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Judul: **STUDY ON RECYCLING PROGRAMS IN KUCHING**

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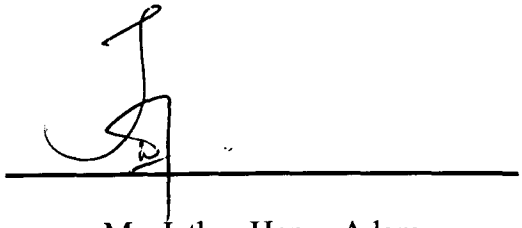

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STUDY ON RECYCLING PROGRAMS IN KUCHING

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"Dedicated to my beloved family and friends..."

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Abstract

Nowadays, there is an increase of the generation of waste materials. This will diminish the life of landfills area. Thus, one of the possible solutions for this matter is by implementing recycling program which will eventually reduce the amount of waste materials. This study focuses on the method recycling program available in Kuching area. Through this method, the community will be able to recognize recyclable items. There are two types of recycling programs could be identify from the Local Councils (MBKS and DBKU) such as school recycling program and awareness program (exhibition, campaign and talk) . Others recycling program that organize both of Local Councils are 'Buy Back' program and 'Green Barter Trade'. Buy Back program is a recycling program conducted by MBKS which use the concept coupon-based redemption system while DBKU introduce the Green Barter Trade as a program where recyclable material can be exchange with the recycled products. Besides that, MBKS and DBKU provide the recycling program centre under their areas to collect the recyclable items such as papers, plastic and aluminum can. All the data that has been collected from MBKS and DBKU has been analyzed. The comparison of recycling program method used by both councils in implementing their recycling program is recognized. Consequently, it can be concluded that MBKS is the most effectiveness method of recycling program because they are conducted that program actively based on their promoting recycling program.

Abstrak

Semakin hari jumlah sampah yang dibuang semakin meningkat. Ini akan mengakibatkan berlakunya kekurangan tempat pelupusan terutamanya bandaraya yang semakin pesat membangun. Oleh yang demikian, program kitar semula adalah salah satu cara yang telah dijalankan bagi membantu pengurangan sampah. Projek ini merupakan kajian tentang kaedah program kitar semula yang dijalankan di sekitar Kuching. Melalui kaedah ini, masyarakat dapat mengenal pasti bahan kitar semula yang dapat dikumpul. Majlis Perbandaran Tempatan (MBKS dan DBKU) diberi tanggungjawab untuk menjalankan aktiviti program kitar semula dan antara aktiviti-aktiviti yang telah dijalankan adalah program kitar semula di sekolah dan program kesedaran di kalangan masyarakat (pameran, kempen dan ceramah). Selain itu, program seperti 'Buy Back' centre yang dijalankan oleh MBKS merupakan program yang menggunakan konsep kupon sebagai pertukaran keperluan rumah manakala DBKU pula memperkenalkan program 'Green Barter Trade' melalui kaedah pertukaran dengan barangan kitar semula daripada jumlah bahan kitar semula. Di samping itu, MBKS dan DBKU telah menyediakan kemudahan pusat kitar semula di kawasan masing-masing seperti kertas, plastik dan tin aluminum sebagai tempat pengumpulan. Semua data yang diperolehi dari MBKS dan DBKU telah dianalisis. Perbezaan kaedah program kitar semula yang digunakan di antara kedua-dua Majlis Perbandaran Tempatan dapat di kenalpasti. Kesimpulannya, kaedah program kitar semula yang dilakukan oleh MBKS paling efisien kerana program ini bergiat dengan aktif dalam promosi berbanding DBKU.

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ABBREVIATIONS

B/W	-	Black or White
CPU	-	Computer Processor Unit
DBKU	-	Dewan Bandaraya Kuching Utara
HDPE	-	High-density polyethylene
ISWM	-	Integrated solid waste management
kg	-	kilogram
km^2	-	kilometer
Kpg	-	Kampung
KPKT	-	Kementerian Perumahan dan Kerajaan Tempatan
LDPE	-	Low-density polyethylene4
MBKS	-	Majlis Bandaraya Kuching Selatan
MP	-	Mixed Paper
MSW	-	Municipal Solid Waste
NREB	-	Natural Resources and Environmental Board
OCC	-	Old Corrugated Carton Box
ONP	-	Old Newspaper
P.E.T.E	-	Polyethylene terephtalate
PP	-	Polyproplene5
PVC	-	Vinyl/polyvinyl chloride3
RORO	-	roll on roll off
SK	-	Sekolah Kebangsaan
SMK	-	Sekolah Menengah Kebangsaan

CHAPTER 1

INTRODUCTION

1.0 General

Malaysia is among the country that has a high rate of waste generation. Each Malaysian throws away about 0.8 kg of waste daily. Our country generates more than 15,000 tonnes of waste every day. If we put them all together, we have enough waste to fill up the KL Twin Towers in just 9.5 days. In fact, the amount of waste is expected to increase by 2% every year, depending on our population, economic activity and waste disposal methods (Kementerian Perumahan dan Kerajaan Tempatan (KPKT), 2005). All of this must be prevented before it became more aware to society and environmental life.

Solid waste can be define as the discarded material from municipal, industrial and agricultural activities(Kaseva M.E & Gupta S.K.,1996).It means waste that is produce by human activities product. The waste we generate must go through a disposal process and the usual method is via landfills and incinerators. It also includes

composting as the smaller methods through disposal process. There are also illegal ways of waste disposal such as illegal ways of waste disposal such as open burning and some people dump their waste into rivers and prohibited areas. However, majority of the waste goes to the open and sanitary landfills.

