

STUDY ON E-WASTE MANAGEMENT IN ASEAN COUNTRIES



BCRC-SEA
Semarang, 2016



1. Baseline Data and Information on E-waste Generation and Flows

E-waste Generation (2009-2014)

No			Countries									
			Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
	Issue											
1.	Data on e-waste generation	Available		V	V		V		V	-	V	V
		Not available	V			V	V	V		-		

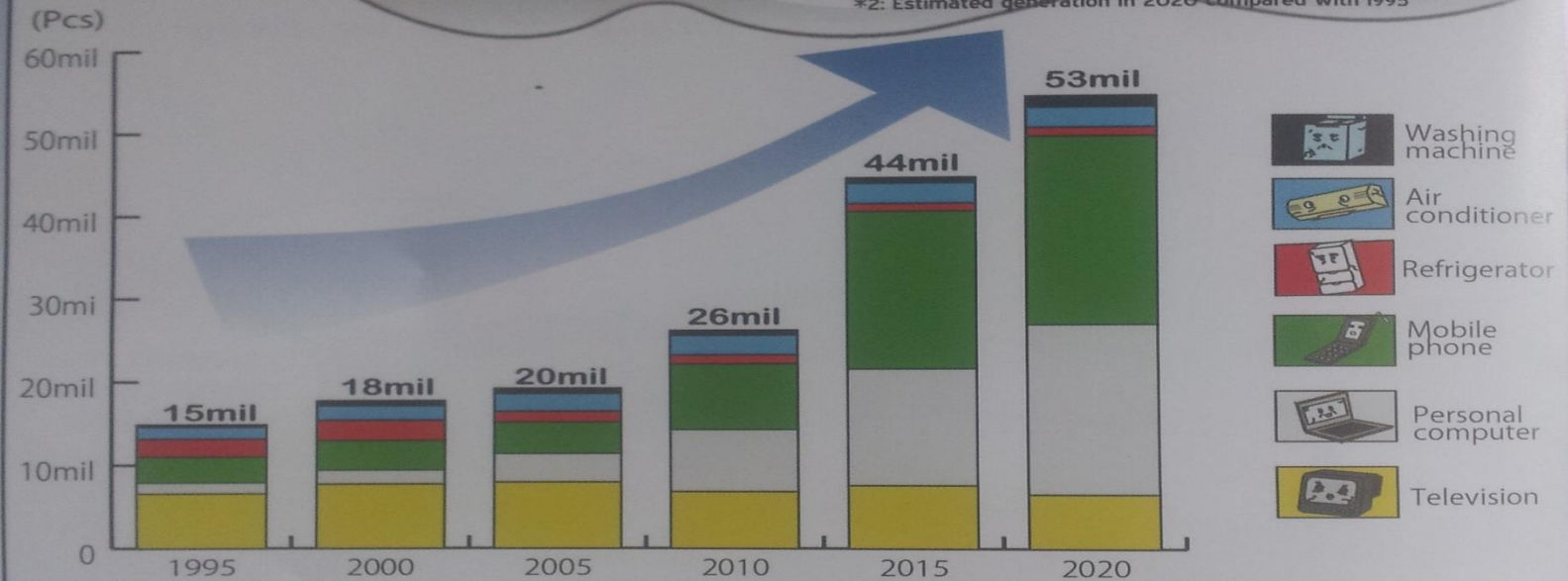
- **Cambodia:** Based on National Inventory of UEEE in Cambodia 2007, estimation of e-waste discarded (TV, AC, Refrigerator, Computer, Mobile Phone) in 2009: 223,883 sets and in 2010: 125,180 sets
- **Indonesia:** Quantity of e-waste: 212,782 MT between 2010-2014 (only from 1 treatment company)
- **Malaysia:** No specific data available for domestic e-waste generation
 - Quantity of e-waste generated by industries in Malaysia:
 - 2009 : 134,035.70 metric ton
 - 2010 : 163,339.80 metric ton
 - 2011 : 152,722.04 metric ton
 - 2012 : 78,278.05 metric ton
 - 2013 : 52,978.13 metric ton
 - 2014 : 57,103.40 metric ton
 - Data on quantity of e-waste generated by household is still under internal review
- **Philippines:** Data is available for year 2014, M506 (WEEE) 69.86 MT
- **Thailand:** Data is available for year 2014 (T/year): for TV (103,605); computer (55,276); mobile phone (1,657)
- **Vietnam:** Quantity of e-waste: 18,000 MT/year (calculated from report by treatment company)

* (-) no information



Estimation shows Malaysia generates 53 million pieces of E-waste*₁ in 2020. **3.5times** higher than 1995*₂.

*1: The figure is based on 6 selected items: TVs, PCs, Mobile phones, Refrigerators, Air conditioners and Washing machines
*2: Estimated generation in 2020 compared with 1995



Source: The E-waste Inventory Project in Malaysia, DOE

Data on Import of UEEE and E-Waste (2009-2014)

No	Countries		Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
3	Data on used EEE and e-waste import	Available	V		V		V		V	V	V	V
		Not available		V		V		V				

Brunei Darussalam: No importation of e-waste between 2009-2014

Indonesia: e-waste import is prohibited. For UEEE (computer and monitor) that meet the Ministry of Trade criteria is allowed (quantity of UEEE import data is available in Ministry of Trade)

Malaysia: No data found on import e-waste into Malaysia (year 2012-2014).

