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E-Waste Management: Towards an Appropriate Policy

A. ASKARI[1], A.GHADIMZADEH[1], C. GOMES[2], M.D. BAKRI ISHAK[1]
1.Department of Environmental Science, Universiti Putra Malaysia
2.Department of Electrical and Electronics Engineering, Universiti Putra Malaysia
Email:arameh.askari@gmail.com

Abstract
The socio-environmental impact of rapidly increasing piles of electrical and electronic waste or E-waste at global level has been evaluated in detail. Malaysian scenario was selected as a case study to analyse various issues regarding generation, storage, transportation and disposal of E-waste. Generation of E-waste has been estimated to be about 652909 tonnes in 2006 and was extrapolated to reach around 706 000 tonnes in 2011 and about 1.2 million tonnes in 2020 in Malaysia alone. E-waste basically includes disposed materials of refrigerators, calculators, alarm clocks, computers, printers, televisions, monitors, audio setups, electronic thermometers, laser printer, etc, most of which contain batteries and other components. They carry traces of heavy elements and toxic compounds that threaten human and animal health and various other parts of ecosystem. As per the estimation, over 75% of subjects interviewed in this study has lack of knowledge in storage and disposal techniques of E-waste. The situation may be worse in some other parts of the world. Finally, this paper proposes viable procedures for the safe management of E-waste.
Keywords: E-waste, electrical, electronic, waste management, solid waste, built environment

1. Introduction

Waste Electrical and Electronic (WEEE) or E-waste is one of the fastest growing waste streams in the world. Nowadays, with the vision 2020, there are many challenges that need to be facing to realize the vision. Two of the critical challenges are Human Resources Development and Information and Communication Technology (ICT) development.(Adbdulah, 2010).[1]
With traditional municipal wastes, E-waste is a very different (Duan et al., 2011) [2]. policies for waste management is differ from the policies which is apply for traditional waste types cause the E-waste stream contained both highly toxic substances, which bring a dangerous problem to the health and environment (Guo et al., 2010) [3] and valuable raw materials which can be recovered (Huisman et al, 2004)[4]
According to E-waste managment confereance in 2012, [5] E-waste may contain hazardous substances such as lead, mercury, PCB, asbestos and CFC's that pose risks to human health and the environment; The amounts of E-waste are growing rapidly, due to the wide use of this equipment, both in developed countries and in developing countries;Contains valuable material that can be recovered as secondary resources to conservation of energy and reduction in greenhouse gas emissions.
Under such circumstances, lack of properly formulated micro and macro scale E-waste management plans may lead to serious local and global chatasprophies in the near future. At present, As per the observation of authors in eighth Asian Countrires (India, Pakistan, Bangladesh, Bhutan, Nepal, Sri Lanka, Malaysia and Indonesia), at present, E-waste diposal is performed in a highly disorganized and uncontrolled manner in many parts of the world. Our interaction with several layers of society has indicated that lack of knowledge in handling E-waste and the absence of proper policies and guidelines at state level are basic reasons of E-waste mismanagement.
This study is done, in the above backdrop, to assess the present situation of E-waste management in an industrialized country, with the view of developing a feasible management model. Various issues at global level are analysed and discussed, giving special attention to Malaysia, which has been selected as a case study.

2. Information and data

In 2008 the generation of E-waste about 700, 00 tonnes annually and forecasted to be 1.11 million tonnes in 2020 (figure 1)

