can be done either by unit or volume. Conversion figure is to be determined.

10. Recycling fee

Collection cost (weighted average collection cost for whole Malaysia)

- For setting the recycling fee, (**total collection cost + total recycling cost) x collection amount + RFMB cost / POM**
- Total collection cost for Peninsular and East Malaysia is converted to the unit cost through weighted average calculation considering the population ratio in the region

Unit collection cost

	Total collection cost(RM)	Population ratio 80% : 20% per unit(RM) West Malaysia	per unit(RM) East Malaysia	Entire Malaysia (weighted average)
CRT TV	1,322,640	5.5	157.3	**36**
Flat TV	661,320	2.75	56.2	**13**
WM	1,865,600	13.75	363.7	**84**
AC	2,244,000	9.17	203.0	**48**
Fridge	3,269,538	21.15	369.8	**91**
PC(desktop)	8,944,306	13.75	261.8	**63**
Laptop	1,219,680	2.29	41.4	**10**
MP	318,824	0.07	1.3	**0.3**

POM estimation

- Put On Market quantity is estimated with available estimation sources. Figures are used to calculate the unit recycling fee

POM quantity estimation

Item	POM assumed (,000 units)	Source
CRT TV	850	Reed Electronics Research assumed generation as of 2015(CRT and LCD is 1:1)
Flat TV	850	Reed Electronics Research assumed generation as of 2015(CRT and LCD is 1:1)
WM	555	JEMA(Japan Electrical Manufacturers' Association) assumed White goods demand as of 2013
AC	790	JARAC(Japan Association of Refrigeration and Air-Conditioning Contractors) assumed A/C demand as of 2015
Fridge	500	JEMA(Japan Electrical Manufacturers' Association) assumed White goods demand as of 2013
PC (desktop)	552	BMI Research assumed generation as of 2018
Laptop	1,849	BMI Research assumed generation as of 2018
MP	10,770	BMI Research assumed generation as of 2015
TOTAL	16,716	-

Recycling fee (RM/ unit)

- Recycling fees to be imposed on manufacturers and importers are shown in the following table

	(1)	(2)	(3)	((1)+(2))*(3)=(4)	(5)	(4)+(5)=(6)	(7)	(6)/(7)
Item	Collection cost(RM)	Recycling cost(RM)	Collection amount(unit)	Sub TOTAL	Allocated FMB cost	TOTAL(RM)	POM(unit)	Recycling Fee(RM/unit)
CRTTV	36	41	300,600	23,146,200	2,277,820	25,424,020	850,000	**29.9**
Flat TV	13	12	300,600	7,515,000	2,277,820	9,792,820	850,000	**11.5**
WM	84	16	169,600	16,960,000	1,285,157	18,245,157	555,000	**32.9**
AC	48	5	306,000	16,218,000	2,318,739	18,536,739	790,000	**23.5**
Fridge	91	49	193,200	27,048,000	1,463,988	28,511,988	500,000	**57.0**
PC(desktop)	63	8	813,119	57,731,449	6,161,473	63,892,922	552,000	**115.7**
Laptop	10	3	665,280	8,648,640	5,041,211	13,689,851	1,849,000	**7.4**
MP	0.3	3	5,796,800	19,129,440	4,392,571	23,522,011	10,770,000	**2.2**
			8,545,199				**16,716,000**	

Item	Recycling Fee (RM/unit)
CRT TV	30
Flat TV	12
WM	33
AC	24
Fridge	57
PC(desktop)	116
Laptop	8
MP	2

11. Adjustment of fund management surplus

- Recycling Fee is collected based on the POM amount by each manufacturers and importers. **Quantity of household E-waste to be recycled at household recycling facilities is not equal to the POM** because of various factors such as deadstock and leakage of E-waste.
  - Recycling Fee to be charged
    - Collection amount for the fee to be determined considering the assumed collection volume, Instead of 100% of POM equivalent fully charged
- There might be the surplus of the fee collected and this needs to be taken into consideration for setting the Recycling Fee.
- When setting the recycling fee, the cost eventually needed in the future, considering the life span of the E-appliances need also to be taken into consideration.

12. Recycling Fee review mechanism

- Recycling Fee rate is to be reviewed periodically
- Fee review is conducted, considering the market trend of recyclable materials, relevant technology development, change in the components and materials used in the E-appliances.
- In the initial stage E-waste amount collected and recycled may not be large enough to expect scale of economy.
- When more amount collected and recycling facility has become more experienced, cost for recycling can be reduced.
- Additionally, when it becomes more efficient, more market is created and revenue is generated for some fraction which may not exist without enough volume. Therefore, it is important for RCMB to monitor the cost and revise Recycling Fee on regular basis.
- RCMB also closely monitors how the fee collected is utilized to ensure for avoiding over charge and false reporting and improper spending.

Conclusion…

- Recycling Fee rates jointly produced in this Technical Cooperation attaches to the Schedule of the draft Fee Guideline.
- E-waste to be collected in Malaysia is an assumption. Close monitoring is necessary to identify actual collection amount after the implementation.
- POM also needs to be accurately replaced based on the POM report provided by manufacturers and importer.
- Recycling Fee is finalized after necessary follow ups and internal approving process.

Annex 9

Summary of Regional Workshop

PROCEEDINGS

OF THE REGIONAL WORKSHOP

ON HOUSEHOLD E-WASTE MANAGEMENTIN

IN MALAYSIA

Held at
Le Meridien Hotel, Putrajaya, Malaysia
22-23 November 2017

1. Outline of the Workshop

The "Regional Workshop on Household E-Waste Management" was conducted on 22nd and 23rd November 2017 at Le Meridien Hotel in Putrajaya. It was organized jointly by the Department of Environment (DOE) and Japan International Cooperation Agency (JICA), and officiated by the Honourable Dato' Sr. Dr. Azimuddin Bahari, Deputy Secretary General (Environment), NRE.

The objectives of the Regional Workshop were:

- For Malaysia to share their experiences and challenges towards the development of a new household e-waste management mechanism in Malaysia
- To provide a good platform and opportunity for environmental officials from the South East Asian counties to exchange information and best practices on household e-waste management in each country

To achieve the objectives, the workshop invited the representatives from six neighbouring countries including the Philippines, Indonesia, Vietnam, Thailand, R.O.C (Taiwan), and Singapore. A total of 62 people attended the two-day Workshop, including the above-mentioned international delegates, the representatives from the related federal government agencies in Malaysia, as well as state government.

Prior to the workshop, the Launching Ceremony was held with the attendance of the Honourable Mr. Hiroyuki Orikasa, Minister Counsellor, Embassy of Japan. In the Launching Ceremony, a certificate of appreciation were presented to the Pilot Project Partners by the Honourable Dato' Sr. Dr. Azimuddin Bahari, for their active cooperation to the Pilot Project. The newly produced awareness raising video was also shown in the Ceremony.

In the following workshop, each participating country gave a presentation on the current status and challenges of household e-waste management in their countries, to share their experiences and exchange opinions for the possible method to improve the current situation. At the end of the workshop, the participants all agreed to have a continuous opportunities to discuss, exchange information and share the experiences among the officers in charge of household e-waste management in the South-East Asia.

The workshop was adjourned with the closing remarks by Dato' Dr. Ahmad Kamarulnajuib Bin Che Ibrahim, Director General of DOE Malaysia who expressed his thanks to the participants from other countries, JICA, JET, as well as DOE officers.

2. Programme:

22nd November 2017

The Launching Ceremony

9:15-9:45	Registration and arrival of guests
9:45-10:00 10:00-10:05	Arrival of VIP National Anthem "Negaraku"
10:05-10:10	Doa recitation
10:10-10:25	Welcome remarks by The Honourable Dato' Dr. Ahmad Kamarulnajuib Bin Che Ibrahim Director General, Department of Environment Malaysia
10:25-10:40	Speech by The Honourable Mr. Hiroyuki Orikasa Minister Counsellor, Embassy of Japan to Malaysia
10:40-11:00	Opening remarks by The Honorable Dato' Sr. Dr. Azimuddin Bahari Deputy Secretary General (Environment) Ministry of Natural Resources and Environment Malaysia
11:00-11:05	Montage presentation
11:05-11:30	- Appreciation to the Pilot Project's partners - Presentation of Token of Appreciation to Embassy of Japan - Presentation of Token of Appreciation to Deputy Secretary General (Environment), Ministry of Natural Resources and Environment Malaysia
11:30-11:45	Group photo
	Light refreshment
11.45	End

Regional Workshop

<Session 1> Moderator: Mr. Satoshi Sugimoto, Chief Advisor of JICA Expert Team

13:30-14.20	**Presentation (DOE Malaysia):** **Overview and challenges of new household E-waste management system in Malaysia,** Dato' Dr. Ahmad Kamarulnajuib Bin Che Ibrahim, Director General, Department of Environment Malaysia
14:20-14:30	Q&A
14:30-14:50	**Presentation (Thailand):** **Current status of E-waste Management in Thailand** Mr. Rachain Rachaphila, *Environmentalist,* Professional Level Pollution Control Department, Ministry of Natural Resources and Environment Thailand
14:50-15:00	Q&A
	Tea Break