Used EEEs were imported to Malaysia from USA and Singapore. Used computer/laptop was imported to Malaysia from Australia and New Zealand

Philippines: import UEEE and e-waste from Thailand, USA, Korea, Hong Kong, Japan, UK, New Zealand, Costa Rica, Singapore, Laos, Canada, Australia, Germany, Israel, Italy, Belgium, with total amount for year:

- 2009: 1,100 (MT) and 421,478 (pcs/boxes/units/sets/pkg)
- 2010: 18,765 (pcs/boxes/units/sets/pkg)
- 2011: 3960 (MT) and 1,534 (pcs/boxes/units/sets/pkg)
- 2012: 514.34 (MT) and 70,071 units
- 2013: 5,600.81 (MT) and 547,174 (pcs/boxes/units/sets/pkg)
- 2014: 500 (MT) and 89,430 (pcs/boxes/units/sets/pkg)



Note: Singapore and Thailand: Data on e-waste only

Philippines : Data on UEEE and e-waste

Data on Import of UEEE and E-Waste (2009-2014)

No			Countries									
			Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
3	Data on used EEE and e-waste import	Available			V				V	V	V	V
		Not available	V	V		V	V	V				

Singapore: Singapore import e-waste from Japan, Thailand, New Zealand, Philippines, South Africa, Malaysia, Australia, Vietnam, China, India, Hong Kong, Korea, Indonesia, Srilanka, Brazil, Trinidad and Tobago, Qatar, with total amount (MT) for year 2010 (1,935.271), 2011 (2,193.41), 2012 (4,369.79), 2013 (4,268.51), 2014 (1,699.036).

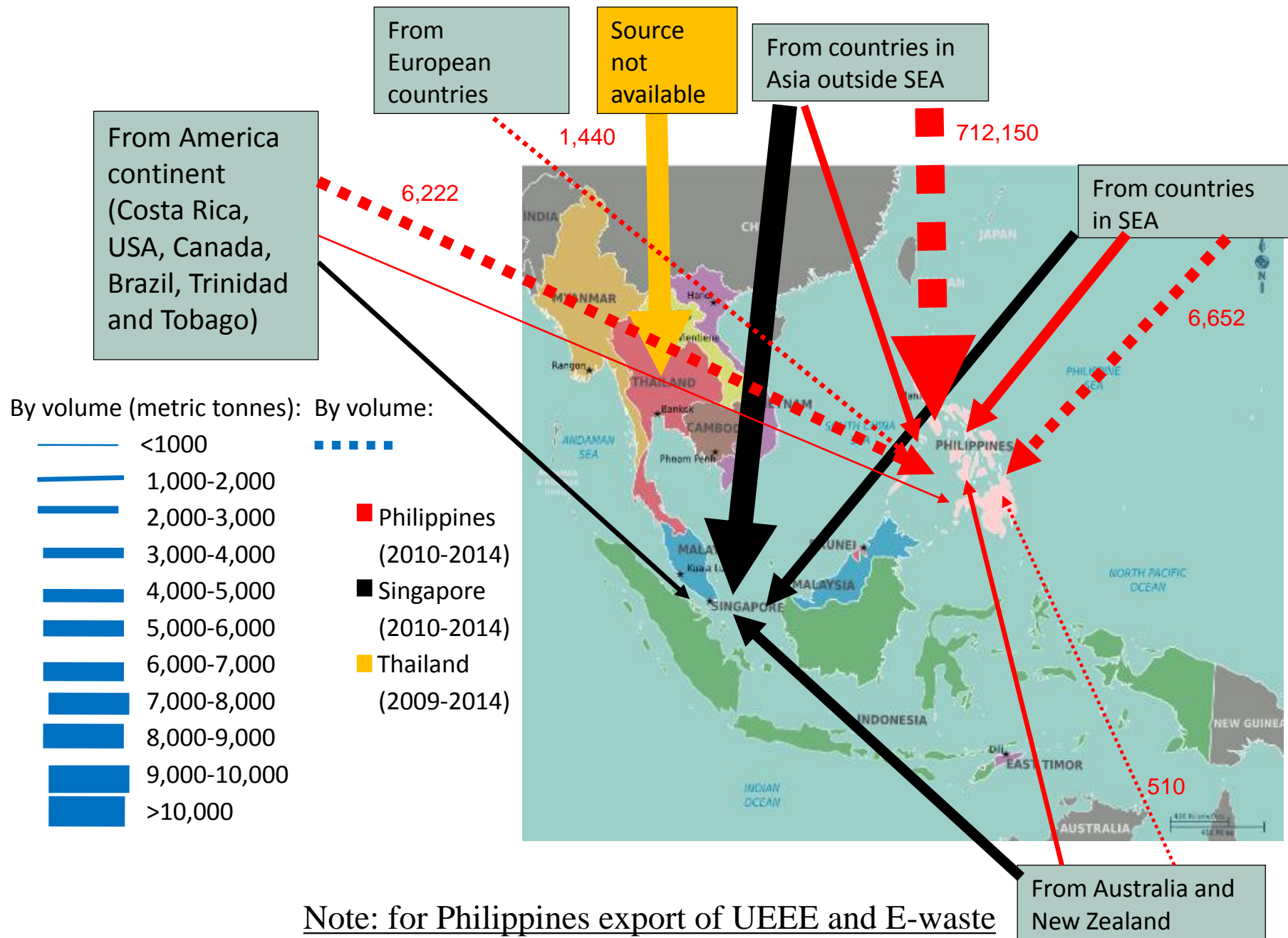
Thailand: the amount e-waste imported to Thailand between 2009-2014: 7,964.739 MT

Vietnam : not allowed to import UEEE and e-waste

Note: Singapore and Thailand: data on e-waste only
Philippines : data on UEEE and e-waste



Import of E-waste



Data on Export of UEEE and E-Waste (2009-2016)

No			Countries									
			Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
	Issue											
4	Data on used EEE and e-waste export	Available	V		V		V		V	V	V	V
		Not available		V		V		V				

Brunei: Between 2009-2014, there were no exportation of e-waste. In 2015, about 6.45 MT of electronic board scrap was exported to Japan

Indonesia: on 2015 export amounting to 1687,4 MT, on 2016 export amounting to 706,7 MT

Malaysia: Quantity of e-waste exported from Malaysia (year 2012-2014):

- 5,454.9 MT to Asian countries (Japan, Thailand, Korea, Hong Kong and Singapore)
- 240.8 MT to Europe (Sweden, Italy, Finland, Netherland, Belgium, Germany and Denmark)
- 1,761 MT to America (US and Canada)