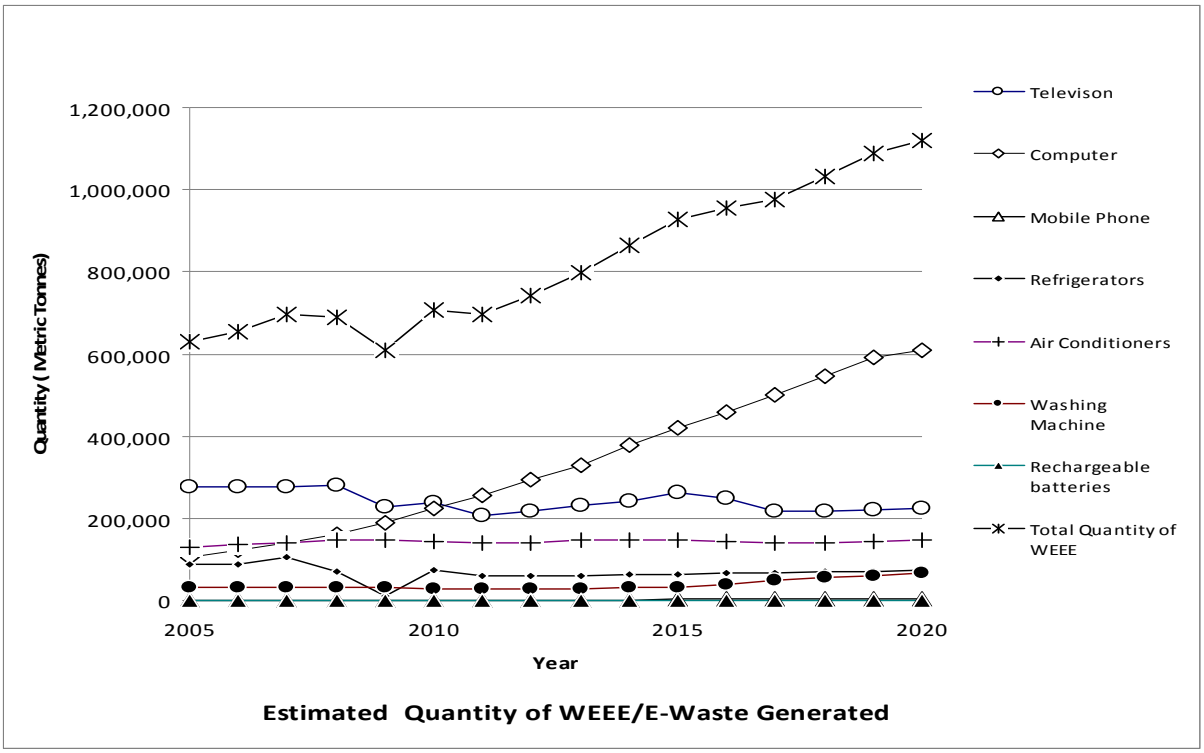

Figure 1: Generation of E-waste (adopted from Department of environment DOE, 2011) [6]

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3. Data collection and method

Information were gathered by adopting multiple methods of data collection; i.e. interviews (with related parties), visual observations at sites and reviews of literature. This is done by the majority of the researchers somwhere else (Tengku Hamzah, 2010) [7] . Data gathered from questionnaires were analyzed by chi-square analytical method. Secondary data were analyzed from several sources. Before the questionnaires were handing out to the target as known as commercial shops in this study, a pre-test was assumed so as to ensure the suitability and the relevance of the questions to this survey. Where it is relevant, some information was added in the questionnaires to enable the analysis better.Total sets of 30 questionnaires distributed in the shops which is randomly selected such as selling shops , repair shop and repair/selling shops from a justification of total community of 50 electronic shops that engaged in this research ,most people are not well educated ,but whole area have been chosen for the study and open interviews were draw out to give more information to support the reults towards E- waste managment scheme. Result from this study shown the releavent agnecy in implementing suitable waste management systemspersonal interviews followed up where as it possible. The interviews ratified to be the main method of obtaining and collecting data from the target respondents. The interview data was recorded in the questionnaire. All datas collection method used in same methods for all the respondent.The main and formost intention was to ensure that the interview shall be conducted in a good way so that the target respondent would understand the questions that asked during the interview and would be able to return reliable information. Hense, the data collected from the target respondents, other sources also investigated to compile more information and datas that will be related to this survey such as service centers, recycable centers, private contractor which can be find in the DOE website [8] , DOE guidelines for example. Also, to expand the range of study, the personnel at local authorities have been interviewed and the databases and libraries of such institutes have also been referred

in collecting information on currently enforced legislation and directives. The players of E-waste management at various industrial layers have been interviewed using oral and written questionnareis to acquire the information on current practices and level of awareness. A majority of such interviewes has been conducted at waste-generation points. The gatherd data have been analyzed and compiled to develop a database by which the current scenarios can be assessed and the future trends can be predicted.