<Session 2> Moderator: Mr. Satoshi Sugimoto, Chief Advisor of JICA Expert Team

15:00-15:20	**Presentation (Indonesia):** **Current status of the household E-waste management system in Indonesia** Ms. Upik Sitti Aslia Kamil, Directorate General for Solid Waste, Hazardous Waste, and Hazardous Substance Management
15:20-15:40	**Presentation (The Philippines):** **Overview and current status of the existing household E-waste management system in the Philippines** Ms. Clarisse D. Diaz, Environmental Management Specialist II of Hazardous Waste Management Section, Environmental Management Bureau, Department of Environment and Natural Resources, the Philippines

15:40-16:05	**Presentation (Singapore):** **Current status of E-waste management in Singapore** Mr. Sim Jun Hua, Manager of Waste & Resource Management Department, National Environment Agency Singapore
15:45-16:05	Q&A
17:35	End

7:30 – 10:00 pm Reception (Hosted by DOE and JICA)

23rd November 2017

<Session3> Moderator: ***Mr. Satoshi Sugimoto, Team Leader, JICA Expert Team***

9:00-9:40	**Presentation (Taiwan):** ***Overview and Evaluation of household E-waste Management in Taiw***an *Dr. Lih-Chyi Wen, The Center for Green Economy, Chung-Hua Institution for Economic Research* ***Overview of E-Waste Management in Taiwan*** *Dr. Chun-Hsu Lin, Research Fellow, Deputy Director of Center for Green Economy, Chung-Hua Institution for Economic Research*
9:40-10:10	**Presentation (Vietnam):** ***Current Status of E-waste Management in Vietnam*** *Mr. Nguyen Nhu Trung,*
10:10-10:35	Q&A
10:35-10:45	Coffee Break

<Session 4> Moderator: ***DOE***

10:45- 11:10	**Presentation (JICA Expert Team)** ***Development of the New Mechanism for Household E-waste Management in Malaysia (Progress)*** *Mr. Satoshi Sugimoto, Leader of the JICA Expert Team*
11:10-12:15	**Discussion** Challenges of implementing an E-waste management system in the South East Asia region and possible collaboration
12:15-12:25	Closing remarks by the Honorable Dato' Dr. Ahmad Kamarulnajuib Bin Che Ibrahim, Director General of DOE Malaysia
12:25-14:00	Lunch/ End of workshop

3. Speech in the Launching Ceremony

1) Welcome remarks by The Honourable Dato' Dr Hj. Ahmad Kamarulnajuib Bin Che Ibrahim, Director General, Department of Environment Malaysia

It is my privilege to address this welcoming speech for the launching of The Regional Workshop on Household E-waste Management. We are delighted and honoured to host The Regional Workshop on Household E-waste Management and we would like to extend a warm welcome to this event. On behalf the Ministry of Natural Resources and Environment (NRE), we would like to express our sincere gratitude to the Japan International Cooperation Agency (JICA) for co-organizing with the DOE and provides funding which undoubtedly highly contribute to the success of this workshop.

As you know, the Department of Environment (DOE) is cooperating with the Japan Cooperation Agency (JICA) to develop the household e-waste management and control system through "The Project for Development of Mechanism for household E-waste Management in Malaysia" since September 2011 until 2018. This phase of this project also involves the pilot projects on the Household E-waste Recycling and Household E-waste Collection and Reporting particularly for the six (6) main targeted items such as televisions, washing machines, refrigerators, air-conditioners, personal computers and mobile phones. The aims of the pilot projects are testing an appropriate, effective and efficient E-waste collection, reporting and recycling of household E-waste in Malaysia. We would also like to take this opportunity to thank all the relevant stakeholders in contributing in this pilot project which involved JICA experts, the E-waste full and partial recovery facilities, collectors, retailers and NGOs.

As the Phase II project will be completed in 2018, the DOE and JICA organize this Regional Workshop as a good platform to share an overview and challenges of new Household E-waste Management System in Malaysia and also to increase the understanding of Household E-waste management system among relevant government officers as well as other stakeholders in the Asian region. The issue on E-waste management could not be solved by one actor only – it's play an important roles when all relevant stakeholders such as government delegates and experts sit together to exchange best practises and strengthen their capacity to develop a comprehensive and systematic solution that is sustainable and environmentally sound to be implemented.

In this Regional Workshop on Household E-waste Management, we are pleased to note that 50 delegates are in attendance including from The Philippines, Indonesia, Singapore, Vietnam, Thailand and Taiwan. We are also pleased to welcome JICA experts in Household E-waste management**, who** are present to impart their knowledge and expertise to the workshop.

Waste electrical and electronic equipment (WEEE) commonly known as E-waste, is recognized as an emerging issue globally, due to the fact that the types of electrical and electronic equipment are getting more complex in terms of its characteristics and the quantity has increased tremendously with more common use of different technologies in our daily activities. Particularly for E-waste generated from households such as televisions, washing machines, refrigerators, air-conditioners, personal computer

and mobile phones, the management of household E-waste remains a big challenge because the generation amount is enormous, and E-waste contains hazardous substances (e.g. mercury, lead and cadmium), which shall be carefully managed.

In Malaysia, E-waste is categorized as SW 110 under the Environmental Quality (Scheduled Wastes) Regulations 2005. At present, there is no formal system in place for household E-waste management, although E-waste from the industries are controlled and regulated. As a result, household E-wastes mostly end up at informal sectors, where some of the recyclable parts are dismantled by the recyclers, while the unwanted components or residues are either disposed at the disposal site, or illegally dumped. Such practice if not control will cause contamination to the environment, as well as release of harmful chlorofluorocarbon (CFC) gases into the natural environment eventually bringing about global warming and climate change.

The impacts of mismanagement of household E-waste transcend all levels, sectors, stakeholders and major groups and it is essential for the stakeholders to become more involved in the overall development of the household E-waste management mechanism. Therefore, institutional capacity for implementation can only be made effective through collaborative participation, based on indigenous and scientific knowledge.

Today's recognition and appreciation of commitments by the stakeholders in the pilot project of Household E-waste Recycling and Household E-waste Collection and Reporting is in regards to their immense contribution to the development of household E-waste management system in Malaysia. I do hope that this recognition would spur the household E-waste stakeholders to become more innovative and forward-looking to continuously explore the best solution to address the challenges faced by the sectors in having proper management system of household E-waste.

The institutionalization of the household E-waste management mechanism will be an important milestone for the Malaysia Government to move forward to the next step to implement the Extended Producer Responsibility (EPR) and sustainable household e-waste recycling system in near future. Further institutionalization through the technical assistance by the experts is very much needed in order to structure a body, assist building the necessary technical expertise as well as the necessary tools and instruments for its operation.

In closing, I wish to express my gratitude to all delegates and experts for their full cooperation and contribution to the Regional Workshop on Household E-waste Management. I would also like to express my gratitude to the Regional Workshop of Household E-waste Management Secretariat and the Organizing Committee for their diligence. I wish all participants a very fruitful workshop and pleasant stay in Malaysia. Thank you.

2) Speech by The Honourable Mr. Hiroyuki Orikasa, Minister Counsellor, Embassy of Japan to

Malaysia

It is indeed a great pleasure for me to be here today to attend the "Regional Workshop on Household E-waste Management" organized by the Ministry of Natural Resources and Environment of Malaysia and Japan International Cooperation Agency (JICA). This workshop will provide a good platform for environmental officials from the South East Asian region to exchange information and best practices on household e-waste management.

I am sure all of you will agree with me when I say that the economic growth in South East Asia has been exemplary in recent years. However, as a result of South East Asia's economic development and population growth, the region and also the world is faced with a rapid increase not only in the amount of waste, but also electrical and electronic waste or E-waste. E-waste is becoming a global issue because of the tremendous growth in the use of electrical and electronic equipment and their disposal. Improperly managed waste results in deterioration of a community's living environment, as well as public health, sometimes causing serious health problems. Sustainable development requires the proper management of waste.

In Japan, in the 1960s, rapid industrialization resulting from high economic growth generated pollution by hazardous waste discharged from factories, such as organic mercury and cadmium, seriously damaging the health of residents in surrounding areas.

Fortunately, there had been significant progress in the proper management of waste by the 1980s in Japan. However some problems were still left unresolved, including the continuing increase in waste generation and the resulting shortage of landfills. In order to provide comprehensive solutions to such problems, the Japanese government shifted the focus of its policies to reducing waste generation itself.

In 2000, Japan formulated the Basic Act for Establishing a Sound Material Cycle Society to promote the establishment of a sound material-cycle society designed to ensure the implementation of the 3R Reduce, Reuse and Recycle) and proper waste management.

I am pleased to say that Japan has a long cooperative relationship in waste management with Malaysia and other South East Asian countries. For Malaysia, the Technical Cooperation Project provided by JICA to the Department of Environment on the management of E-waste generated from households since 2011 has contributed significantly to Malaysia in terms of the understanding on possible collection mechanisms and challenges faced in overall recycling of household E-waste. We look forward to further cooperation on waste management with Malaysia through JICA.

In addition, proper waste management leads to a reduction in CO2 emission. Japan has been introducing Japanese technology utilizing Joint Crediting Mechanism (JCM) as well as JICA technical cooperation as measures against climate change. The JCM quantitatively evaluates contributions to the reduction of greenhouse gas emissions in a developing country through the execution of any project planned and implemented jointly by a developed and a developing country. The

main feature of JCM is that it promotes climate change mitigation actions through bilateral agreements. In the area of waste management under JCM, Japan has carried out the construction of waste energy plants and biomass power plants in the South-East Asia area.