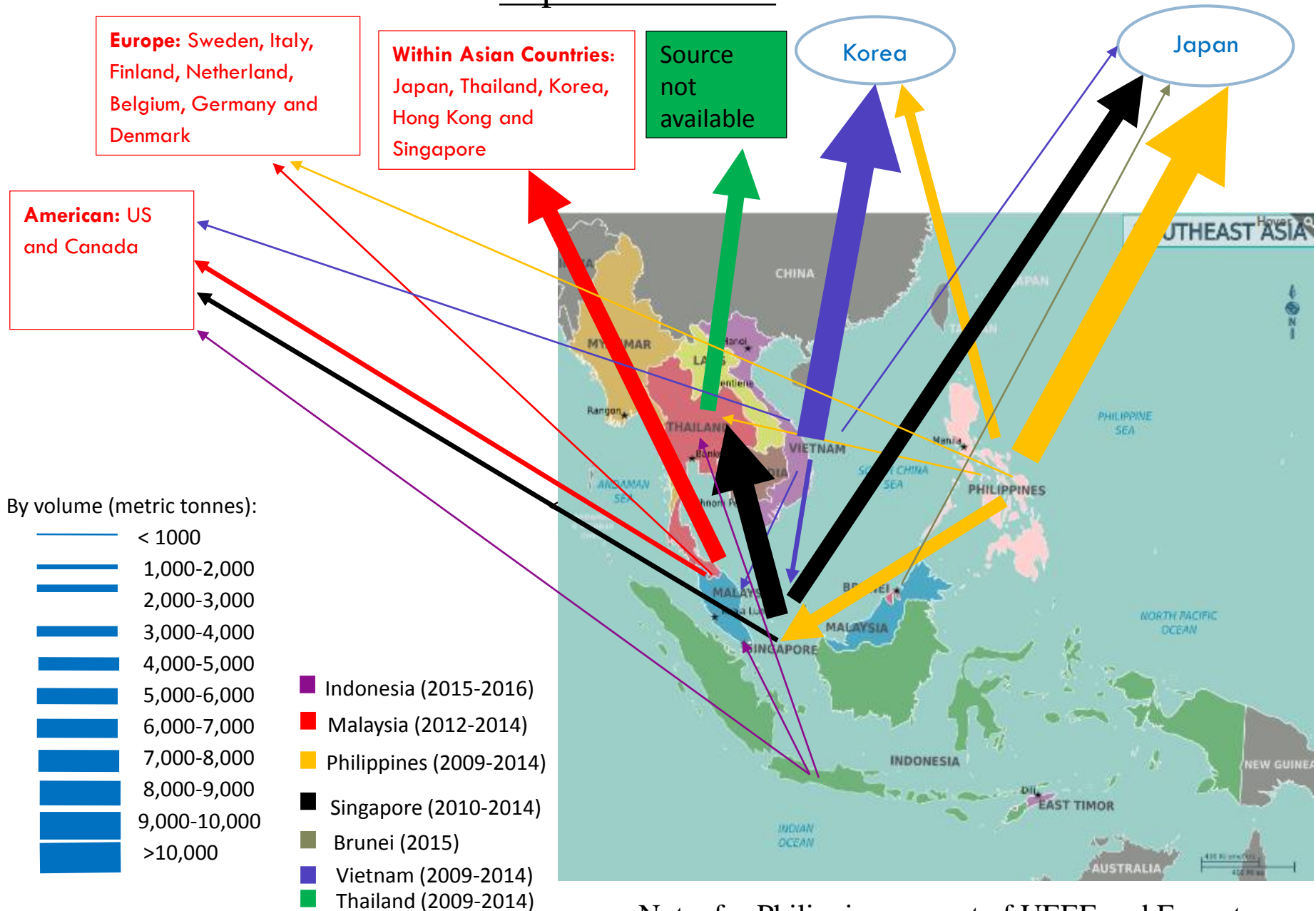
Philippines: Philippines exports UEEE and e-waste to Japan, Korea, Thailand, Singapore and Belgium. Total quantity for year 2009: (3,944.5 MT), 2010: (2,650 MT), 2011: (2,720 MT), 2012: (6,810 MT), 2013: (2,080 MT), 2014: (9,150 MT)

Singapore: Singapore exports e-waste to Japan, Thailand and Canada. Total quantity for year 2010-2014: to Japan 6,640.692 MT, to Thailand 7,028.66 MT and to Canada 1.928 MT

Thailand: the amount e-waste exported to Thailand between 2009-2014: 5,195.63 MT

Vietnam: export quantity of e-waste between 2009-2014 to Singapore (Battery) 1,929 MT, to Korea (accumulator) 9,700 MT, to Canada (battery) 15 MT, Malaysia (HDD) 400 MT, Japan (PCB) 600 MT

Export of E-waste



Note: for Philippines export of UEEE and E-waste

Data on Future Projection of E-waste

No	Issue		Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
		Available		V	-				-	-	V	
7	Data on future projection of e-waste	Not available	V		-	V	V	V	-	-		V

Cambodia: 22,443 metric tons in 2019

Thailand: estimation of e-waste generation (2012-2016) for television, camera/video camera, portable audio player, printer/facsimile, telephone/mobile phone, personal computer, air conditioner and refrigerator for year 2012:19,680,000 unit, 2013: 20,889,000 unit, 2014:22,080,000 unit, 2015: 23,237,000 unit, 2016: 24,318,000 unit

*(-) no information


Develop Future Projection of E-waste



Challenges:

Lack data on quantity of:

1. Domestic EEE production and consumption
2. Export and import of EEE
3. Lifetime of EEE
4. Number of unit EEE/thousand persons
5. Domestic e-waste generation
6. Domestic e-waste generation rate (kg/inhabitant)



2. Assessment of Current E-waste Management System

E-waste Regulation

No	Countries		Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam	Note
	Issue												
1	E-waste Regulation	Specified		V	V*		V*		V*		V*		*in draft form
		Not specified	V		V	V	V	V	V	V	V	V	

• **Brunei Darussalam:** Covered under Hazardous Waste (Control of Export, Import and Transit) Order 2013

• **Cambodia:** Sub.Decree on E-waste Management had been enacted on 1 February 2016

• **Indonesia:**

- For e-waste from industry Govt Reg 101/2014 on Hazardous Waste Management
- For household and municipal waste Act no 18/ 2008 on Solid Waste Management categorized as specific municipal solid waste
- under preparation (Ministry of Environment and Forestry Regulation on Municipal Electronic Waste Management)

• **Lao PDR :** Covered under Regulation:

- Law on Environment Protection No. 29/NA, 18 December 2012. Article 38, 39 and 40
- Ministerial Instruction on Hazardous Waste Management No. 0744/MoNRE, 11 February 2015.
- Ministerial Agreement on Waste Management from Processing Industry and Handicraft No. 0555/IC, dated 20 March 2.

