



REPORT

Demonstration Programme at a Recyclable
Waste Collecting Site of ESM of the E-wastes
August-November, 2010 in Phnom Penh

Department of Pollution Control
Ministry of Environment

Background

As revealed by results of the 2007 Training Courses on the Environmentally Sound Management of Electronic Wastes supported by Secretariat of the Basel Convention, the participants from the 6 regions involved recommended strongly to the project team to organise demonstration projects on the Environmentally Sound Management of E-wastes at recyclable waste collecting sites, so participants could build more capacity and practice how the e-wastes can be managed in an environmentally sound manner, especially for the workers who are involved in the collection, repairing, transporting, refurbishment and dismantling. Additionally, the demonstration programme can play important role in getting the necessary support and raising awareness among relevant stakeholders in order to develop laws or standards for the ESM of E-wastes in the future. Due to this strong need to continue with capacity building and awareness-raising activities on the ESM of E-waste, the Demonstration of Environmentally Sound Management of the E-waste “ESM of E-waste” at the Recyclable Waste Collecting Site was developed and implemented.

The specific objectives of the demonstration programme are as follow:

- i) To demonstrate an example of good practices in ESM of E-wastes at the Recyclable Waste Collecting Site to stakeholders, particularly the informal sector;
- ii) To encourage all the stakeholders to apply the ESM of E-wastes, such as end users, e-wastes collectors, recyclers, second-hand shops, recycling facilities, repairing shop and public sectors;
- iii) To help bridge the institutional gap between formal and informal sector on e-waste management in order to fully implement ESM of E-wastes;
- iv) To disseminate a success story and example of good practice as the outcome of the Project, that may be shared on a national level and with other Asian countries facing similar challenges for ESM of E-wastes.

The “Demonstration of ESM of E-waste” at the Recyclable Waste Collecting Site was carried out from August to November 2010. It was implemented accordingly in order to build capacity and raise awareness on the ESM of E-waste including collection, transport, storage, refurbishment, repair. The recyclable waste collecting site was selected to demonstrate and provide an example of good practices of ESM of E-waste. Stakeholders who work in e-waste management, such as end users, e-waste collectors, recyclers, second-hand shops, recycling facilities, repairing shop, formal and informal sectors were priority participants in the activities organised under the demonstration programme.

1. The operations and functioning of the selected recyclable waste collection site and the E-waste collection scheme

Due to recyclable wastes collecting site is largest collecting site in the country, it therefore was selected for the pilot study. The recyclable wastes collecting site located in Phnom Penh City. The site was constructed on a plot with the area of 468 m². The site was constructed mostly on paved areas, except some part with soil as the floor and has no complete roof. The site buys and sells all kind of e-wastes such as TV sets, computers, tape player, washing machine, and radio, etc (See picture 1).



Picture 1: View of E-wastes at recyclable wastes collecting site in center of Phnom Penh

E-wastes are collected by scavengers from small e-wastes collection sites in various districts of the provinces, cities and from local users. The owner of the site has his own collection network for e-wastes all over the provinces and cities throughout the country. The e-wastes are transported by hand cart, bicycle, motorcycle and small truck to a recyclable waste collecting site (See picture 2).



Picture 2: Vehicles and motorcycles are used to transport E-wastes to/from the site

The site has been operating since 2007 and there are around 20 workers in the recyclable wastes collecting site. Their activities are e-waste dismantling, sorting, and packaging, etc (See picture 3). Those workers were mostly male and between 18 and 25 year of age. There is no official e-waste collection scheme; however there are several groups working at different sectors in the premise such as sectors for plastic separation, circuit boards collection and sorting and milling machine, etc. The official working hours of the recyclable wastes collecting site is from 7a.m till 17 p.m.

Those electronic and electrical wastes are dismantled to collect the valuable material such as plastic housing, circuit board for resale or reuse as a spare part in other equipment and non broken cathode-ray tubes (CRTs) for refurbishing into new electronic and electrical equipment. With regard to the e-wastes dismantling process, the workers breaks it down manually and these processes are carried out mostly at rear part of the site.