Nevertheless, E-waste also contains many valuable, recoverable materials such as aluminum, copper, gold, silver, plastics, and ferrous metals. These useful metals pollute the environment if inappropriate processing is done but they can be reused as resources by effectively utilizing them. In order to conserve natural resources and the energy needed to produce new electronic equipment from virgin resources, electronic equipment can be refurbished, reused, and recycled instead of being landfilled.

This year, 2017, marks the 60th anniversary of Malaysia's independence as well as the establishment of diplomatic relations between Japan and Malaysia. I believe that Malaysia and Japan are important political and economic partners based on mutual respect, understanding and trust. I hope this workshop will open new opportunities for both Malaysian and Japanese companies to expand their partnerships and business. This certainly represents excellent facet of friendship between Japan and Malaysia.

Before I conclude, I would like to once again thank the Ministry of Natural Resources and Environment, JICA and everyone who have put your utmost efforts to make this regional workshop a success. I wish you a fruitful and informative seminar and every success in your future. Thank you.

3) Opening remarks by The Honorable Dato' Sr. Dr. Azimuddin Bahari, Deputy Secretary General (Environment), Ministry of Natural Resources and Environment Malaysia

On behalf of Ministry of Natural Resources and Environment Malaysia, it is a great pleasure to extend a warm welcome to all the international delegates from various countries and local delegates to the Regional Workshop on Household E-Waste Management. We are pleased to note that 50 delegates are in attendance from Indonesia, The Philippines, Singapore, Vietnam, Thailand, Taiwan and local delegates.

I also would like to take this opportunity to register our sincere appreciation to the Government of Japan and Japan International Cooperation Agency (JICA) for their continued support and cooperation towards the management of household electrical and electronic waste (e-waste) in Malaysia.

One of the major environmental challenges that the world face today is the increasing volume of waste that are being generated as a result of urbanization, industrialization and economic growth. In the mid-1960s through 1980, Malaysia experienced rapid economic growth in the manufacturing sector which contributed to the generation of wastes in Malaysia and the associated negative impacts on the environment.

The waste sector is also one of sources of greenhouse gas (GHG) emission that contributes to climate change. According to UN Environment (formerly known as the United Nations Environment

Programme or UNEP), although the waste management sector makes a relatively minor contribution to greenhouse gas emissions, it is in a unique position to move from being a minor source of global emissions to becoming a major saver of emissions. The waste sector contributed 12% of the total GHG emission for the year 2011 as reported in Malaysia's Biennial Update Report (BUR).

Waste electrical and electronic equipment (WEEE) commonly known as e-waste is becoming a global issue because of tremendous growth of demands on the use of electrical and electronic equipment and the disposal after use because of the nature of hazardousness. Realising the growing problem of e-waste generation worldwide and in the country, Malaysia wants to ensure the safe, effective, and economically beneficial management of e-waste in Malaysia.

Therefore, Malaysia has made various initiatives and approaches on e-waste management including legal frameworks and guidelines, enforcement and promotion of e-waste recovery activities. The growing concern on hazardous e-waste generation led to the development in the Environmental Quality (Scheduled Waste) Regulation 2005 under DOE to improve the effectiveness of e-waste management in Malaysia.

Over the recent past, the global market of electrical and electronic equipment has grown exponentially, while the lifespan of these products has become increasingly shorter. Household e-waste generated from non-industrial sectors such as TVs, air conditioner, washing machine, refrigerator, computer and mobile phone are not yet regulated properly in most of the countries. As a consequent, household e-waste ends up with improper recycling and disposal at informal channel posing a new challenge to policy makers.

One of the aims of this workshop is to share the current approaches and best practises on household e-waste management that being implemented in other countries. I believe, together with us today, we have experts from various countries that will share their knowledge and vast experience on the management of household e-waste.

This workshop also shall serve as a platform for us to keep abreast on the various views on leading to a better understanding of the e-waste challenges and assist in evaluating the spectrum of issues related to household e-waste. All these experiences can then be used to develop the strategies and actions for both immediate and long-term period to strive to achieve better management of household e-waste.

May I take this opportunity to assure you that, the Government of Malaysia is committed in supporting the household e-waste management and to ensure the safe, effective, and economically beneficial management of e-waste in Malaysia. The Government recognise that the effective implementation of policies and strategies is required to minimize the environmental and health risks caused by hazardous wastes.

It is now my pleasure to declare the Regional Workshop on Household E-waste Management officially opened and wish you all a fruitful discussion. Let me once again take this opportunity to express my sincere gratitude to the organizers of this event for inviting me to officiate this event. I do hope that you

will also take time to enjoy the beauty of Malaysia with its tropical weather, friendly people and multi-cultural cuisine and with that, thank you.

4. Workshop Presentations

Seven (7) presentations were made to introduce the current status of household e-waste management in each country, followed by the presentation by JET to introduce the new household e-waste management mechanism that is being developed in the JICA Cooperation Project.
The following presentations are included in the Appendix 1.

1	**Overview and Challenges of New Household E-Waste Management System in Malaysia** Dato' Dr. Ahmad Kamarulnajuib Bin Che Ibrahim Director General, Department of Environment Malaysia
2	**Current Status of Household E-waste in Thailand** Mr. Rachain Rachaphila Environmentalist, Professional Level Pollution Control Department, Ministry of Natural Resources and Environment Thailand
3	**Current Status of the Household E-Waste Management System in Indonesia** Ms. Upik Sitti Aslia Kamil Directorate General for Solid Waste, Hazardous Waste, and Hazardous Substance Management
4	**Current Status of Household E-waste Management in the Philippines** Ms. Clarisse D. Diaz Environmental Management Specialist II of Hazardous Waste Management Section, Environmental Management Bureau, Department of Environment and Natural Resources, the Philippines
5	**E-Waste Management in Singapore** Mr. Sim Jun Hua Manager of Waste & Resource Management Department, National Environment Agency Singapore
6	**Overview and Evaluation of Household E-waste Management in Taiwan** Dr. Lih-Chyi Wen, The Center for Green Economy, Chung-Hua Institution for Economic Research
7	**Overview of E-Waste Management in Taiwan** Dr. Chun-Hsu Lin, Research Fellow, Deputy Director Center for Green Economy, Chung-Hua Institution for Economic Research
8	**Current status of E-waste management in Vietnam** Mr. Nguyen Nhu Trung Vietnam Environment Administration (VEA) Ministry of National Resources and Environment (MoNRE)
9	**Development of the New Mechanism for Household E-waste Management in Malaysia (Progress)** Satoshi Sugimoto, Chief Advisor, JICA Expert Team

3. Questions and Answers

1) Session 1 (on Day 1: 22nd November 2017)

Question 1-1 ***Mr. Sim Jun Hua, Singapore (to Malaysia)***

1) I'd like to ask about the roles of E-appliance producer's roles in the new mechanisms. You have mentioned that generators, collectors and recyclers are involved in this system, but how about the producers?
2) You have also mentioned about the fee structures. Can you explain what the fee is, how you set the fee, and who will pay?

Answer 1-1 ***Mr. Satoshi Sugimoto, JICA Expert Team***

There are three key flows in the new mechanism which we are now developing in Malaysia.

One is the proper flow of e-waste from generators to the final destinations through registered collectors and transporter of household e-waste. In Malaysia, there are many players involved in collection and transportation including the formal and informal players, but currently we cannot capture all of them. So we are going to ask them to register so that we can completely capture them.

As to the recyclers, now there are so-called partial and full recovery facilities that are registered at DOE. But they mainly deal with industrial e-waste, not household e-waste. Since different technologies will be required to treat household e-waste, we decided to ask all the potential recyclers to apply for a new license for recycling of household e-waste. So no one will be allowed to recycle any household e-waste unless they get the new license for household e-waste recycling from DOE. In this way, we are going to make a transparent e-waste flow from the generators to the recyclers.

The other thing is about the involvement of manufacturers and importers. Our basic concept is something like this: If we are going to ask all the recyclers to conduct a proper recycling of all these six target e-wastes, it will require a certain incremental cost which differs by types of items to be treated. If the e-waste only contains low valuable recyclables, or if it contains hazardous substances, recycling of these items can never be economically feasible. So, in order to secure the proper recycling of these items, we need to provide some finance to make their business economically feasible. How we are going to get the money for this? When we consider about this based on the extended producers' responsibility, we need to involve the manufacturers and importers in our discussion on how we can collect fee from them to make recycling business feasible, or at least break-even. That is the mechanism we are going to consider for our fee structure. So, we are going to collect fees from manufacturers and importers and reimburse them to the recyclers who treat these six target e-wastes in line with the guidelines which we are now developing.

Question 1-2 ***Mr. Geri-Geronimo R. SAÑEZ, Philippines (to Malaysia)***

1) You have mentioned that you are going to set up the separate registration or accreditation system for treater and transporter of household e-waste and industrial hazardous waste. Is that right? If so, for example, even though I have been already accredited or registered as a transporter for industrial hazardous waste, am I not qualified to collect household e-waste? I understand that you are going to develop a new registration or accreditation system for the collection and treatment of household waste. But what will you do with the existing transporters and treaters for the industrial hazardous waste?

2) How will you institutionalize the extended producer responsibility? Is there any producer responsible organization now? Who will manage and collect the fund?