• **Malaysia :** Covered by hazardous waste regulation:

- Environmental Quality (Scheduled Wastes) Regulations 2005.
- Guidelines for the Classification of Used Electrical and Electronic Equipment in Malaysia, 2nd Revision, 2010 is to assist in identifying and classifying Used EEE and e-waste as prescribed under the First Schedule Environmental Quality (Scheduled Wastes) Regulations 2005
- Malaysia is drafting regulation and promotion of household e-waste

E-waste Regulation

No	Coutries		Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam	Note
	Issue												
1	E-waste Regulation	Specified		V	V*		V*		V*		V*		*in draft form
		Not specified	V		V	V	V	V	V	V		V	

•**Myanmar** : Myanmar does not have regulation for e-wastes. The e-waste has not been categorized as hazardous waste.

•**Philippines** : Regulation that control e-waste is under DENR Administrative Order (DAO) 2013-22 or the Revised Procedures and Standards for the Management of Hazardous Wastes.

-The EMB-DENR is currently finalizing the proposed “Technical Guidelines on the Environmentally Sound Management (ESM) of Waste Electrical and Electronic Equipment (WEEE)”.

•**Singapore** :For transboundary movement of e-waste classified as hazardous waste under the Basel Convention, Singapore has enacted the Hazardous Waste (Control of Export, Import and Transit) Act (HWA) and its Regulations to implement the obligations under the Convention

•**Thailand** :

- Thailand has a draft of e-waste regulation that is draft WEEE Act B.E.

- Not specifically, e-waste regulation is covered by hazardous waste management regulation:

Notification of the Ministry of Industry on a list of Hazardous Substance B.E. 2556 (2013)

Vietnam:

e-waste regulation is covered by hazardous waste management regulation:

- Law on Environmental Protection No. 55/2014/QH13

- Decree No 38/2015/ND-CP regarding the management of waste and scraps

- Circular No 36/2015/TT-BTNMT regarding hazardous waste management

e-waste regulation is covered by other regulation: Decision No.16/2015/QD-TTg regarding on Retrieval and Disposal of Discarded Products. Products to take-back is not only e-waste, but mostly focus on e-waste, both from industry and household. Now, Vietnam is drafting Circular under the Decision No.16/2015/QD, but have not been issued yet.

Institutional Arrangement

No	Countries Issue	Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
1	EEE production and import-export	Custom DoEPR	-	MoI, MoT, Custom							Custom and MoIC
2	UEEE and e-waste import-export	Custom DoEPR	-	MoT, MoEF, Custom	MoE	DoE, Custom	Custom MoC, MoECF	Custom EMB-DENR	NEA, Custom	Mol, MoPH, MoInterior, MoNRE	VEA-MONRE, Custom
3	Collector of e-waste	DoEPR	-	MoEF, Local Govt.	MoE	DoE	CDC, MoECF	EMB-DENR	NEA	Mol, MoPH, MoInterior, MoNRE	VEA - MONRE/ DONRE
4	Transporter of e-waste	DoEPR	-	MoEF, MoTrans	MoE	DoE	CDC, MoECF	EMB-DENR	NEA	Mol, MoPH, MoInterior, MoNRE	VEA – MONRE/ DONRE
5	Recycling Facilities of e-waste	DoEPR	-	MoEF	MoE	DoE	CDC, MoECF	EMB-DENR	NEA	Mol, MoPH, MoInterior, MoNRE	VEA – MONRE/ DONRE
6	Treatment/recovery of e-waste	DoEPR	-	MoEF	MoE	DoE	CDC, MoECF	EMB-DENR	NEA	Mol, MoPH, MoInterior, MoNRE	VEA-MONRE/ DONRE
7	Residue from treatment/recovery of e-waste	DoEPR	-	MoEF	MoE	DoE		EMB-DENR	NEA	Mol, MoPH, MoInterior, MoNRE	VEA - MONRE/ DONRE

Formal and Informal Sector Participation

No			Countries									
			Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
	Issue											
3	Fomal and informal sector participation	Formal	V	V	V		V	V	V	V	V	V
		Informal		V	V	V	V	V	V	V	V	V

Indonesia: some of the collection, refurbishment and recycling especially in bonded zone are conducted by informal sector

Lao PDR:

- Informal sector conducted collection, transportation, refurbishment/repair separation/dismantling, recycling and disposal activities for TV and mobile phone.
- Informal sector conducted collection, transportation, refurbishment/repair, separation/dismantling and recycling activities for computer

Myanmar: For TV, Computer and mobile phone:

- Formal: conducted collection, segregation, recycling and disposal activities
- Informal: conducted transportation, refurbishment/repair and separation/dismantling activities

Formal and Informal Sector Participation

No			Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
	Countries											
	Issue											
3	Formal and informal sector participation	Formal	V	V	V		V	V	V	V	V	V
		Informal		V	V	V	V	V	V	V	V	V

Philippines:

- For TV and computer: Formal and informal sector conducted collection, transportation, segregation, separation/dismantling, recycling, recovery, disposal. Except for refurbishment/repair only formal sector involved
- For mobile phone: Formal and informal sector conducted collection, transportation,, recycling, recovery, disposal. For refurbishment/repair, segregation, separation/dismantling only formal sector involved

Singapore:

- Formal sector: as recyclers and repair centers
- Informal sector: as repairers & 2nd hand shops and dismantlers