4. RESULTS

4.1 E-waste in Malaysia: Legislation and Intensions

As a signatory of the basel convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal-1989, which is express in the E-waste managment conferance in 2012 in Kuala Lumpur, [5] . Malaysia have imposed strict regulation on importing and exporting E-waste. Code- SW 110-2005 defines E-waste as wastes from the 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.

According to the interviews and discussions with some staff working in local authority government and institutes, in some management options, they declared that mostly the systems, in which they are practicing by backing system or pay backing. The statistical findings revealed that there was a noticeable difference between frequencies of these groups ($\chi^2 = 6.533$, $p<0.011$). Consequently, it can be concluded that the majority of shopping managers have no information about E-Waste. Which figure 2 and 3 as well showed the illegal dumping of those kind of waste .

Figure 2. Dumping of E-waste at the backyard of an electrical repair shop. (Source: author)

Also, the results showed that there is no law and regulation related to the electronic and electronically waste in commercial shops. Therefore, applying some enforcement under the law will be important to ensure that the people follow it to gain the proper management. One of the staff, working in the big shops, stated that, the shops were not generated a lot of E-waste, because they just keep the electronic equipments in a such short period of time and pass it to the second hand consumers and sell or repair them very soon to let the people use it. Therefore, during their work in shops, the amount of waste they produce is so high, which needs to care and follow a special and desirable way. That is why, no one cares about the shops and they do not follow any particular policy for that purpose. However, the governments and different departments have their own rules and regulations which are explained somewhere else. But, some of the shops being aware a little bit were in the first or third section of management, even, if they do not know that they are conducting the management process. As a result, total 6 out of 9 shops are applying collection (67%), while 4 out of 9 ones are collecting and disposing (44%), furthermore, 2 shops are collecting and recycling and 6 ones are in the stage of collection and storage (66%), but in a short period of time. There were very few respondents who described E- waste as a matter of recycling or positive reference to recycle, while only 13% of respondents knew how to dispose the E-waste and 87% did not know, which means that, the current management is still poor in city, but should be aware by the suitable campaign applied by the relevant institutes in the future. Also, the results showed that the problems with which Malaysia is faced with the lack of special laws and regulation related to E-waste generated in her cities by shops .Obviously, E-waste has to be managed in a proper way. In addition, some data gathered from the shops, which illegally dump their waste in the site, showed lack of their awareness about their action. It may be considered that it is not their responsibility, so they should be fined. Recently, all of the E-waste recovery facilities have been manufactured and operated by private companies in Malaysia. Generally, E-waste recovery