Some of the big companies will have their own EPR system. And some will have an association that will be managed based on EPR policy. For example in the Philippines, chemical industry has their own responsible care program. So when you buy chemicals and if you have a problem in disposing them, you can just call them and ask them take away, or you can bring them to the drop-off centers.

Answer 1-2 ***Mr. Satoshi Sugimoto, JICA Expert Team***

1) When starting the project, we first focused on the six items, including TV, washing machine, air-conditioner, refrigerator, PC, and mobile phone. In our recycling guidelines, we are going to provide how the recyclers should handle the hazardous substances in these six items, including how to take out, treat and dispose of. All the recyclers of these six household e-wastes must follow these guidelines. We also set the target recycling rate for each items, which all the licensed recyclers have to follow.

To implement these guidelines in the future, we need to request all the existing recyclers, regardless of whether they treat hazardous waste or non-hazardous waste, to make sure how they are going to handle the hazardous substances and how they are going to reach the target recycling rate. That's why we are going to establish the new licensing system for the six target household e-wastes for recyclers.

But as for the collectors and transporters, our guidelines are not so strict. The required action is somewhat similar to that required for industrial hazardous waste collection and transportation. The most important thing here is that, many collectors or transporters of household e-waste in Malaysia dismantle the waste and only take out the valuable parts to sell to the second buyers, while they leave other non-valuable items and/or even hazardous substances, or sometimes just dump them at their backyard. So we have to stop these activities. That's why we need to officially register those collectors and transporters to screen their activities. Once you are registered as a collector or a transporter, you have to follow the guidelines for household e-waste collection and transportation, in which you are not allowed to dismantle e-waste, and you are required to transport these six items only to the licensed recyclers, not to other scrap dealers or other informal dealers.

That's why we developed different systems for recyclers and collectors & transporters.

2) The establishment of the management body for the recycling fund is still under discussion in the project. But basically the DOE will be the core member of this board, so the DOE should have a legal power (authority) to collect fees and to make a decision on how to disburse the collected fees to recyclers.

The basic principle behind the fee collection from the manufacturers and importers is, of course, the extended producer responsibilities. We are going to ask all the manufactures and importers to pay the recycling fee. Manufacturers here mean the domestic manufacturers of the six target items, who put their products the domestic market in Malaysia. Importers mean the overseas manufacturers of the target six items who put their products into Malaysian market. So we are going to capture all the manufacturers and importers to make them pay the fee we set based on our own methodologies

of calculation taking into consideration the local cost for recycling, as well as collection and transportation cost. We are going to fairly, in the same rates per item, collect fees based on the number of items by types from each manufacturer who put their products on the market in Malaysia. That is the basic mechanism of fee collection.

Question 1-3 ***Mr. Geri-Geronimo R. SAÑEZ, the Philippines (to Malaysia)***

Thank you for the clarification. That is one of the most difficult parts in institutionalizing EPR. In order to request the industries to pay the recycling fees, you need to have a legal basis. So is there any policy that has already been issued relating to the recycling in Malaysia? Or how will the DOE issue their policy for collecting recycling fee?

I also would like to ask the roles of the local governments in the household e-waste management. In the Philippines, we have a role allocation between the national government and local government. Since it is about household waste, regardless of whether it is hazardous or non-hazardous, it is the local governments who take responsibility for collection and disposal, not national agencies.

Answer 1-3 ***Mr. Satoshi Sugimoto, JICA Expert Team***

For now, as far as the six target items are concerned, the key role of the local governments is to monitor and supervise the collection and recycling activities. Once the household e-waste management mechanism has been developed, we need to be very sure and very transparent about the actual collection, transportation and recycling activities by the registered and/or licensed recyclers. It is necessary as a proof to justify the reimbursement of the fee collected from the manufacturers and importers.

As for the municipal solid waste in Malaysia, there are several concessionaires who have exclusive contracts with the government. But the contract is about municipal solid waste, not hazardous waste. We have discussed the handling of household waste and household e-waste with the Ministry of Well-being, Housing and Local Governments, and also discussed the legal basis for the DOE to collect fee, to establish a fund, and to disburse this money to the recyclers with an independent account. We have already made a series of discussions with legal advisors of this Ministry, as well as Attorney General's Chamber representatives, and we also get the MOF involved in our discussions. So far we see a certain legal basis to collect fees and to establish an independent account as a fund.

Question 1-4 ***Mr. Satoshi Sugimoto, JICA Expert Team (to Thailand)***

In Thailand, you are going to develop a new law to control the five items. How are you going to define household hazardous waste in Thailand? Are these 5 items defined as hazardous waste?

What about the recycling, treatment and disposal of e-waste? Are there any laws or regulations have been developed? Have these activities been conducted only based on the market mechanism or private recyclers or treater?

Answer 1-4 ***Mr. Rachain Rachaphila, Thailand***

About the hazardous waste, those that can be separated for recycling or recovery will be put in a higher priority under the drafted Act. But, about the non-valuable e-waste, local government has the responsibility for transportation and final disposal.

The recycling and recovery facilities for hazardous waste are managed by private companies. The government sectors are responsible for food waste and municipal waste only, not hazardous waste.

Question 1-5 ***Mr. Geri-Geronimo R. SAÑEZ, the Philippines (to Thailand)***

I am just asking for clarification. Among ASEAN, Thailand is the first to have a policy on clarifying e-waste or second hand equipment, in which any e-appliances whose usage period exceeds more than three years are defined as e-wastes regardless of whether it is still functional or not. But I haven't seen anything about this in your presentation. That is becoming a model, even in the Basel Technical Guidelines on the environmental sound management of the used electrical and electronic equipment.

Are you amending your national policy to address the generation of household e-waste?

Answer 1-5 ***Mr. Rachain Rachaphila, Thailand***

In Thailand, we had a testing pilot project before, in which the private sectors and ministries were involved. We have to evaluate the result of the pilot project before changing the national policy, so that the pilot project participating companies can enough time to address it.

Question 1-6 ***Ms. Mary-Anne Pan Lu-Yin , Singapore (to Thailand)***

About slide 38, was the pilot project successful or not?

Answer 1-6 ***Mr. Rachain Rachaphila, Thailand***

The pilot project was successful with the participation of Philip and Toshiba in Thailand.

Question 1-7 ***Ms.Rosni Binti Ismail, DOE Malaysia (to Thailand)***

In the presentation, you showed us a good data of WEEE for many years. Can you share with us how you systemize the waste inventory to get such a quite comprehensive data?

Answer 1-7 ***Mr. Rachain Rachaphila, Thailand***

As for the data on estimation of e-waste generation, we surveyed the households in Thailand and found that there are two types of consumer behaviors; 50 % of consumers sell their e-waste to the illegal, and the other 50 % collected legally from household. We have collected the data for two years to estimate the future generation.

3) Session 2 (on Day 1: 22nd November 2017)

Question 2-1 ***Ms. Sabariah Ghazali, MITI Malaysia (to the Philippines)***

In your presentation, you have pointed out all of your guidelines for the industries as well as the households. But we know that the Philippines is a very big country with many islands, and these guidelines are not acts, so I suppose these are not legally-binding but a kind of voluntary, still you need to enforce them. So how do you monitor to ensure that people do properly follow the guidelines?

Answer 2-1 ***Mr. Geri-Geronimo R. SAÑEZ, the Philippines***

As you said, the Philippines is a large country. We have 7,100 islands. There is a central office, and the Philippines is divided into 15 regions. Each region has the

same bureau, and there is the one enforcing the regulations. Our duty as the central government is to grab the policies and enforcement of them at the regional level. So if you will compare with the situation in Malaysia, you have the federal government and state governments, so the federal produces the guidelines, while the states enforces the guidelines. It is the same in the Philippines. As Ms. Clarisse mentioned in her presentation, because of the geographical nature of the Philippines, and as we are in the IT age, the most of our reporting, if the security permits, are being done online. So you can just access to the websites, and the clients are not required to visit the office physically. And we are trying to make our system more paperless. So the permits, once the city approves, will only be printed by the clients, not by us. So it is an electronic permit right now. So in your question, from the central, we have 17 regional offices that have exactly the same structure with the central office. And that is how we enforce the regulations and guidelines in the Philippines.

Question 2-2 ***Ms. Sabariah Ghazali, MITI Malaysia (to Singapore)***

Thank you for your refined presentation. I was especially attracted by the pollution prevention. You have mentioned that the manufacturing people are requested to produce their products with less mercury or less hazardous materials. So I would like to know: how that is going on, what is the exact status of this concept, if they can do it, how they find their alternatives, and if they do their own R&D, and so on.

Answer 2-2 ***Mr. Sim Jun Hua, Singapore***

Before we implemented the regulations, we had extensively consulted with the producers on the current limits of the six hazardous substances in the production. And to our surprise, the most of the products has already met the requirements, because they sell in the worldwide market including the European market and the American market which have implemented something similar regulations. So we found that the producers had no objection to this regulation. In fact they had been foreseeing it would come, it was only the matter of time when it would be implemented.

Question 2-3 ***Ms. Sabariah Ghazali, MITI Malaysia (to Singapore)***

Do they provide any incentives to the producers?

Answer 2-3 ***Mr. Sim Jun Hua, Singapore***

No, we don’t provide any incentives.