Vietnam: For TV and computer, formal and informal sectors conducted collection, transportation, separation/dismantling, recycling, recovery, disposal activities

For mobile phone, formal and informal sectors conducted collection, transportation, recycling, recovery, disposal activities. For separation/dismantling only formal sector involved

[illegible]

Informal Sector Participation

No	Issue	Countries									
		Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
1	Collection		V	V	V	V		V		V	V
2	Transportation		V	V	V	V	V	V		V	V
3	Refurbishment/Repair		V	V	V	V	V		V	V	
4	Segregation		V	V		V		V		V	
5	Separation/Dismantling		V	V	V	V	V	V	V	V	
6	Recycling		V	V	V	V		V			V
7	Recovery		-	V		V		V		V	V
8	Disposal		V	V	V			V			V

Malaysia : most of e-waste from household, from collection to recovery was conducted by informal. With Alam Alliance Program, Malaysian government try to formalize the informal sectors

*(-) no information

E-waste Definition

No			Countries									
			Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
2	E-waste definition	Available	V	V	V		V		V	V		
		Not available				V		V			V	V

- Brunei:** The definition of e-waste is any discarded electrical and electronic devices
- Cambodia:** e-waste is defined as all equipment that not used anymore but still in the whole figure or broken (not function) or separating/recycling of EEE
- Indonesia:** e-waste is defined as electronic goods that are not functioning and/or not used anymore originating from household, office, commercial activity, etc (in draft form)
- Malaysia:** E-waste is categorized as scheduled wastes under the code SW 110, First Schedule Environmental Quality (Scheduled Wastes) Regulations 2005. The SW 110 wastes are defined as waste from electrical and electronic assemblies containing components such as accumulators, mercury-switches, glass from cathode-ray tubes and other activated glass or polychlorinated biphenyl-capacitors, or contaminated with cadmium, mercury, lead, nickel, chromium, copper, lithium, silver, manganese or polychlorinated biphenyl.
- Philippines:** Waste electrical and electronic equipment (WEEE):
Include all waste electrical and electronic equipment that contain hazardous components such as lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) that includes its peripherals i.e., ink cartridges, toners, etc
- Singapore:** adheres to the definition stipulated under the Basel Convention “A1180”
- Thailand:** Not yet (under draft WEEE Act)

UEEE-waste Definition

No	Issue		Countries									
			Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
3	Used EEE definitiom	Available			V				-	-	V	
		Not available	V	V		V	V	V	-	-		V

Indonesia: UEEE (only for computer and monitor) is defined as electronic goods that fulfill requirements as follows: Still being function (proven by certificate), the lifetime is not more than 5 years, new technology: with type of monitor LCD and LED (definitely not CRT), Must be in one complete set, must be imported in proper packaging

Thailand: Used EEEs means Electric and Electronic Equipments which were used but still workable and keep as its original form or can be repaired, modified, reconditioned in order to be used as same as original purposes.

*(-) no information

Criteria to Differentiate UEEE and E-waste

No			<div>Countries</div>									
			Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
	Issue											
4	Criteria to differentiate Used EEE and e-waste	Available	V		V	V	V			V	V	
		No criteria		V				V	V			V

•**Brunei:** Used EEE and e-waste is distinguished as defined and categorized by the Basel Convention.

Indonesia: UEEE (only for computer and monitor) is defined as electronic goods that fulfill requirements as follows: still being function (proven by certificate), the lifetime is not more than 5 years, new technology: with type of monitor LCD and LED (definitely not CRT), must be in one complete set, must be imported in proper packaging

•**Lao PDR:** Used EEE is the second hand of electrical and electronic equipment that can be use, but the E-waste is electrical and electronic equipment that cannot use anymore.

•**Malaysia:** DOE Malaysia has published a guidance document to differentiate whether Used EEE is categorized as e-waste or non-waste, refer to Guidelines for the Classification of Used Electrical and Electronic Equipment in Malaysia, 2010

Philippines: Presently, there is no distinction between used EEE and e-waste. Used EEE is classified as e-waste.

Singapore : Singapore has put in place domestic guidelines to distinguish UEEE from e-waste and they include the key provisions (e.g. supporting documentations and surveyor reports, etc.) contained in the technical guidelines adopted on an interim basis at the Basel Convention for the classification between UEEE and e-waste

Thailand: The following criteria are used to distinguish between used EEE and e-waste:

-Appearance of the products (e.g. visual inspector)

-Condition of packaging and labelling (Individual packaging in order not to be damaged during transportation)

Export Import Policy on UEEE

No	Countries		Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
	Issue											
6	Policy on UEEE export and import	Export allowed	V	V	V		V	V	V	V	V	V
		Export banned				V						
		Import allowed	V	V	V		V	V	V	V	V	
		Import banned				V						V*

- **Brunei:** Import activity of UEEE is not banned, only if the UEEE falls under Annex IX of the Basel Convention (i.e. B1110).
- **Cambodia:** Exportation of UEEE to abroad have to permit letter from MOE and apply document to procedure of imported country. Some kind of UEEE has to be prohibited import into Kingdom of Cambodia and this needs to be identified by inter-ministries circular for MOE and MOEF
- **Lao PDR:** Policy on import and export of UEEE is banned in Lao. Import and export of e-waste is banned in Lao based on the Prime Minister's Office Notice No. 829/PMO, dated 13 June 2016
- **Malaysia :** Any exportation/importation of UEEE is restricted and exporter/importer required obtaining the written approval from Director General prior to the exportation/importation.
- **Philippines:** Import activity of UEEE is not banned, however it is regulated and subject to compliance with the requirements of DAO 2013-22
- **Myanmar:** Myanmar does not have regulation for e-wastes. The e-waste has not been categorized as hazardous waste.