facilities pay the industries or E-waste generators when they are supplied by E-waste; this policy has informed the public now to send their E-waste to recovery system. They are limited for used cell phones, batteries, and computers and their accessories and also, television sets to the E-waste collection centers. The addresses are posted in the DOE's website [8]. Results show that the percentage of knowledge about current management process for E-waste management is low, i.e., most people do not know how to manage the process. Even, E-waste management in Malaysia has started in a desirable way, thanks to the private sector, this sector has provided it while the required technology is available and the responsibility of Environmental Corporation is important. It is noted that the private firm cannot enact the law; it has to be forced by the government on some social regulation, while the community is ready to play its role. According to an open interview and discussion with some staff working in local authority government and institutes, in some management options, they said that, mostly the systems in which they are practicing as commercial shops are by back system or pay back systems. In addition, some results from shops showed that they dump their E-waste in the site, which is not legal, that is while no agency is aware of that. It can be concluded, that even if, it is their responsibility, they do not notice and each shop has its own policy and method to deal with their E-waste, which is not the same as the appropriate E-waste management system. Unfortunately, there is not any special confirmed information in E-waste processing management in electronic shops in Malaysia. The process consists of the major steps of, segregation, handling, transportation and disposal of waste. The results showed that the shops throw away their E-waste in a simple and normal trash bins, the same as the time they want to throw away their junks food; for example , they put two different colors of bins , one yellow and one blue, then they put their E-waste in a yellow trash bin and the rest in the blue one .This method seems to be simple, but it is helpful and can be desirable in a collecting system ,so it is obvious that, they do not follow any special rules and policy regarding their E-waste. It will be useful if they use different trash bins with different colors to help the collectors to collect in a proper manner of management .In addition , in a survey questionnaire, respondents indicated, that if the technology of the receiving country is better than that of Malaysia, E-waste could be exported to other countries, they revealed some of the problems faced by the government in managing E-waste, as lack of expertise, absence of ultramodern recycling plants, lack of public awareness, insufficient collecting facilities, inadequate finance and the problem of actual data of E-waste generation at the commercial level. Additionally, relying on the literatures is one of the major drawbacks of the Malaysian Laws, it shows that there are no regulation for electronic and electronically waste management, which specialize the commercial buildings and the generators in comparison with the developing countries. Also, another weakness of the law is the inexperienced staff and financial issues. DOE needs to be supported by other government agencies (Lau, 2004) [9]. Based on the in-depth study of literature review, the combination of E-waste management systems is useful to get the proper E-waste management in developing country, such as EU, US, Japan, It is not easy for Malaysia to adopt, but still practical. Results demonstrated that, combination of proper ways of managing of E-waste in European Union, US and Japan can be applied in Malaysia in the future. Moreover, positive action from the government will ensure and be sustainable for E-waste management. But, briefly, it can be assumed that there is no special environmental agency in Kuala Lumpur, Malaysia. There is only Department of Environment (DOE) that, its duty differs from the other developing countries, which are in charge of certain area, but the works are conducted on behalf of local authorities and different relevant agencies. Malaysian E-waste systems acquire several reforms, as the environmentally sound and regulated scientific processing of E-waste .To suit Malaysian scenario, further studies, considerations and research are reviewed to reform the policies, legislature and laws related to E-waste. Management of E-waste, if properly conducted, is a significant opportunity, as it is often called as "urban mining." The increasing rate of E-waste inventory is expected to trigger the expansion of E-waste collecting, transportation, treatment capacity, both in formal and informal sectors. It can be concluded that, current E-waste collection, transportation, treatment and disposal in Kuala Lumpur shops are inadequate, both in terms of capacity and environmentally sound management. The expansion of E-waste treatment is expected to remarkably enhance the E-waste toxicity. Following pictures will emphasized the result as well.

Figure 3. Illegal dumping of E-waste at the road side. (Source: author) & E-waste is mixed with other scrap at a scrap dealer storage yard. (Source: author)

The result of an open ended interview with DOE showed that Malaysia allows importation of used electronic and electrical equipment into the country for direct reuse. The date of manufacturing of such provided equipment should not be more than three years. The import action of E-waste for recovery or disposal is disallowed.

This policy is described under the "Guidelines for the Classification of Used Electrical and Electronic Equipment in Malaysia", published by the DOE in 2008. [8]

The foremost ordinary kinds of E-waste are cathode ray tubes (CRTs) and PCs (Nnorom, 2008) [10] . Moreover, the majority sorts of E-waste include abstruse hazardous materials, both in high and low values as Pb, Hg and plastics (Realff , 2004) [11] . Pb is one of the major elements in the glass of CRTs, that can be found in monitors (Macauley , 2003) [12] . Another component in many E-waste, is the printed wire boards (PWBs) which contains lead (Pb) and brominated flame retardants (BFRs) (Niu & Li, 2007)[13].

Malaysia allows importing used electronic and electrical apparatous into the country for direct salvaging,the date of manufacturing of which must not be more than three years. Importing of E-waste, for recovery or disposal is not allowed.This policy is explained in the "Guidelines for the Classification of Used Electrical and Electronic Equipment in Malaysia" ,published by the DOE in 2008[8] . Since, there are plenty recovery facilities established in Malaysia, to process and recover useful materials from E-waste, it is also the policy of the Government of Malaysia not to allow E-waste to be exported out of the country. Malaysia only allows the exportation of E-waste for recovery through overseas, if the local recovery facilities do not have competency and capacity to carry out such an activity.Contemplation for such an exportation will be based on case by case basis and the exportation of E-waste for final disposal is not allowed at all .