Picture 3: View of dismantling and sorting process of E-wastes in premise

The plastic housings and other plastic component are milled into small pieces before selling to the recycling facilities abroad (See picture 4).



Picture 4: View of plastic piece from plastic housing milling process

The plastic milling machine was very old and has been operated 2-4 times a week depends on the amount of plastic collected (See picture 5). Water is used for the milling process and it is discharged directly into the public sewage system due to there is no waste water treatment system or temporary waste water storage in the premise.



Picture 5: View of plastic housings milling machine

Some non recyclable wastes generated during dismantling process of e-wastes such as plastic, lamp, etc. are collected by household wastes collection company and disposed at the wastes dumping site (See picture 6).



Picture 6: View of non recyclable wastes and household wastes transportation system

2. The findings of the pilot project and the modifications made to the project to address these findings;

Before the pilot project has been introduced in the recyclable wastes collecting site, the situation of e-waste management is that the operation seems to be smooth, however, all processing of e-waste is on the environmentally unsound management, and many problems have been identified during the demonstration programme as follow:

- a) Lack of the environmental awareness to protect the environment and human health against the adverse effect caused by the environmentally unsound way, for example workers have no personnel protective equipment such as masks, shoes, overall clothing, gloves, etc and furthermore, they do not like to use it when it is available,
- b) No data of e-wastes in the recyclable wastes collecting site and no e-wastes audit system has ever been introduced in this site,
- c) The careless storage of e-wastes and e-wastes handling shows that workers, including the owners of the e-wastes collection sites are not aware of the hazards associated with the e-wastes,
- d) Limited opportunity of national stakeholders, especially workers to learn the environmental and health effects caused by e-wastes not only at schools but also at working places,
- e) The Basel Convention and the technical guidelines on e-waste management prepare under the Basel Convention or by other international bodies are not in place. Furthermore, neither the Convention's regulations or the e-wastes guidelines have ever been introduced to the workers involved with e-wastes at recyclable wastes collecting site,
- f) Owner and workers are not aware of risk caused by wastes water and non recyclable e-wastes generated in their working place,
- g) Owner and workers are not aware of air pollution resulting from operating old plastic milling machine,
- h) The site is not constructed completely on paved areas and has no complete roof, so the e-wastes residue emissions can be released to public area and there is possible damage of rainwater to the stored e-waste,
- i) Lack of awareness and knowledge of how to improve the environmental condition in the site.

Modifications made to the project to address these findings

- a) Several trainings on the environmental and health effect caused by e-wastes and e-wastes guideline including video and brochure, etc related to e-wastes have been organized for workers during the pilot programme. As the result, all workers are very interested in using protective equipment, particularly the masks during working at the recyclable wastes collecting site (See picture 7).
- b) Providing the training courses including practice to owner and workers of how to use the form for e-wastes inventory in the site (See picture 8). As the result, all amounts and kinds of e-wastes have been recorded during the pilot programme.
- c) Recognized the risk which is caused by the discharged untreated wastes water from the plastic milling process into the public sewage system and air pollution caused by old plastic milling machine. As the result, the recyclable wastes collecting site stopped voluntarily the plastic milling operation, unless the wastes water treatment system has been set up.

- d) Conducted training course on safety management and correct transportation procedures of e-wastes to help workers and owner to minimize the risks that are posed by e-wastes due to careless storage of e-wastes in their premise,



Picture 7: View of workers with protective equipment during the pilot programme

- e) The dissemination of the Basel Convention regulations for the transboundary movement of e-wastes and the technical guideline on e-wastes management to help to workers and owner at the recyclable wastes collection site to protect their health and eliminate the potential environmental damage caused by the illicit movement of e-wastes,
- f) The site is covered completely with the roof, so it could minimise the emission of e-wastes residues to public areas, especially to neighbouring resident, as well as protect the material to be further processed,
- g) The storage rooms are expanded for each e-wastes component, so it is much convenience for its management, particularly for the inventory work.