Export Import Policy on UEEE

No			Countries									
			Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
	Issue											
6	Policy on UEEE export and import	Export allowed	V	V	V		V	V	V	V	V	V
		Export banned				V						
		Import allowed	V	V	V		V	V	V	V	V	
		Import banned				V						V*

- **Indonesia:** UEEE (only for computer and monitor) that fulfill requirements as follows: Still being function (proven by certificate), the lifetime is not more than 5 years, new technology: with type of monitor LCD and LED (definitely not CRT), Must be in one complete set, must be imported in proper packaging
- **Singapore:**
 - for re-use: surveyor report indicating all UEEE are in good working condition and importer ensure UEEE are meant for re-use
 - for repair and refurbishment: contractual agreement between manufacturers and repair facilities, warranty and repair facility
- **Thailand:** Import of UEEE allowed for direct reuse, repair and refurbishment
- ***Vietnam:** based on the (regulation) Decree No. 187/2013 / ND-CP regarding the detail implementation of Trade Law on International Buying and Selling of Commodities and Agent Activities including Purchasing, Selling, Sourcing, Outsourcing, Border-gate Transfer, and Transiting of Commodities with Foreign Countries

Export Import Policy on E-waste

No			Countries									
			Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
3	Policy on E-waste export and import	Export allowed	V	V	V		V	V	V	V	V	V
		Export prohibited				V						
		Import allowed					V	V		V	V	
		Import prohibited	V	V	V	V			V			V

- Cambodia:** all importation of e-waste from abroad into Kingdom of Cambodia is prohibited and exportation of e-waste to abroad have permit letter from MOE
- Lao PDR:** Policy on import and export of UEEE is banned in Lao. Import and export of e-waste is banned in Lao based on the Prime Minister's Office Notice No. 829/PMO, dated 13 June 2016
- Malaysia :** The exportation/importation of hazardous waste/ scheduled wastes (i.e. e-waste) are restricted and subject to the written approval of Director General of Environment prior to any movement/shipment.
- Lao PDR:** Lao Government strictly not to allow any person import of e-waste for recycling in the country as well as export of recycled metals since 13 June 2016..
- Philippines:** Import activity of e-waste intended for disposal is strictly prohibited.Import of e-waste intended for recycling is allowed subject to the requirements of DAO 2013-22 and the Basel Convention.

Export Import Policy on E-waste

No			Countries									
			Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
	Issue											
3	Policy on E-waste export and import	Export allowed	V	V	V		V	V	V	V	V	V
		Export prohibited				V						
		Import allowed					V	V		V	V	
		Import prohibited	V	V	V	V			V			V

•**Singapore:** Singapore follows closely to the obligations of Convention for the transboundary movement of hazardous waste. The Prior Informed Consent (PIC) procedure is applied for e-waste imports and exports in circumstances where exporting/importing countries classify e-waste as hazardous waste under the Convention framework. Singapore applies the same import/export policy principles in reference to the preliminary technical guidelines adopted on an interim basis by the Basel Convention for its domestic guidelines

•**Thailand:** ban on the import of e-waste for final disposal and restriction on the import of e-waste for 3R

•**Vietnam:** based on the (regulation) Law on Environmental Protection No. 55/2014/QH13

Company Involved in E-waste Management

No			Coutries									
			Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
1	Data on company involved in e-waste management	Available	V		V		V		V	V	V	V
		Not available		V		V		V				

Indonesia: there are 6 companies for collection and 2 companies for recycling

Malaysia: As of July 2016, there are total 129 E-waste facilities in Malaysia which covered 97 partial recovery E-waste facilities (physical or manual segregation of e-wastes for further processing) and 32 full recovery E-waste facilities which can process the e-wastes to recover the precious metals. List of the company involved in e-waste management refer to the link: <http://eswis.doe.gov.my/facilityList.aspx>

Philippines: provided details data on EMB-registered Transporters and TSD facilities for WEEE/e-waste who registration is valid as of October 2015

Singapore: <http://www.nea.gov.sg/energy-waste/3rs/e-waste-lamp-battery-recycling/e-waste-recycling>

Thailand: there are 66 facilities (dismantling and recycling facilities)

Vietnam: Details on the website <http://quanlychatthai.vn/>

Extended Producer Responsibility (EPR)

No			Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
	Countries											
	Issue											
5	Incentive mechanism	Applied					V		V	V		
		Not applied	V	V	V	V		V			V	V

Philippines: July 2015-July 2016: Program 1 Phone, Globe Telecom, Inc.

The project aims to collect e-waste from different waste generators such as schools, companies, private entities, and government agencies, store these with their partner TSD facility prior to export for recycling, recovery and treatment. The project requests companies for donations of e-wastes earmarked for disposal. Once a donation is confirmed, Globe, in tandem with their partner transporter-TSD facility, assures the proper pick-up, transport, storage, and subsequent export of the e-wastes. Funds raised by the project will be donated to support the building of classrooms for selected schools which were affected by typhoon

Singapore: Currently, Singapore works closely with the industries to take responsibility for the recycling of their own electrical and electronic products on a voluntary basis. It works closely with its industry partners and communities to increase public awareness and encourage recycling of e-waste through voluntary programmes led by industry partners (<http://www.nea.gov.sg/energy-waste/3rs/e-waste-lamp-battery-recycling/e-waste-recycling>)

Malaysia: EPR applied in several areas and on voluntary basis

No EPR system applied (mandatory basis)

Data on Illegal Traffic

No			Countries									
			Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
6	Data on illegal traffic	Available	V	V	-		V			-	V	
		Not available			-	V		V	V	-		V

Brunei Darussalam: no illegal cases were reported for both import and export of hazardous waste

Cambodia: in 2013, 42 tons of scrap e-waste (3 containers) through Trapeng Thlong International check point in Kampong Cham province

Malaysia: Data of illegal traffic relevant to Paragraphs 2, 3 and 4 of Article 9 Since Year 2008 - August 2015: 53 cases (Data from National Reporting submitted by Malaysia to the Secretariat of the Basel Convention)
Illegal shipment of E-waste (2009-2014) was from USA, Australia, China, Hong Kong, India, Indonesia, Japan, Korea, Latvia, Lithuania, New Zealand, Pakistan, France, Philippines, Singapore, Sweden and Taiwan

Thailand: 196.11 tonnes of illegal hazardous garbage was seized at Laem Chabang Port by the Customs Department and Department of Industrial Works on 28 August 2015 from Japan mostly containing hazardous e-waste. The waste will be sent back to Japan on 29 July 2016.