In a comparison with the survey questionnaire, respondents indicated that E-waste would be exported to other countries if the technology of the receiving country is better than that of Malaysia, thus revealed some of the problems the government is faced with in managing E-waste absence of expertise, lack of ultramodern recycling plants, lack of public awareness, insufficent assumed facilities, insufficient finance and the problem of actual data of E-waste generation at the commercial level.Voluntary use scheme of E-waste has not been implemented vastly by the producer or importer of electronic and electrical equipments , then a compulsory requirement of taking back scheme through legislation is required. A study is needed to be conducted on how to establish a taking back scheme of E-waste in Malaysia in the future.

4.2 E-waste Management: Malaysian Experience

E-waste practice in Malaysia is targeted towards the middle of the waste management hierarchy with a strong emphasis on recycling and material recovery processes to avoid disposal, but no attempt has been shown so far to achieve the most desirable option in waste management triangle (i.e., prevention of E-waste generation). Malaysian Government imposed a law (Environmental Quality Scheduled Wastes) Regulation 2005 [12] that is sourced domestically (from industries, business entities and institutes) and abroad (from local imports) to control the treatment of non-household E-waste in order to ensure that the process of E-waste recycling and material recovery are conducted in an environmental sound manner with minimal impacts to the environment and community. But, several main problems related to E-waste recycling and material recovery management strategy adopted in Malaysia include the influx of illegal import or smuggling of E-waste due to ineffective enforcement of law; rapid growth of locally generated E-waste due to the absence of prevention and minimization strategies; indiscriminate dumping and improper disposal of E-waste due to the lack of facilities provided and low awareness of the society and tracking down illegal E-waste recycling operators.(DOE,2011)[6].

Base on the current practices of E-waste management until June 2011, 152 E-waste recovery facilities are licensed by DOE; 132 facilities are "partial recovery" and another 20 facilities are "full recovery"; Products from

the partial recovery facilities are still considered as scheduled waste and need to be sent to the full recovery facilities; In general, E-waste from industries and commercial centers are properly collected and sent to the recovery facilities, however collection of E-waste from commercial buildings need to be improved; E-waste recovery facilities in Malaysia 155 E-waste recovery facilities in Malaysia with the total capacity to handle more than 24,000 metric ton of E-waste per month. 135 are partial recovery, small and medium size operators engaged in physical or manual segregation of E-waste for further processing. 20 full recovery facilities which can process the E-waste to recover the precious metals. (DOE, 2011) [6].

The provision for E-waste management in the EQA 1974 is found in Section 34B (Prohibition Against Placing, Deposit, etc. of Scheduled Waste) and in a subsidiary law (which was made under EQA 1974, called 'The Environmental Quality (Scheduled Waste) Regulation 2005').E-waste is categorized as scheduled waste in Malaysia. The administration and enforcement of laws on E-waste is recognized as the responsibility of a unit called as, the Hazardous Substances Division. This unit is supported by three other units under the DOE to prevent, control and reduce the pollution in Malaysia through administering and enforcement of Environmental Quality Act 1974 (EQA 1974) (www.doe.gov.my)[13] and also, the Strategic Communication Division pertaining to issues in order to elevate public awareness and education, the Environmental Institute of Malaysia (EIMAS)to train purposes and a Legal Unit to deal with legal matters and any prosecutions that might be brought under the law are the main functions of the DOE.

5. Discussion

Due to this complex composition of valuable and hazardous substances, specialized and often "high-tech" methods require to process E-waste through the methods that maximize resource recovery and minimize potential harm to human or the environment. Unfortunately, the use of such specialized methods is rare with much of the world's E-waste traveling far distances, mostly to developing countries, where crude techniques are often used to extract precious materials or recycle parts for further use.Such "backyard" techniques will pose dangers to poorly protected workers and their local natural environment. Moreover, they are very inefficient in terms of resource recovery, as recycling in these instances usually focuses on a few valuable elements ,such as, gold and copper (with often poor recycling yields), while most other metals are discarded and inevitably lost. In this respect, it may be demonstrated that, resource efficiency is another important dimension in E-waste discussion in addition to the ecological, human security, economic and social aspects.