Ms. Mary-Anne Pan Lu-Yin, Singapore

Regarding the ROHS, I just would like to highlight that we do not take the EU Directive as it is. We have presented the six categories, but we wanted to see how the market and technological transition would be. So there would be a review to see how we can update the requirements in the future to cover more categories. Even though the official consultations have been already concluded, when it comes to the administrative controls, we still have a few companies coming back to us. Because they have different scenarios and are not quite sure how the things will play out. We have granted exemptions on a very principal basis, but we did tell those companies that you will have to revisit these exemptions next time, when things are more adapted to.

As for the Minamata, where the batteries are being controlled, that is also an upstream control, we were just trying to fulfill our obligations to the Minamata Convention since we already ratified it. We even went a step further to include

button cell batteries which are not included in the Minamata Convention. That is because, arising from our consultation with the producers, we found out that they were able to meet that by 2018.

Question 2-4 ***Ms. Rosni Binti Ismail, DOE Malaysia (to the Philippines)***

You have two scenarios in which household e-wastes are collected by the waste collector and sent to MRF, while the other e-waste from the industries are collected by hazardous waste transporter and sent to the facilities to be dismantled, segregated and later to be exported. Can you explain the difference between these facilities and MRF?

Another question is about the collectors. Do you have any mechanism to control the collectors of e-waste from household and industries? Do you authorize them or register them? Is there any license needed for collection?

Answer 2-4 ***Mr. Geri-Geronimo R. SAÑEZ, the Philippines***

There is no difference between waste collector and transporter. It is only semantic. Waste collectors are only allowed to collect household hazardous waste if they are registered as a collector or a transporter. I said they are registered, but actually they need to have a license to collect.

As for MRF, material recovery facility will just be a collection point wherein the separation of hazardous waste and non-hazardous is carried out. And there must be no processing in that material recovery facility. Now only licensed and authorized facilities can do dismantling, treatment, storage and disposal. We are considering inclusion of dismantling and segregation in pretreatment before sending waste to recyclers. But there are six categories of TSD (Treatment, Storage and Disposal) in the Philippines. One is the case in which generator itself manages generated waste, as a part of EPR of certain company. If the company X has their own EPR system, and they conclude that their product becomes waste, they can get back and treat their waste employing technologies from B to E. Category B of TSD is thermal treatment facility either they burn or do not burn, C is landfilling, D is recycling and recovery, E is physical or chemical recycling, and F is storage facility. So this storage facility is consolidated as licensed facility for hazardous waste prior to export, or bringing it to the local recyclers. But this is required to secure a permit to transport. And after a permitted transport, they need to report and submit the manifest, how much hazardous wastes are collected in MRF, and sent to TSD. And if the TSD is categorized in F, they need to declare it to us in their safe monitoring report. If they export, usually e-wastes are exported to Singapore and Japan, we need to put the MRF as a generator in the notification procedure. So that is the difference and all of those are regulated.

As for the household hazardous waste, it is in an infant stage, we are still increasing awareness of the local government. That is the reason why only roughly 130 tonnes of e-wastes are reported.

In RA 9090, all the individual generators are required to be registered as generator, and submit a report. But it is totally different for households, we do not require all the households in the Philippines to register as generator of hazardous waste. There is smaller unit of community called Balangay. Under the Act 9003, each community is required to establish a collection point, which is called “Balangay MRF.” This is under municipality, so the Balangay MRF is registered as household generators.

So right now, the local governments in the Philippines are registered as a generator, at the same time as a transporter, as well as treatment and disposal facility. And now we are trying to increase their awareness. Once we issue the

guidelines on the ESM (Environmentally Sound Management) of WEEE, we expect to strengthen its enforcement. So when we go back to my house, I cannot just put my old PC into the bin, I need to pay for disposal to the local government. There is a model city in the central Philippines, called Cebu, they have this ordinance. The local government can issue a local law based on the national law. At the initial stage, the local government is financing for the next two years, starting from this year, for the disposal of household hazardous waste that includes fluorescent lamps and electronic waste. After two years, the local governments will request their residents to pay for the disposal fee, per lamp for example, and disposal will no longer be free. So that is the model adopted and output of our ongoing project with UNIDO.

Question 3-5 ***Ms. Fenny Wong Nyuk Yin, DOE Malaysia (to Singapore)***

Do you have informal sector in your country? If yes, how do you manage them? Is there any mechanism to manage them?

Answer 2-5 ***Mr. Sim Jun Hua, Singapore***

We do have informal sector in Singapore. They tend to go door-to-door for valuable items such as newspapers, laptop, wine bottles, not so much TV right now, and sell it to the second hand market. So they provide a very convenient service to the residents, especially for newspapers. For e-waste and bulky items, handling cost is not available to the informal sector, so they do not take them. So residents have to dispose them to a regular collector.

We do not control the informal sector or informal collector right now, because it is the livelihood means for them, and they are actually providing the services to the residents.

Question 2-6 ***Ms. Fenny Wong Nyuk Yin, DOE Malaysia (to Singapore)***

But you are regulating e-waste, so I would like to know how you manage if e-wastes are managed by those informal sectors.

Answer 2-6 ***Mr. Sim Jun Hua, Singapore***

There is a system we are considering, in which definitely we have to take into account the informal sector's improper handling of E-waste.

Question 2-7 ***Mr. Junya Kikuhara, JICA Expert Team (to Indonesia)***

I have a question to Indonesia. You have listed all the activities, which are very interesting. Can you show us the timeline? And can you tell us more about the activities started in Jakarta?

Answer 2-7 ***Ms. Upik Sitti Aslia Kamil, Indonesia***

Regarding the timeline, actually, we do not really have a timeline. We are going to enact the Minister Degree on e-waste, which will be the regulation on specific waste. So we need to wait until the government regulations for the specific waste to be enacted first.

As to the activities in Jakarta Province, the activities are being conducted voluntarily, but they made a local regulation referring to the Act 18. They already started their activities this year. They are doing the collection of e-waste from a drop box set up at each office in Jakarta. There are several districts in Jakarta, such as the Central Jakarta, West Jakarta, and each district has their own district office. And while we have collection days on the weekend, they do collection. So they collect all the e-wastes. Right now, they have a cooperation of one of our facility for the treatment after the collection of e-wastes. But, because they have not receive enough amounts of e-waste, so they have not done

beyond the collection. But they already have MOU with one of our facility. Hopefully next year they will have enough sources, and they can give collected e-wastes to the facilities for the final treatment of the collected e-waste.

Question 2-8 ***Mr. Sim Jun Hua, Singapore***

Are there any ways to control for on-line e-retailers? How can we get them involved in the EPR system we are going to implement? When we implement EPR, we definitely have to collect fees from producers and importers. But if the on-line retailers are not present in our country, how can we get them pay the fee?

Ms. Mary-Anne Pan Lu-Yin, Singapore

Nowadays, everybody is rushing in to order online, there are so many people in Singapore who buy things from Amazon. There is also Taobao from China, so there are many on-line retailers.

Answer 2-8a ***Mr. Satoshi Sugimoto, JICA Expert Team***

That is one of the very serious problems in our new mechanism here. How we are going to capture on-line businesses and let them pay the fees if we are going to introduce a fee mechanism. But we still do not know the most efficient way to capture them in order to ensure the implementation of the mechanism.

Answer 2-8b ***Mr. Junya Kikuhara, JICA Expert Team***

I do not represent the industries, but after I studied some of the financial models in some countries including Europe and Japan, I can say one thing. Manufacturers, more or less, agree with the ideas of paying the extra fees, but they still need to know why they should pay, and how much. Also under the fare share rules, everyone has to share responsibilities. So everyone has to take responsibility, including the government sector, by making sure all the rules to be applied equally to the every stakeholder. So government sector has a responsibility to govern the mechanism. There should be no cheating, and no free-rider.

With this kind of fare mechanism, manufacturers, even though they would still make noises, will agree.

Maybe Taiwan has this experience, so can you share with us your experiences?

Answer 2-8c ***Dr. Lih-Chyi Wen, Taiwan***

I think it would be better that we explain tomorrow systematically. Because there were so many incentive problems especially in the recycling market, so we needed to do so many different incentive programmes in the market, including consumer incentives, producer incentives, and also collector incentives. So please wait until tomorrow's our presentation.

Answer 2-8d ***Mr. Satoshi Sugimoto, JICA Expert Team***

As all the participants of this workshop may know that, in the case of Japan, we do not charge manufacturers or importers, instead, we directly charge the consumers who are going to discard their e-waste. At the time of discarding, we are going to collect the fees from the consumers. So there will be no such issues. But the most important issue is that it is very difficult for other countries to ask consumers to pay fees. That is why many countries prefer to collect fee from manufacturers. That is the big difference between Japan and other countries.

Answer 2-8e ***Mr. Geri-Geronimo R. SAÑEZ, the Philippines***

When we are presenting the draft guidelines, we will have this concern. Of course you have to get the opinions from consumers, stakeholders, and

manufacturers. They would say they have several waste schemes to be taken into account, but it is up to the producers or manufacturers, how they will market their programs. There is a model in the Philippines. There is a company making chemicals and other products, that has a program called metro-logistics. If you buy one bottle of hydrochloric acid from this company they will sell this at 100 USD, and then there is the competitor that sells the same chemicals at 80 USD. But the company that sells at 100 USD explains the consumers that you can just return the bottles to them after it expires or be used, and dispose. So if you compare with the others that sell it at 80USD, they say that consumers bare the fee. But as for the company that sell at 100 USD, the disposal cost is already included in the price. That is how the principal of EPR should be marketed.