Picture 8: View of workers during training programme and site visit

3- The amount of E-waste collected and treated through the pilot project

During implementation of the Demonstration Programme scheduled from 1 August to 30 November 2010, the form to record the incoming and outgoing e-wastes were developed and disseminated to workers including trainings of how to use it at recyclable wastes collecting site. However, there were no e-wastes recycling at the site. The data of e-wastes is described in table below. More detail information of amount of E-wastes collected each month is shown in the annex I of the report.

Data of Electronic and Electrical Wastes at a selected recyclable wastes collection site (Sale)								
Date	Circuit Board (Kg)				Tr/IC (Kg)	Relay (Kg)	Transformer (Kg)	Others
	TV-Monitor	Blue-CB	CPU	HP				
Aug,2010	5,636.50	0	397.5	38.9	12	19	242	
Sep,2010	7,275	214.5	351	40.1	39.5	15	335	Moyen Frequencies= 73Kg
Oct,2010	10,793.50	50.5	454.5	117.6	372.4	0	690.5	Speakers= 40.5 Kg
Nov,2010	841.5	0	2,328	0	55.5	0	333	SPK=74.5Kg

Data of Electronic and Electrical Wastes at a selected recyclable wastes collection site (Sale)

Date	Usable CRT (No)		Disk (Kg)	UPS (Kg)	Keyboard (Kg)	CDR Box (Kg)		Others
	TV	Monitor				CDR (big)	CDR (small)	
Aug,2010	0	51	0	201	55	153	155.2	
Sep,2010	0	133	275.5	112	75.5	142.5	210.6	
Oct,2010	0	30	1,185	215	331.5	578.5	231.5	Extractor fan: 300 Unit
Nov,2010	14	16	194	426	0	126	35.5	

Data of Electronic and Electrical Wastes at a selected recyclable wastes collection site (Sale)

Date	Copper (Kg)		Aluminium (Kg)	Magnet (Kg)	Iron (Kg)	Po-Supply (Kg)	HDD (Kg)	RAM (kg)	Wire (Kg)	Others
	Yellow	Red								
Aug,2010	127	246	429.5	39	3681.5	526	153	21.4	684.5	
Sep,2010	114	148	550	42	4,545.50	806	128	15.7	788.5	
Oct,2010	74	1,292	224.5	56	1,645	539	282.5	16	277.5	
Nov,2010	0	103	362	0	3,046	151.5	18.5	0	248.5	

Data of Electronic and Electrical Wastes at a selected recyclable wastes collection site (Sale)

Date	Battery (Kg)			Scrap of Plastic (Kg)				Others
	Laptop	HP	ID	PS,ABS	BS,ABS	PP	HI, BK	
Aug,2010	0	12	0	16,900	3,319	3,110	940	
Sep,2010	0	0	0	20,250	2,569	3,350	550	
Oct,2010	13	208	37.5	17,385	336	1,225	0	
Nov,2010	0	0	0	9,150	0	864	2,500	

Data of Electronic and Electrical Wastes at a selected recyclable wastes collection site

Date	Solid Waste (Kg)	Waste Water (M3)	Air	Noise	Waste CRT (No)		Others
					TV	Monitor	
Aug,2010	267	24.2	-	-	5	7	
Sep,2010	294	26.6	-	-	28	2	
Oct,2010	224	20.8	-	-	1	3	
Nov,2010	148	16.5	-	-	10	0	

Data of Electronic and Electrical Wastes at a selected recyclable wastes collection site (buy)

Date	Circuit Board (Kg)					Others
	Monitor	CPU	TV, Ma.	Printer	HP	
Aug,2010	1,435.70	337.3	11,255.70	70.8	54.9	
Sep,2010	1,509.90	476.3	12,455.60	70.8	63.3	Refrigerators = 90Kg
Oct,2010	681.3	174	5,741.50	6	59.2	DVD-HDD= 187Kg
Nov,2010	512	194.8	4,629.80	142	9	Printer= 138Kg

Data of Electronic and Electrical Wastes at a selected recyclable wastes collection site (buy)

Date	Battery (Kg)			Plastic (Kg)					Others
	Laptop	HP	ID/ICOM	TV, Ma	Computer	Keyboard	Small Piece	CDR Box	
Aug,2010	8.4	11.7	1.65	21,124.50	1,340.90	7.5	202.5	338.5	
Sep,2010	17.5	21.9	5.75	22,005.50	1,377.90	31	743.7	389.5	
Oct,2010	18	55.5	0	12,709	875.5	11.3	137	125.4	
Nov,2010	0	6	0	7,455	374.5	0	96	167.6	Remote Control=45Kg