5.1 Methods of Disposal

In 1990s, governments of the EU, Japan and some of the US states set up E-waste 'recycling' systems, whereas,a large member of countries did not have the capacity to deal with the sheer quantity of E-waste they have generated or with its hazardous nature.Therefore, they began exporting the issue to developing countries, where laws to protect workers and the environment are inadequate or is not enforced. It is also cheaper to 'recycle' waste in developing countries; the cost of glass-to-glass recycling of computer monitors in the U.S. is ten times more than in China.

Demand in Asia for electronic waste began to grow, when they found out that they could extract valuable substances, such as, copper, iron, silicon, nickel and gold during the recycling process in scrapyards. A cell phone, for instance , contains 19 percent copper and eight percent iron.

Almost two million tonnes of E-waste were landfilled in 2005, that is,while toxic materials comprise only a small amount of this volume, that does not take much lead or mercury to contaminate the soil of an area or water supply.One should keep this in mind, when deciding what to do with those old electronic devices.

5.1.1 Landfill

According to the US EPA [14] , more than 4.6 million tonnes of E-waste ended up in the U.S. landfills in 2000. Toxic chemicals in electronic products can leach into the land over time or are released into the atmosphere, impacting nearby communities and the environment.Regulation have been declared to prevent electronic waste being dumped in landfills due to its hazardous content in many European countries. However, the practice still continues in numerous countries. In Hong Kong, for example, it is estimated that 10-20 percent of discarded computers penetrate into landfill.

5.1.2 Incineration

This product releases heavy metals, such as lead, cadmium, mercury and also into the air . Mercury released into the atmosphere can bioaccumulate in the food chain, particularly in fish - the main route of exposure for the general public. If the products contain PVC plastic, highly toxic dioxins and furans are also released. Brominated flame retardants generate brominated dioxins and furans when E-waste is burnt.

5.1.3 Reusing

Increasing a product lifespan is a desirable method. Many old products are exported to developing countries. Although the benefits of reusing electronics in such a method are clear, the practice causes serious problems, because the old products are dumped after a short period of use in the areas that are having hazardous waste

facilities.

5.1.4 Recycling

Although recycling can be an appropriate way to reuse the raw materials in a product, the hazardous chemicals in E-waste can be harmful to workers in the recycling yards, as well as their neighboring communities and environment.

Electronics recycling is carried out particular built recycling plants under controlled conditions in developed countries, for example, in many EU states. In order to avoid brominated furans and dioxins being released into the atmosphere, plastics from E-waste are not recycled. However, such contacts are not available in developing countries. Recycling is conducted by hand in scrapyards, often by children.

5.1.5 Exportation

E-waste is routinely exported to developing countries by developed ones , often in violation of the international law. Inspections of 18 European seaports in 2005 found the amount of 47 percent of waste destined for export, including E-waste, which was illegal. In the UK , at least 23,000 metric tonnes of undeclared or 'grey' market electronic waste was illegally shipped to the Far East, India, Africa and China.It is estimated that, 50-80 percent of the waste collected for recycling is being exported in this way in the US. This practice is legal because, the US has not ratified the Basel Convention[15] .

5.2 Challenges on management of E-waste

There is no logical and strict legislative framework to determine the collection and disposal of E-waste generated from commercial buildings. In order to have a developed country, much more efforts are needed, so as to legislate on protection of the environment, particularlyl, lack of infrastructure for the collection of the end of life products, as well as, facilities to dispose such an environmentally sound manner in the EE sector .

Controling over raw materials, used in manufacturing is significantly important to reduce waste generation that is while , reduction of hazardous materials will ultimately lead to reduce of the waste generated quantity with the advent of inventory management. Production and related process modification will change production process, which will lead to reduction of waste generation. Improving operation and maintenance procedures, material change and process-equipment, modification, volume reduction, techniques used to diminish some areas of waste-stream volume are as follows:

Source segregation waste containing different types of metals can be treated separately to recover metal value.