I remember way back to a decade ago in Europe, specifically in Vienna, Austria, an electronic product on the shop shelf had two prices. The price was 100 for the cost of the equipment, and ten for the disposal of the equipment. And there was a sticker on the equipment. So if the sticker is recognized by one retailer, you are not required to bring back the used equipment to where you bought, and you can just get it back to another retailer. That is the spirit of Producer Responsible Organization on the EPR.

We regulate and we know how EPR will work, but it depends on people's understanding and also depends on how you explain things to the stakeholders. Whatever you prefer, at the end of the day, you will have troubles in paying the disposal, or when you buy something, the price already incorporate the disposal cost.

What is more challenging is orphan products. And there are some that go into the informal market. That will not be in the EPR system.

That is why the EPR system should be promoted and well explained to the public, because the stakeholders are very wise right now. So you need to explain totally about the benefits and outcomes of the system, and the policy of polluter pays principal, so at the end of the day, you need to pay and no environmental activities or degradation will be free.

In the Philippines, we have started the polluter pays principle in terms of waste water. We are moving forward to do another thing. For chemical waste, there is a proposal from our Congress about emission fee, that is, every car owner needs to pay emission fee regardless of whether their cars comply with the emission standards of the clean air act, so that you can control your contribution to GHG, and to air pollutant. It is very difficult. So that will be a domino effect in which car owners and motor-vehicle owners will be driven to have their car fixed to have no carbon emission or carbon monoxide, etc. Those are the things currently being studied in the Philippines, and very challenging one.

3) Session 3 (on Day 2: 23rd November 2017)

Question3-1 ***Ms. Marry-Ann, Singapore (to Taiwan)***

1) The way of waste discharge in Taiwan we saw in the video was really impressive. How do you encourage the residents, particularly those who living in apartment to follow the current system? Is there any different scheme for them? Also, how can the Taiwanese residents be so dedicated to gather and dispose at a designated location and time?

2) How to prevent illegal dumping by the residents especially in the apartment area, where the dumping is usually done in a common space?

Question3-1

3) Is there any way to ensure that the right unit pricing bag is being used for disposal?

4) Have you seen any innovation for the residue of white goods? For example, washing machine has huge plastic parts, which are not of high value for recyclers.

Answer 3-1a ***Dr. Chun-Hsu Lin, Taiwan***

1) There are two options for residents to discharge their waste; one is to bring their wastes in the three types of waste bags to the designated location at the designated time in the evening and give then to the truck by themselves as shown in the video. The second option is for the residents of the apartments. They can make an agreement to hire the agent to collect their waste at the front door. The second option is applied to the large-size buildings, but at the small apartments, usually residents carry their wastes by themselves.

   How we can achieve this situation is very complicating. Somehow it is related to education, but I think the enforcement of regulations is very important especially at the initial stage. If this behavior can become their normal behavior or normal lifestyle, they come to gather to a certain location automatically. The most interesting thing is that people are affected by social occasion/ neighborhood (peer pressure).

2) If residents do not properly segregate the waste, they will be fined. The government officials visit the sites to check from time to time in order to ensure the proper segregation is carried out.

3) Unit pricing bag is a scheme to encourage residents to reduce the waste generation. It will be charged according to how much waste to discharge. So every household has an intention to minimize the waste generation. It is a kind of financial incentive. And it has another aspect; the truck does not take the waste if residents do not discharge their waste using the proper bags, so the residents need to take back their waste, which would be a problem for them.

4) The old white goods are usually collected by the retailer when the customers purchase the new EEE. Or people can call the Environment Bureau to pick them up from the front door. But the recyclers have to take the whole unit of the white goods no matter it is plastic or metal in line with the regulation, otherwise, they cannot meet the qualification to get the subsidies.

Answer 3-1b ***Dr. Lih-Chyi Wen, Taiwan***

Regarding the white goods, we have calculated the total net cost of recycle. And if the total net cost of recycle is too high, and greater than the value of residue when it is put on the market, we provide the subsidy to the recycler so that they have enough value added in the market to collect the white goods.

Question 3-2 ***Mr. Sim Jun Hua, Singapore (to Taiwan)***

Why only the E-waste collected from household is subsidized from FMB, while the E-waste collected from industrial cannot get subsidy, even though the E-wastes generated from household and industrial are the same product?

Answer 3-2 ***Dr. Chun-Hsu Lin, Taiwan***

The E-wastes from factory/producers are categorized as industrial waste (manufacturing scrap). To discharge industrial waste, generator needs to make

a contract with a certified agent as stipulated in the regulation for the collection and treatment.

Question 3-3 ***Mr. Sim Jun Hua, Singapore (to Taiwan)***

In Taiwan, you have a e-waste collection ratio of 60%. Will all those collected e-waste be processed locally in Taiwan or sent to overseas for processing?

Answer 3-3 ***Dr. Lih-Chyi Wen, Taiwan***

Our estimation has two parts. One is calculated in Taiwan domestic market only. So collection ratio of 60% is calculated as collection amount divided by the total sales in the domestic market in Taiwan. We have another statistics which shows that about 10-15% of e-waste is exported to other countries for the recycling treatment.

Question 3-4 ***Ms. Fenny Wong Nyuk Yin, DOE Malaysia (to Taiwan)***

1) In the recycling fee formula (total expenditure required divided by total sales of EEE), the total sales of EEE represent the actual volume of the particular year of EEE put on the market? What is your rational to use this formula if you are not revising the recycling fee every year?

2) There is F parameter in this formula. F means surplus, so you minus surplus of the particular year or previous year. How often do you have that surplus? When you have surplus, it will reduce the recycling fee then, which would be good news for the manufacturer and importers.

Answer 3-4 ***Dr. Lih-Chyi Wen, Taiwan***

The recycling fee is calculated by dividing the total expenditure by the total sales of EEE in the particular year. This is a kind of forecast. So in the next year, we forecast the amount of sales in the market.

We do not change the fee rate that often. It will be revised when there are some changes in the market and the EPA Recycling Management Fund considers that there is a need of adjustment, then they submit a proposal to the Review Committee in order to change the fee rate. So revision of the recycling fee totally depends on the market situation. But as you said we have this F parameter. This is a kind of adjustment factor. So sometimes we minus the surplus in order to get more recycling fee in the next year.

Question 3-5 ***Mr. Satoshi Sugimoto, JICA Expert Team***

We are going to use a similar formula to calculate recycling fee in Malaysia. But the most difficult issue is how to get the figure of the total sales of EEE every year. You said that you estimate the figure, but what kind of baseline data do you use to estimate, and how do you collect those data?

How to come up with these data is really a big issue for us, because we have to persuade manufacturers/importers with this set of data.

Answer 3-5 ***Dr. Lih-Chyi Wen, Taiwan***

Initially we didn't have experiences so we checked the market survey. There are some market statistic survey provided by the authorized market experts, so this will be the number we need. After accumulating 1-2 years' experience, you will find out that the local condition would be different from those estimated. So we accumulated our experiences. Taking sales for example, we retrieved the past 3-5 years of data and try to see how the shape come out, the average sales data and how much of sales would be in the next year. Especially for the household appliances, the market is really stable. So the experiences are very

good to make the forecast.

Question 3-6 ***Ms. Fenny Wong Nyuk Yin, DOE Malaysia (to Taiwan)***

What if the amount of e-waste generated and collected is huge and beyond your estimation, and you have negative expenses for 4-5 years? Does EPA have a budget to recover the negative expenditure?

Answer 3-6 ***Dr. Lih-Chyi Wen, Taiwan***

H in our formula is the total expenditure, which is calculated by multiplying the quantity of the collected WEEE in the market by unit cost. So this will be the estimation of the total cost to be spent in the market. To have this figure, you need to have a collection rate.

For the Malaysia's case, you will have to have a very high collection rate to estimate recycling cost in the beginning. Usually, actual recycling rate of each item of e-waste is about 50 % or 40 %. So in the begging, you need to use higher rate like 80 % or even higher like 90% for your target, in order to collect more money in the first year, which will cover the negative expenses in the future.

Question 3-7 ***Mr. Sim Jun Hua, Singapore (to Taiwan)***

Regarding the data collection and estimation, in the case of producers in Singapore, they do have their internal forecast or records of exactly how much of sales they are going to have in a certain year, or in the coming year. So why not you force producers to report their figures to FMB so that you can have more accurate forecasting.

Answer 3-7 ***Dr. Lih-Chyi Wen, Taiwan***

We can certainly force the producers to report by themselves. But it is difficult to make them report the correct number because the producers always want to pay less for the recycling fee, so they would over-report the number unless you have a penalty on it.

Question 3-8 ***Mr. Sim Jun Hua, Singapore (to Taiwan)***

What about implementing auditing or force penalty on reporting, or giving a disincentive to under-reporting?

Answer 3-8 ***Dr. Lih-Chyi Wen, Taiwan***

Taiwan has auditing and penalty for the producers who under pay money but still need to focus on the sales amount for the future.