Data of Electronic and Electrical Wastes at a selected recyclable wastes collection site (buy)

Date	CRT-Television (No)			CRT-Monitor (No)		HDD (Kg)	UPS (Kg)	Disk (Kg)	Others
	Usable	Unusable	Sony	Usable	Unusable				
Aug,2010	13	2	4	30	3	113.2	31.4	283.3	LCD=37Kg
Sep,2010	11	17	3	139	10	135.45	18.3	1,254.8	
Oct,2010	0	0	0	52	0	52.5	401.7	194	
Nov,2010	15	9	0	26	0	101.7	295	150	LCD=15Kg

Data of Electronic and Electrical Wastes at a selected recyclable wastes collection site (buy)

Date	Copper (Kg)		Aluminium (Kg)	Iron (Kg)	Wire (Kg)	Po-Supply (Kg)	IC-Tr-STR... (Kg)	Others
	Yellow	Red						
Aug,2010	13.2	4.9	74.3	3,382.50	214.4	437.5	0.7	SPK=42Kg
Sep,2010	10	1.8	134.7	4,069.80	660	858.6	2.7	
Oct,2010	0.6	1.6	46	981.4	93.5	364.3	1.8	
Nov,2010	0	20.4	6.8	1,321.50	68.3	145.5	6.5	SPK=155Kg

4- Conclusion and Recommendation

The pilot project clearly identified that the main problem areas associated with the environmentally sound management of e-wastes are dismantling, sorting, collecting and legitimate transport to the recycling plants. An isolated example of plastic milling operation could indicate that there may be others, but that is probably unlikely as the export trade in e-wastes is a thriving operation. These problems are exacerbated because of the inadequate knowledge and understanding of the people working in the sector of the potential health risks to themselves and the environment damage caused by the e-wastes. The workers lack of understanding means that they have adopted poor safety operating practices when handling the e-wastes and none of the people involved in exporting illegally the e-wastes to Vietnam or Thailand follow the correct legal procedures or international conventions.

In order to protect and prevent risks to human health and damage to the environment caused by e-wastes at the recyclable wastes collecting site. The recommendations are:

- a) The sub decree on the ESM of E-wastes including occupational health and environmental standards for dismantling, collecting, transporting and e-wastes recycling operations should be developed in collaboration with all stakeholders in order to protect the health and safety of workers as well as the general public,

- b) Awareness raising through mass media and televised debate programme, and Training Courses on the Environmentally Sound Management of E-wastes to be conducted in all recyclable wastes collecting sites throughout the country. These courses must include information about the potentially harmful effects of e-wastes to human health and the environment. There must also be an explanation of the proper handling procedures and recycling practices for e-wastes. The prioritized participants are all those people who work in the e-wastes collecting sites,
- c) The introduction of the technical guideline on e-waste management prepared under the Basel Convention and other international bodies, including collection, storage, transportation, recycling and final disposal procedures. These should be undertaken by the Ministry of the Environment in consultation with other concerned Ministries,
- d) The control procedures for the transboundary movement of hazardous waste that is an obligation for Cambodia under the Basel Convention should be adopted immediately to control the export and disposal of e-wastes. This can be included during the training courses on E-wastes Management, conducted in all provinces throughout the country or through interactive media by the Ministry of the Environment,
- e) The owners of retail outlets play an important role in a deposit system that can provide the incentive necessary for the return of UEEE, but, this system can only be implemented and succeed through a governmental sponsored initiative with public support and participation,
- f) Due to the increasing volume of soil and water contaminated accumulated from year to year and caused by e-wastes collection sites, some measures should be taken to introduce an e-wastes collection system in order to stop or at least minimize the risks and hazards to human health and environment,

In order to implement and achieve these recommendations, institutional and financial support is required; otherwise the problems posed by e-wastes are unlikely to be resolved in the Kingdom of Cambodia.