Waste Concentration-Concentration of waste stream to increase recyclable and reusable material.

5.3 Recovery and Reuse

Waste can be recovered on-site, or off-site recovery facility or through industry exchange. Physical and chemical techniques, such as electrolysis, reverse osmosis and filtration could be used to reclaim a waste material. Metals, such as copper, in PCB manufacturing could be reclaimed using electrolytic recovery.

Many parts of discarded computers and television sets can be re-employed for newer products either in the same state or by passing through a revamping process. However, at present in many of the developing countries (even in developped countrires) there are no proper mechnism to collect the material in such a way that the stocks can be cassified and deliever to processing centres for re-using. Such mechanism will not only reduce the additon of waste into the surrounding but also increase the job opportunities to the public.

5.4 Sustainable Product Design

Products should be designed in such away that defected parts could be troubleshooted and replaced componentwise. However, in the modern world the trend is towards integration of all parts, thus addressing individual components at trouble shooting stage is almost impossible. The result is the discarding of a large part of an equipment or the equipment itself, which adds more burden into the waste mangement. However, it is advisable to reverse this trend up to some extent (considering cost constraints and physical factors) so that comoponents can be examined and replaced individually, in the future. However, note that integration of elctronics also has its own advantages such has greatly reducing the amount of material needed for a given task.

It is also recommended to design equipment powerd by rechargable batteries in place of disposable type whereever possible. That will considerably reduce the addition of heavy metals and acids into the nevironment.

It is also the hightime to look for a more environment friendly and less or no toxic replacement for lead as a soldering medium.

Following are the aother recommendations we make for sustainable eco-friendly producting

a. Designing products with less hazardous and less qauntities of materials: Eg: Reduce material for new computer design by flatter, lighter and more integrated components.
b. Use of renewable materials and energy: Eg. Biobased materials, as bioplastics made from plant-based polymers and the use of solar energy.
c. Use of no-renewable materials that are safer: Designers should ensure that such a product is manufactured for reuse, repair/or upgradability.
d. Use of bio-degradable materials in non-conducting parts of equipment: Eg. Biodegradable polymers for

equipment covers and PCB bases..

5.5 Policies of E-wastes

Malaysia does not allow importation of used electronic and electrical equipments into the country for direct reuse,unless the date of providing such equipment is not more than three years from the date of its manufacture. Also, the import of E-waste for recovery or disposal is disallowed.This policy is described under the "Guidelines for the Classification of Used Electrical and Electronic Equipment in Malaysia", published by the DOE in 2008. Since, there are already recovery facilities established to process and recover useful materials from E-waste in Malaysia , it is also the policy of the Malaysian Government not to allow E-waste to be exported out of the country. If the local recovery facilities do not have capability and capacity to carry out such activity , Malaysia will only allow the exportation of E-waste for recovery overseas. The E-waste generator/exporter must submit their proves, before DOE can allow E-waste to be exported.