4) Session 4 (on Day 2: 23rd November 2017)

Question 4-1 ***Mr. Geri-Geronimo R. SAÑEZ, the Philippines***

1) Is there any explicit provision in EQA on fund management and fund collection? And what is the nature and purpose of this fund? What is the legal personality of the Recycling Management Board and the function of DOE in the new mechanism? Is the calculation of recycling fee for the Recycling Management Board an obligation of DOE? Because this is an economical instrument, so what is the relation to environment? How will the DOE work with MOF for fund collection? Because this will be related to the tax.
2) And in the implementation of the pilot projects, how can you drive the

regulated community stakeholders? Are these guidelines already a policy, which all the stakeholder must comply with?

3) In the Philippines, we have so-called environmental guarantee fund, which are collected by the holders of certificate allowing them to operate. This fund is used for environmental rehabilitation, compensation for the accidents. But these are privately operated, and totally for the environment. When you say recycling fund, it is more related to economy than environment. I feel those things are mixed up in your study.

Answer 4-1a ***Ms. Fenny Wong Nyuk Yin, DOE Malaysia***

We have an existing fund called the environmental fund just like in the Philippines. But this fund is collected from multiple sources, and its objective is to clean up the environmental issues such as illegal dumping. And this fund is managed by our department.

Mr. Geri-Geronimo R. SAÑEZ, the Philippines

It seems totally different from our system. Because in the Philippines, each company is required to set up a guarantee fund. So that is managed by the company, not by the government. The calculation of the guarantee fund is based on the environmental management plan that is required to be submitted to us. As we employ a risk based approach, the potential risks are taken into consideration in the calculation. So there is no standard for all industries, the fund is depending on their activities.

Answer 4-1b ***Mr. Satoshi Sugimoto, JICA Expert Team***

Regarding the guidelines, we have drafted and explained to some of the stakeholders, and now we are testing of its workability in the pilot projects, involving the private stakeholders who are going to be influenced by issuing of the guidelines. So the guidelines have not been officially issued yet.

So the private companies' participation to the pilot project is 100 % voluntary now. We are not forcing them. But to develop these guidelines, we have developed so-called "taskforce," which is comprised of not only governmental sectors but also private players, to discuss every aspect of the guidelines.

So once the pilot project finishes and the results are incorporated to finalize the guidelines, the next step will be the official legalization of these guidelines.

Answer 4-1c ***Ms. Siti Zaleha Binti Ibrahim, DOE Selangor Malaysia (Chairman of the committee on review & legislation of the EQA)***

Regarding the legal status, in Malaysia, in order to gazette the law, firstly the study needs to be done about whether it is feasible to be implemented in a large scale. Stakeholder engagement in the pilot project is of great importance as well. After the pilot project is completed by JICA, the results will be presented to DOE. If the result shows it is feasible, then it will be tabled to the Environmental Quality Council which was enacted in Environmental Quality Act 1974, to have an agreement before presenting to the Minister. The Council is represented by all government agencies, NGOs, industry associations. The Minister may also invite other parties to participate in the council whereby consents of all the parties are made.

Furthermore, DOE also need to get through Legislation Review Committee so that the committee can provide suggestions or direction on how the draft regulation is to be drafted such as the recycling fee and Fund Management Board stated in the regulations. In addition, a particular requirement called Regulatory Impact Assessment must be done before draft regulations are

submitted to the Attorney General's Chambers (AGC) of Malaysia to look into the economic impacts.

Any guidelines mentioned in the regulation is mandatory to compliance with it. The good thing of having the guidelines is that we can update them without amending the regulations. But once it is mentioned in the law, it will be a law.

Now DOE is in the stage to review the EQA to clearly specify this new household e-waste system. Malaysia already has Environmental Quality (Scheduled Wastes) Regulations which is enacted in 2005, so we have a 12 years' experience in managing the scheduled wastes. This is just to extend to specify the household e-waste, which is not covered in our Act currently. We just want to have it in more regulated manner.

In the Selangor State, we are fully aware of on the contestants Relating to the scheduled waste, we have a few cases of noncompliance and we went to the court, and we won the cases of illegal dumping and illegal export under the EQA. So we know the limitation of the law. Just in this year alone, we have collected the penalty of 1.5million MYR at the court, because we won the cases.

Question 4-2 ***Ms. Penny from NREB Sarawak***

1) The pilot project has not been implemented in Sarawak yet. May I know the plan of the pilot projects and how it will be done?
2) Sarawak has a very different situation from other regions in terms of logistic. So transportation fee would be an issue. In order for the system to success, we need to have cooperation from all the players including enterprises, not only government agencies. So it is also needed to include the third party enterprise to ensure the transportation in Sarawak.

Answer 4-2 ***Dr. Theng Lee Chong , JICA Expert Team***

JICA Expert Team and DOE have visited Sabah in order to engage the stakeholders in this pilot project. However, those stakeholders did not yet obtain the TWG approval from DOE Sabah in order to transport E-waste from Sabah to the Pilot Project Partners in Peninsular Malaysia. As to Sarawak, we didn't visit but invited the potential players to participate. So far, no player shows interest in taking part in the pilot project.

Mr. Satoshi Sugimoto, JICA Expert Team

Regarding the cost required for collection and transportation cost in Sabah and Sarawak area, we do recognize this issue. How we can take this difference into account in setting fee rate is going to be discussed from now. In fact, still some recyclers in the Peninsula Malaysia collect e-waste from Sabah and Sarawak. So it does not mean there are no recyclers and takers in Sabah and Sarawak, just the far distance is the issue.

Question 4-3 ***Ms. Marry-Ann, Singapore***

In the e-waste flow in the recycling flame work, is there any flow of household e-waste flowing into the repair/refurbishment stream?

We found out that there are a lot of people who just think it cannot be repaired if the screen becomes black, and just dump it. May be these are our own domestic context but we hope to look into this area.

Answer 4-3a ***Ms. Fenny Wong Nyuk Yin, DOE Malaysia***

Those e-wastes that go to the repair/refurbishment, we do not catch up in our flow, because it is not in our scope. We assume that anything people send to the collection point is considered to be e-waste.

But in reality, we have those activities. There are some licensed partial recovery facilities that do some repair and refurbishment activities, but we license them.

Answer 4-3b ***Mr. Satoshi Sugimoto, JICA Expert Team***

We are not going to control anyone and any entities who are only involve in repair and refurbishment of e-appliances, as long as they only repair/refurbish. But if they dismantle some parts by the name of repair, and combine those to produce a new product and sell it, we may need to control residue. There are always difficulties in dividing those repair/refurbishing entities and recyclers, not only in Malaysia, but also in any countries.

Question 4-4 ***Mr. Sim Jun Hua, Singapore***

1) What is the consideration behind in setting up of the Fund Management Body? Why Malaysia did not adopt to establish the Producer Responsibility Organization System? Why not let the private companies manage their own money instead of forcing them to pay recycling fee to FMB?

2) Will you require make all the manufacturers and importers to pay the recycling fee regardless of the amount of product they put on the market? Or will you have any threshold to look after only the big companies and leave small company alone?

Answer 4-4 ***Mr. Satoshi Sugimoto, JICA Expert Team***

1) Regarding the manufacturers and importers, we will try to capture all. Because the important thing is that we have to be very fair to all those who are manufacturing and importing those items. However, practically it is so difficult that no country can fully capture all. Still we need to do our best to do this. And, as we have discussed in the yesterday's sessions, actually there are many orphan goods which you cannot trace the manufacturers and importers, and traceable manufacturers and importers need to cover the cost for those goods. So we have to make them understand this system.

2) In Japan also, manufacturers and importers are responsible for physical recycling of all materials. But in the case of Malaysia, majority of the six target items are imported, so there are very limited number of entities who can take a physical responsibility for e-waste. That is why we chose to develop the FMB and ask the manufacturers and importers to take a financial responsibility for proper recycling of household e-wastes by paying the recycling fee to the FMB.

Mr. Sugimoto closed the Q&A sessions asking the participants to have continuous opportunities to discussion, exchange information, and share the experiences of household e-waste management among these members.

5. Closing Remarks by Dato' Dr. Ahmad Kamarulnajuib

On behalf of the Department of Environment Malaysia under the Ministry of Natural Resources and Environment and co-organizer cum sponsor of this workshop, Japan International Co-operation Agency (JICA), it is indeed my pleasure to make a few remarks for the closing of the Regional Workshop on Household E-waste Management. I sincerely express gratitude to all those who made this event a reality and we have appreciated the engagement and candour that you all have contributed to this workshop.

During the past 2 days, the workshop had discussed several important issues on household E-waste management taking into account the policies and challenges of managing household E-waste in Asian region, including the strategies for environmentally sound E-waste management and possible collaboration.

Malaysia had shared its status of new household E-waste management system that will be implemented throughout the country in near future. We also heard the country presentations from Singapore, Indonesia, the Philippines, Thailand, Vietnam and Taiwan with a variety of points of view for the management of household E-waste.

What we learnt the most from the technical cooperation project titled 'The Project for Development Of Mechanism For Household E-Waste Management In Malaysia' provided by JICA to DOE is how to develop the mechanism on household E-waste management such as organization, system for sustainable collection and environmentally sound recycling of household E-waste.

Through the DOE-JICA project, 5 guidelines on household E-waste management has been drafted which will be used as an enforcement tools namely:

i) Guidelines for household E-waste collection

ii) Guidelines for household E-waste recycling

iii) Guidelines for establishment of E-waste recycling reporting system (manifest system)

iv) Guidelines for determination of the recycling fees of household E-waste

v) Guidelines for establishment and management of household E-waste recycling fund.