*() no information

Ban Amendment

No	Issue		Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
7	Ban Amendment	Ratified	V		V		V					

3. Identification of Gap for E-waste Management

1. Lack of data on EEE, lifetime of EEE, type of e-waste, amount of each type of e-waste, import and export of UEEE and e-waste, classification of e-waste
2. No specific regulation on e-waste
3. Different definition of UEEE and e-waste among countries
4. Lack of public awareness
5. Few environmentally sound dismantling, recycling and disposal facilities
6. Large number of existing informal sectors without ESM
7. No existing EPR system (mandatory basis), no recycling fee and incentive mechanism
8. Full recovery facility with BAT and BEP is very expensive

3. Identification of Gap for e-waste Management (cont'd)

- 9. Illegal trade and illegal dumping
- 10. No specific HS code for UEEE and e-waste
- 11. Only 3 (three) countries have criteria to distinguish UEEE and e-waste
- 12. Lack of BAT and BEP, only 2 countries have full recovery facility due to lack of finance, human resources and specific regulation
- 13. lack of domestic control system for illegal export and import
- 14. No countries regulate e-waste from household
- 15. E-waste recycling facilities are in shortage of raw material to be process due to collecting by informal sector

4. Identification of Good Practices, Policies and Technology

1. Identification of Good Practice in SEA

Countries : Thailand, Malaysia, Singapore and Vietnam

2. Identification of Policies

3. Identification of Technology



4.a. Identification of Good Practices (Singapore)

Full recovery facility:

1. Have different area for loading, storage, dismantling (combination manual and machine), segregation, crushing, cyanide dissolution, stripping solution using electrolytic machine, ion exchange, melting by aquaregia
2. The product: 99.99% gold
3. Production of gold: 10-22 kg/month
4. Palladium product using Pd refinery
5. Silver (Ag) recovery
6. Chemical treatment with acid to purify silver

Raw material from domestic and import



4.b. Identification of Good Practices (Malaysia)

Full recovery facility:

1. Have different area for loading, storage, dismantling (combination manual and machine), crushing, stripping/extraction using cyanide, electrolysis process, dissolution process, melting process (1 200-1 600°C)
2. The product: 99% gold and silver
3. Platinum, Palladium and Rhodium product

Raw material from industry, government office and household in
Malacca

4.c. Identification of BEP in Singapore and Malaysia

1. All workers using personal protective equipment, in Malaysia especially for laser cutting the workers using mercury mask
2. Each activity having dust collector and transported to air pollution control (EP and scrubber)
3. Concrete floor, lighting, ventilation, water collection that will send to WWTP
4. Good practice storage for each type of e-waste
5. Truck having GIS and monitor by CCTV in every area
6. There are also different room for lithium cutting in air vacuum room (Singapore)
7. Residues from scrubber/EP and sludge from WWTP sent to licensed hazardous waste facility
8. ODS is sent to licensed incinerator
9. Scrap metal or plastic sent to licensed recyclers
10. Effluent and emission should comply with industrial standard
11. Cyanide was stored in locked storage room with proper label and symbol, every usage is recorded in logbook (date, name, amount)
12. Having emergency response equipment e.g. fire extinguisher, hand washer, shower room, first aid box

4.d. Identification of Good Practices (Thailand)

Refurbishing, reconditioning and re-manufacturing facility:

1. Have different area for loading, storage, manual dismantling, segregation, refurbishing, reconditioning and re-manufacturing
2. Waste management processing:
 1. resource recovery
 2. recycle products (re-manufacturing & reconditioning and refurbishing)
3. All workers using personal protective equipment
4. Having dust collectors and collected dust sent to cement kiln
5. Weight measurement before and after processing
6. Effluent and emission should comply with industrial standard
7. Concrete floor, lighting, ventilation, water collection that will send to industrial park WWTP
8. Untreated hazardous waste sent to Japan

*Raw material from Asia Pacific

4.e. Identification of Good Practices (Vietnam)

Recycling facility:

1. Process:

- a. Crushing, Furnace (check weight, separation crushing and furnace)
- b. Process chemical: dissolution purification

2. Valuable metal sent to Japan

3. Exhaust gas, waste water sent to treatment system
(gas, water)

4. Emergency response requirement available

*Raw material from domestic

5. RECOMMENDATION



1. Inventory of e-waste from household, industry and office
2. Develop specific regulation for e-waste management from household and industry
3. Policy and control on export and import of UEEE and e-waste
4. Technology (BAT/BEP)
5. Public Awareness program
6. Set up regional e-waste management facilities

RECOMMENDATION (1)

Conduct e-waste inventory from household and industry by using harmonized guideline for ASEAN countries

- ❑ containing EEE production, lifetime of EEE, type of e-waste, amount of each type of e-waste, import and export of UEEE and e-waste, definition of e-waste, methodology to calculate e-waste generation
- ❑ proposed e-waste classification for ASEAN countries:

United Nations University (UNU)

Classification

1. **Temperature exchange equipment.** Also more commonly referred to as, cooling and freezing equipment. Typical equipment is refrigerators, freezers, air conditioners, heat pumps.
2. **Screens, monitors.** Typical equipment comprises televisions, monitors, laptops, notebooks, and tablets.
3. **Lamps.** Typical equipment comprises straight lamps and LED lamps.
4. **Large equipment.** Typical equipment comprises washing machines, clothes dryers, dish washing machines, electric stoves, large printing machines, copying equipment and photovoltaic panels.
5. **Small equipment.** Typical equipment comprises vacuum cleaners, microwaves, ventilation equipment, toasters, electric kettles, electric shavers, scales, calculators, radio sets, video cameras, electrical and electronic toys, small electrical and electronic tools, small medical devices, small monitoring and control instruments.
6. **Small IT and telecommunication equipment.** Typical equipment comprises mobile phones, GPS, pocket calculators, routers, personal computers, printers, telephones.

