



Household E-Waste Management Systems [E-Wms] in Malaysia

Ali NEH* and Talmizi NM

Department of Built Environment Studies & Technology, Malaysia

*Corresponding author: Nor Eeda Haji Ali, University Teknologi MARA Perak Branch, Seri Iskandar Campus, 32610, Perak, Malaysia, Email: noree038@uitm.edu.my

Editorial

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Editorial

E-waste is becoming a global environmental issue especially in most developing countries where there are weak solid waste management policies and programs. In the developed countries, progress has been made in addressing the environmental and health challenges associated with e-waste through enactment of laws and regulations guiding disposal and recycling of e-waste. The concern on e-waste management stems from the high demand of electrical and electronic equipment in the last five decades propelled by the information and communication technology (ICT) revolution and rising income among households. Virtually everything man does today depends on ICT, which may require personal computers, mobile phones, I-pad, television sets, radio, electrical boards among others. Also rising household income has made it possible for people to easily discard their old electronic and electrical appliances and replace them with new ones. E-waste is categorised as a hazardous solid waste stream due to the presence of toxic metals (e.g. lead in cathode ray tubes or CRTs, batteries and printed circuit boards (PCBs), mercury and cadmium containing parts and chemicals, such as halogenated flame retardants (e.g. plastic fraction) [1,2]. Uncontrolled disposal of e-waste can be harmful to human health and the environment because e-waste contains toxic substances and heavy metals. However, if there is proper management of e-waste, it could be a source of income generation with high returns, as it contains valuable materials such as gold, silver, platinum and palladium [3]. In the Malaysian context, e-waste is defined as “waste from electrical and electronics assembling components such as accumulators, mercury-switches, glass from cathode-ray tubes and other activated glass or polychlorinated biphenyl capacitors, or contaminated cadmium, mercury, lead, nickel, chromium, copper, lithium, silver, manganese or polychlorinated biphenyl” [4]. It is categorised as a scheduled waste, under the Code SW110

(First Schedule, Environmental Quality (scheduled wastes) Regulations 2005. According to Ismail, et al. [5], management of e-waste in Malaysia is still at the infancy stage and only began in 2005. Although there are strategies for e-waste management in Malaysia, they do not adequately guide households, or consumers and the municipal authorities on how e-waste should be managed, reused, recycled, or disposed [6]. Household e-waste management system (E-WMS) is an issue in Malaysia. According to report by the Department of Environment [5], Malaysia will generate 24.5 million units of e-waste in 2025, as illustrated in Figure 1. As could be seen from the breakdown in Figure 1, the highest volume of e-waste is generated from old mobile phones followed by personal computer, television, air conditioner and refrigerator. With such volume of e-waste generated by households, it important that a system be put in place for e-waste management. The high demand for electronic and electrical equipment among Malaysians have been adduced as the major cause in the rise of e-waste generation over the years [7]. Another factor that has been attributed to the high volume of e-waste is the very fact that Malaysia, is an attractive country for illegal dumping of e-waste [8].



Figure 1: Forecast of e-waste generation in Malaysia 2016-2025.

Source: Department of Environment Malaysia 2022b



In today's technology-based world, where electronic equipment is on the rise, e-waste management systems have become a critical problem which can affect human health and the environment. However, the E-WMS in Malaysia can be considered poor and disorganized due to improper management. The population of Malaysia is projected to reach 37.4 million by 2030 as urbanization continues [1]. This rise in population growth, coupled with economic growth and industrialization could lead to an uncontrolled municipal solid waste (MSW) generation [9]. E-WMS management system in Malaysia is inadequate in terms of capacity and environmentally sound management [10]. Good E-WMS encompasses collection, separation, recycling and final disposal. Despite establishing numerous material recovery facilities (MRF), Malaysia still has serious problems handling the growing volume of e-waste generated [11]. Currently in Malaysia, e-waste handling in the recovery facilities is done under unsafe treatment methods that pose serious environmental challenge. Due to inadequate infrastructure, there is poor recovery of e-waste in Malaysia [12]. Majority of the recycling and recovery activities in Malaysia are undertaken by informal parties that lack skills and capacity for proper storage, recycle, recovery and disposal facilities, which lead to loss of many valuable materials from e-waste during the process [13]. For example, informal recycling procedures involves breaking down of electronic equipment to separate reusable components and recovering valuable metals such as plastic, iron, aluminum, copper using crude techniques [2]. There is also the issue of burning the electrical boards in search of metals such as copper, silver and iron by the scavengers in the informal sector which leads to pollution of the environment with toxic compounds. Aside the infrastructural challenge, another major issue on household E-WMS in Malaysia is knowledge and attitude of the citizens. Studies have shown that knowledge and attitude of Malaysian citizens towards e-waste management is low [14]. Again, absence of a formal framework for disposing and dismantling e-waste in Malaysia has resulted to some health problems in the immediate communities [15]. To address some of the problems confronting E-WMS in Malaysia, Yong, et al. [16] suggested that the DOE and The National Solid Waste Management Department (JPSPN) can formally collaborate to create mandatory e-waste collection by state and local authorities which will send the sorted e-waste fraction to recovery facilities licensed by the DOE. The environmental effect of improper e-waste management in Malaysia manifests in the form soil, water and air pollution. To strengthen e-waste management in Malaysia, there should both infrastructural investment and social orientation or awareness among the citizens. In this regard, the bottom-up approach should be adopted in policies and guidelines related to e-waste management in the country. What this implies is that policies on e-waste management should incorporate effective household participation as the foundation of the

whole process. This is necessary because government's investments on waste management infrastructure alone, without household's participation will not yield the desired result. For households to actively participate in the e-waste management system, there is the need for media awareness campaign on radio and television to enlighten the public on the dangers inherent in improper e-waste handling and disposal. Most households do not know that materials from e-waste such as old batteries from phones and computers contain poisonous metals like lead, beryllium and cadmium. Another issue that the government must find a lasting solution to is the shipment of e-waste from other countries to Malaysia. The country is regarded by many as the "dumping ground for e-waste in the region". The dumping of e-waste in the country from other nations is made possible through collaboration with some local businessmen, who see it as means of enriching themselves, without minding the environmental and health consequences. Thus, government should beef up security along the waterways to stop this illegal act of e-waste shipment into Malaysia. Again, there should be a law banning the importation of e-waste into the country and any individual or organization that flouts the law should be sanctioned accordingly to serve as a deterrent [17-22].

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