Outcome of this project especially the guidelines should report manpower requirements in terms of numbers and nature or roles each has to execute as well as the budgeting.

Since DOE main objective is pollution control that enforce environmental laws based on the regulation or command and control, we want the recyclers/recovery facilities too, to fortify themselves in close monitoring of pollution from their household

E-waste activities through facilitative compliance by executing Environmental Mainstreaming to develop and fostering self regulation culture according to the Environmental Mainstreaming guidelines. Without the emphasis on seven (7) Environmental Mainstreaming Tools the DOE will continue facing enforcement problem of household E-waste project or program.

For your information, our law reform project will incorporate the legal provisions on household E-waste so that the household program in Malaysia could be speed up and smoothly implemented with high integrity and transparency for the wellbeing of the people in Malaysia.

Our workshop has come to an end. I hope the participants gained new insights and greater understanding on environmentally sound manner of household E-waste management. I would like to

thank the experts for their valuable and clear explanations as well as all the moderators and delegates for sharing with us their experiences and active participation throughout the workshop. I would also like to thank the Secretariat that has worked so hard to make this workshop a success. I wish you have a safe journey home. Thank you.

APPENDIX 1: Photos

1) Launching Ceremony

2) Workshop


Protect Our Environment
MALAYSIA


jica
THE REGIONAL WORKSHOP ON HOUSEHOLD E-WASTE MANAGEMENT
Officiated by:
The Honourable Dato' Sr. Dr. Azimuddin Bahari

APPENDIX 3: Attendants List

NO	NAME	ORGANISATION	DIVISION
LOCAL DELEGATES			
1	Mokthar Bin Abdul Majid	Ministry of Natural Resources and Environment – Department of Environment HQ	Director Deputy General (Operation)
2	Azuri Azizah Binti Saedon	Ministry of Natural Resources and Environment – Department of Environment HQ	Director of Hazardous Substances Division
INTERNATIONAL DELEGATES			
3	Upik Sitti Aslia KAMIL	Ministry of Environment and Forestry, Indonesia	Sub Directorate for Determination and Notification of Hazardous and Non Hazardous Wastes
4	Anjar MUNARYANTI	Ministry of Environment and Forestry, Indonesia	Directorate Waste Management
5	Geri-Geronimo R. SAÑEZ	Environmental Management Bureau – Department of Environment and Natural Resources, The Philippines	Environmental Quality Management Division
6	Ma. Clarisse D. DIAZ	Environmental Management Bureau – Department of Environment and Natural Resources, The Philippines	Environmental Quality Management Division
7	SHEU Yiong-Shing	Environmental Protection Administration Executive Yuan, R.O.C. (Taiwan)	Recycling Fund Management Board
8	YUAN Su-Chen	Environmental Protection Administration Executive Yuan, R.O.C. (Taiwan)	Recycling Fund Management Board
9	LEE Chih-Yi	Environmental Protection Administration Executive Yuan, R.O.C. (Taiwan)	Recycling Fund Management Board
10	Dr. WEN Lih-Chyi	Chung-Hua Institution for Economic Research, R.O.C. (Taiwan)	The Center for Green Economy
11	Dr. LIN Chun-Hsu	Chung-Hua Institution for Economic Research, R.O.C. (Taiwan)	The Center for Green Economy
12	WANG Chia-Hsiang	E-Titanium Consulting Inc., R.O.C. (Taiwan)	
13	CHENG Yu-Shu (Candy)	E-Titanium Consulting Inc., R.O.C. (Taiwan)	
14	SIM Jun Hua	National Environment Agency, Singapore	Environmental Protection Division (Waste & Resource Management Department)
15	Mary-Anne PAN Lu-Yin	National Environment Agency, Singapore	Environmental Protection Division (Pollution Control Department)
16	Rachain RACHAPILA	Ministry of Natural Resources and Environment (MONRE)-Pollution Control Department (PCD), Thailand	Hazardous Waste Division
17	NGUYEN NHU Trung	Ministry of Natural Resources and Environment -Waste Management and Environment Improvement Department - Vietnam Environment Administration	Hazardous Waste Management
18	DANG THI MAI Nga	Ministry of Natural Resources and Environment -Waste Management and Environment Improvement Department - Vietnam	Division of Normal Waste

		Environment Administration	
MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT (NRE) MALAYSIA			
19	Syarina Binti Kassim	Ministry of Natural Resources and Environment	Environmental Management and Climate Change Division
20	Marhaini Binti Mat	Ministry of Natural Resources and Environment	Environmental Management and Climate Change Division
DEPARTMENT OF ENVIRONMENT (DOE) MALAYSIA			
21	Dato' Dr. Ahmad Kamarulnajuib Bin Che Ibrahim	Ministry of Natural Resources and Environment – Department of Environment HQ	Director General
22	Siti Zaleha Binti Ibrahim	Ministry of Natural Resources and Environment – Department of Environment Selangor	DOE Selangor Director (Chairman of the Committee on Review & Legislation of the EQA & International Convention)
23	Tuan Haji Rosli Zul	Ministry of Natural Resources and Environment – Department of Environment Pahang	DOE Pahang Director (Taskforce 2 Chairperson)
24	Azlan Bin Ahmad	Ministry of Natural Resources and Environment – Department of Environment HQ	Hazardous Substances Division
25	Fenny Wong Nyuk Yin	Ministry of Natural Resources and Environment – Department of Environment HQ	Hazardous Substances Division (Taskforce 3 Chairperson)
26	Rosni Binti Ismail	Ministry of Natural Resources and Environment – Department of Environment HQ	Water and Marine Division (Taskforce 1 Chairperson)
27	Cressida Karen Chung	Ministry of Natural Resources and Environment – Department of Environment HQ	Hazardous Substances Division
28	Nor Iwani Basri	Ministry of Natural Resources and Environment – Department of Environment HQ	Hazardous Substances Division
29	Nor Azah Binti Masrom	Ministry of Natural Resources and Environment – Department of Environment HQ	Hazardous Substances Division
30	Mohd Hidzir Bin Bakar	Ministry of Natural Resources and Environment – Department of Environment Sarawak	DOE Sarawak Director
31	Tn.Haji Shafe'ee Bin Yasin	Ministry of Natural Resources and Environment – Department of Environment Melaka	DOE Melaka Director
32	Norhazni Binti Mat Sari	Ministry of Natural Resources and Environment – Department of Environment Negeri Sembilan	DOE Negeri Sembilan Director
33	Sharifah Zakiah Binti Syed Sahab	Ministry of Natural Resources and Environment – Department of Environment Negeri Sembilan	Development Division
34	Michiko NISHIKAWA	Embassy of Japan	
35	Kyoko OKUBO	JICA Yokohama	
36	Mami TAKESAKO	JICA Yokohama	
37	Florence Tan Li Chin	JICA Malaysia	
38	June Cheng	JICA Malaysia	

39	Hiroshi NAITO	EX Research Institute	
40	Satoshi SUGIMOTO	JICA Expert Team	
41	Makoto YAMASHITA	JICA Expert Team	
42	Junya KIKUHARA	JICA Expert Team	
43	Shin OKAMOTO	JICA Expert Team	
44	Ryoko TACHIBANA	JICA Expert Team	
45	Dr. Theng Lee Chong	JICA Expert Team	
46	Amy Chow	JICA Expert Team	
47	Sharifah Seri Ratna Bt Tuanku Sharif Hamid	**CUSTOMS** Royal Malaysian Customs Department	Technical Services Division
48	Suzlynna Binti Abu Bakar	**CUSTOMS** Royal Malaysian Customs Department	Technical Services Division
49	Jayakumaran K.P. Vengadala	**EPU** Economic Planning Unit	International Cooperation Section
50	Ir. Fairus Bt Abd Manaf	Energy Commission	Electrical Safety Regulation; Electrical Equipment Section
51	Roziana Binti Omar	**JPSPN** National Solid Waste Management Department	Policy and Planning Division
52	Siti Faridah Binti Samsudin	**JPSPN** National Solid Waste Management Department	Policy and Planning Division
53	Mohd Irwan Bin Amerrudin	**KPDNKK** Ministry of Domestic Trade, Co-operatives and Consumerism	Consumer Research and Policy Division
54	Sabariah Ghazali	**MITI** Ministry of International Trade and Industry	Trade and Industry Related Emerging Issues Division
55	Siti Hailwa Marjunit	**MITI** Ministry of International Trade and Industry	Trade and Industry Related Emerging Issues Division
56	Nik Mohd Sharifuddin Bin Nik Hassan	**MOF** Ministry of Finance	Fiscal and Economy Division
57	Mohd Zahari Bin Md Zakaria	**MOF** Ministry of Finance	National Budget Office(NBO)
58	Md Sezehli Musthafa	**MIDA** Malaysian Investment Development Authority	Green Technology Division
59	Penny Sumok	**NREB Sarawak** Natural Resources and Environment Board Sarawak	Section Monitoring & Reporting
60	Ir Zulkifli Bin Tamby Chik	**SWCorp** Solid Waste and Public Cleansing Management Corporation	Domestic and Public Cleansing Division
61	Sahhir Kunju Bin Abdul Karim	**SWCorp** Solid Waste and Public Cleansing Management Corporation	Domestic and Public Cleansing Division