6. Conclusion

The major problem of E-waste has forced the environmental agencies of many countries to innovate, develop and adopt environmentally sound options and strategies for E-waste management to mitigate and control the threat of E-waste to the environment and human health.In the other part of this study, it was explained that E-waste management is positioned on the top step of most developed ones . That is while, in some developing countries, such as Malaysia, it is complicated to completely adopt the exact E-waste management system as in developed countries,which is due to many country specific aspects, such as, socio-economic conditions, lack of infrastructure, absence of appropriate legislations for E-waste approach and commitments of the concerned electronic devices which consist a complex mixture of several hundred materials. Many of cell phones, Tvs , computers ,which are explained in previous sections, contain toxic heavy metals such as lead, mercury, cadmium , beryllium and hazardous chemicals, such as, brominated flame retardants. Also, polluting PVC plastic is frequently used. These dangerous substances cause serious pollution and face workers with the risk of exposure when the products are produced or disposed of. The exposure of children and pregnant women to lead and mercury is of particular concern . These metals are highly toxic and can hurt children and growing up fetuses even at low levels of exposure. Therefore , proper E-waste management is the foremost issue to protect the health of public and the environment. Suitable scheme on E-waste will improve the management of E-waste. Experience from other countries in implementing take back scheme is very useful. Exiting facilities for E-waste recovery will be able to support the scheme in Malaysia. Amalgamation with the increasing population and economic projections of growth and the volume of WEEE in Malaysia is going to rapidly enhance in the future and will require a concerted effort to properly manage the flow of WEEE. The management of WEEE must involve all stakeholders to avoid the environmental damage from unregulated processing of WEEE seen in some parts of the world. Governments in the EU, Japan and some US states set up E-waste 'recycling' systems. That is while a large number of countries did not have the capacity to deal with the sheer quantity of E-waste they have generated or with its hazardous nature. Therefore, they began exporting the issue to developing countries, where laws to protect workers and the environment are inadequate or not enforced.

Demand in Asia for electronic wastes began to grow when they found out that they could extract valuable substances, such as, copper, iron, silicon, nickel and gold during the recycling process from scrapyards.

Khaled (2010) [16] revealed that, storage, landfilling , immolation, opening and burning, elevation , salvage or recycling of E-waste are the most regular procedures that are used to control E-waste which are conducted in Malaysia nowadays, but still , such procedures have negative impact on human life and environment. According to the expense, the majority of people prefer not to squander their computers; they think that salvage would be averting harmful damage to the environment.Somehow, it is vivid that storage would be better than landfilling and stored computers should be refurbished. Reusing computer mostly is one of the complicated problems that the community are facing with nowadays. Computers in landfills are crushed by the weight of trashes and seperated in different components most of which are toxic to the environment. Thus, during those times, the toxins form the waste emanicipated not only into the soil, but also absorbed in the ground water beneath the landfill. Such amount of lead will be found in domestic, for instance,commercial buildings, industries debris draw out from computer monitors and TVs. Burning did not ruin most of the toxins and substances that were not ratify before this stage.While computers are dissected, they will be divided into different components, as circuit boards, hard drivers, monitor glass and plastic, then selling to business .But recycling E-waste can hurt to the involved party during recycling process.

To summarize, it can be assumed that there is no special environmental agency in Kuala Lumpur,Malaysia. There is only one Department of Environment (DOE), duty of which differs from the other developing countries, which they are in charge of certain area, but the works are conducted on behalf of the local authorites and different relevant agencies.Malaysian E-waste system aquires numerous reforms as the environmentally sound and regulated scientific processing of E-waste.Further studies and considerations are obtained to reform the

policies, legislature and laws related to E-waste to suit the Malayisan scenario. Management of E-waste, if properly conducted, is a great opportunity, as it is often called as,"urban mining." The increasing rate of E-waste inventory is expected to trigger expansion of E-waste collection, transportation, treatment capacity, both in formal and informal sectors. It can be concluded that, current E-waste collection, transportation, treatment and disposal in Kuala Lumpur shops are inadequate, both in terms of capacity and environmentally sound management. The expansion of E-waste treatment is expected to remarkably enhance the E-waste toxicity.

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First Author :Arameh Askari ,Iranian ,born in Iran in 21th of September in 1984. She had get her bachelor in plant pathology in Open University Shiraz (Fars) Iran in 2008 .Then she got her MSC from university of Putra Malaysia(UPM) at Kuala Lumpur Malaysia in 2012 in environmental management and following her PhD in the same University UPM in environmental planning and management field .She started her PhD in the end of 2012 and now she is continuing her education in Faculty of Environmental Studies Universiti Putra Malaysia 43400 UPM Serdang Selangor malaysia

Second author: Azadeh Ghadimzade ,
Third author: Dr. Chandima Gomes Associate Professor (Electrical Engineering), Centre of Excellence on Lightning Protection (CELP).University Putra Malaysia.Department of Electrical & Electronics Engineering .43400 Serdang, Selangor, Malaysia