RECOMMENDATION (2)

Develop specific regulation for e-waste management from household and industry,

covers:

- a. Clear definition of UEEE and e-waste
- b. Classification of e-waste
- c. E-waste management system (collection, transportation, storage, segregation, dismantling/separation, crushing, refurbishment/reconditioning, recycling, recovery, waste treatment facility and disposal)
- d. EIA and licensing for facilities

RECOMMENDATION (2), cont'd

- e. Emergency response
- f. Environmental standard
- g. Criteria to distinguish UEEE and e-waste
- h. Import and export requirement e.g. control by custom with clear regulation and requirements & have a good cooperation between customs and environmental agencies; and among countries
- i. EPR
- j. Recycling fee
- k. Public participation
- l. Administrative sanction e.g. penalty
- m. Criminal sanction

RECOMMENDATION (3)



Technology (BAT/BEP)

Refer to good practices in Thailand, Malaysia and Singapore

SINGAPORE



Extruder

**Mechanical
Facilities**



Vacuum Mold forming Machine



Primary Crusher



Mobile crusher



Compactor



Shredder



Electrostatic Separator



Auto Sampler



Hammer Mill



Extraction 1 - Stripping



Extraction 2 - Electrolysis

Chemical Facilities



Metal Analysis : ICP



Laboratory

Pollution Control System



Cyclone Dust Collector



Waste Water Treatment Plant



Counter-Flow wet
Scrubber System



Racking System

Storage



Cyanide Storage Area

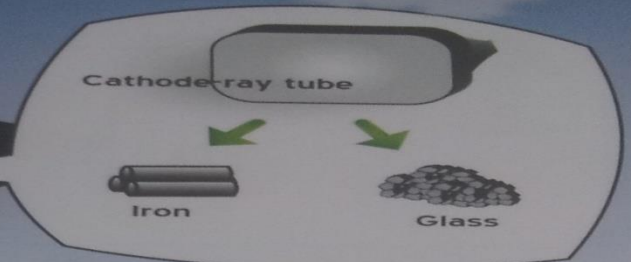


Cyanide antidote Storage Area

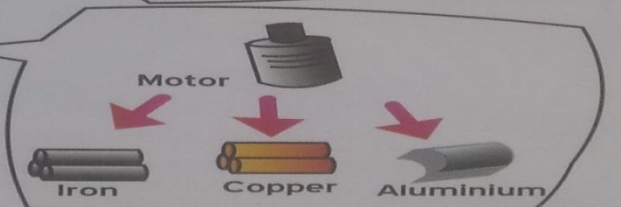
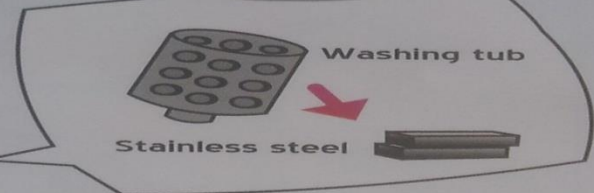
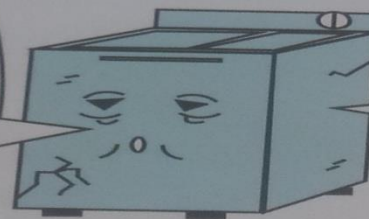
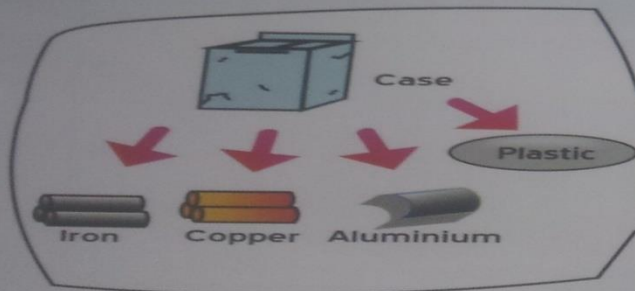


Cyanide Antidote

E-waste can be Recycled



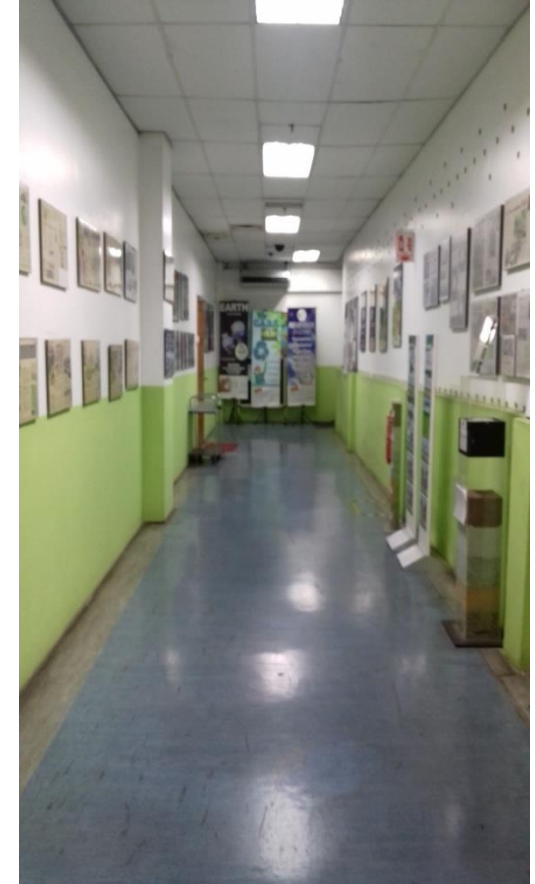
Most of our body parts can be used as raw materials of a new product !!



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



Malaysia



Malaysia



Dismantling

Malaysia



RECOMMENDATION (4)

Public Awareness

- a. Public awareness through partnership between government, recycling/recovery facilities, EEE manufacturer, community, and civil societies and media.
- b. Develop guidelines for public awareness
- c. Training for trainers
- d. Incentives and disincentives

RECOMMENDATION (5)

Set up regional e-waste management facilities :

- Refer to regional facility in Thailand (Fuji-Xerox) and Singapore (TES-AMM)
- Only can be established in countries that allow import of e-waste
- BAT/BEP criteria in Malaysia, Singapore and Thailand can be referred to



Thank You