Open landfills are not equipped to protect the environment from pollution. Sanitary landfills, on the other hand, have facilities to minimize pollution. One of them is a treatment panel for leachate (liquid waste) to avoid it from contaminating our water supply. They also have protective layers to prevent leachate from leaking out of the site.

Solid waste management is a complex process because it involves many technologies and disciplines. These include technologies associated with the control of generation, handling, storage, collection, transfer, transportation, processing and disposal of solid wastes. All of these processes must be carried out within existing legal and guidelines to protect the public health and the environment and also aesthetically and economically accepted able.

Integrated solid waste management (ISWM) can be defined as the selection and application of suitable techniques, technologies and management programs to achieve specific waste management objectives and goals (Tchobanoglous G., Theisen H. & Vigil S.A., 1993). Figure 1.0 shows the solid waste management hierarchy such as waste minimization, re-use, material recycling including composting, energy

recovery, incineration (without energy recovery) and landfill. White P.R., Franke M. & Hindle P. (1995)

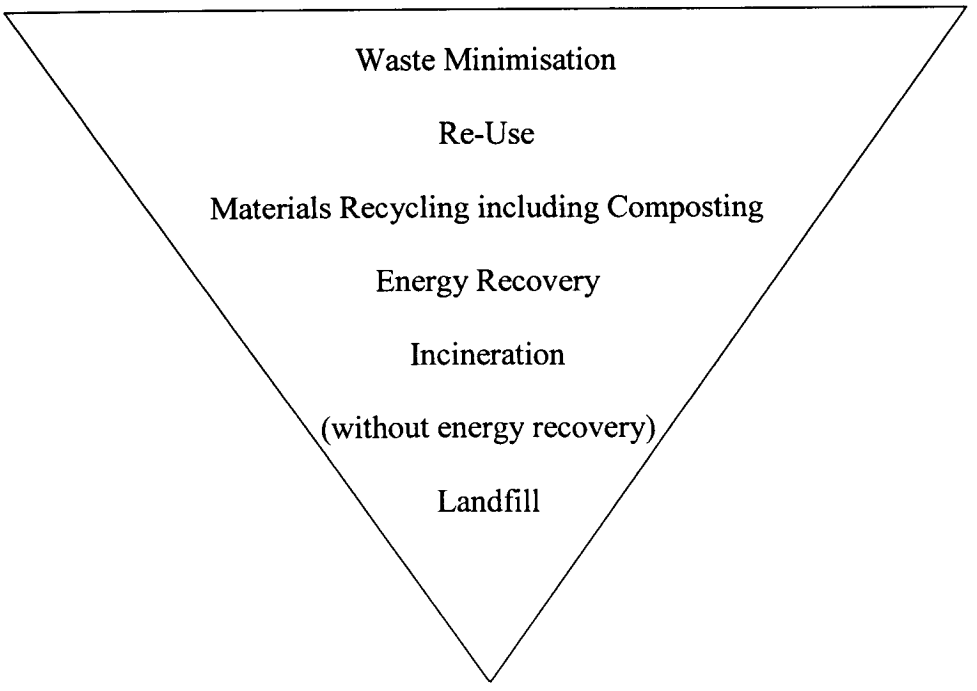

Figure 1.0 A hierarchy of Solid Waste Management. Source: *White P.R., Franke M. & Hindle P., (1995)*

In Malaysia, we have about 230 landfills where 90% are open landfills and the remaining 10% are sanitary landfills. About 80% of these landfills are about to expire two years from now (KPKT, 2005). When this happens, where will our ever-increasing waste go? Are we willing to let waste encroach our homes and affect our quality of life?

Consequently, the society is trying to find a better method of managing solid waste material by reducing the amount of waste thrown to be disposal. Recycling program is one of the best systems discovered by a group of environmentalist today in managing solid waste disposal.

1.1 Recycling Program

In conjunction with limited resources and landfill, recycling is considered the best way to minimize the clearing of landfill. Recycling means solid or scrap waste that goes through manufacturing processes which transform them into another product or the same product (KPKT, 2005)."Recycling means separating, collecting, processing, marketing and ultimately using a material that was thrown away"(Duston T.E ,1993). It means all the solid waste material had to go steps such as separating, collecting, processing and marketing and ultimately before it can be reuse through manufacturing processes. On the other hand, through this manufacturing process the solid waste material will be transform into another new product or the same product. For example, used paper can be processed into new paper or boxes. Like wise with glass, plastic, aluminum and steel, cans and others.

Recycling programs offer to towns, hospital, businesses, office buildings, schools and other institutions and any other producer of solid waste an opportunity to reduce disposal costs and do something good for environment. This recycling

program is an activity that involves the community. This program is to conserve natural resources and protect the environment for example school recycling program or awareness program.

1.2 Objective

The aim of this project is to study the recycling program available in Kuching. From the study of recycling program, the best method to ensure the effectiveness is identified. The objectives of this research are:

a) To compare the method use in recycling program conducted by local councils in Kuching.

b) To identified which local council promote the most effective method in recycling in Kuching.

CHAPTER 2

LITERATURE REVIEW

2.0 Solid Waste

Solid waste is any solid material in the material flow pattern that is rejected by society (Pfeffer, 1992). Just like a flowing stream of water, food, paper and plastics waste as well as thousands of other items, are constantly on the move. A stream of water ultimately flows into rivers, lakes and oceans. Solid waste ultimately flows on, in or above the earth for disposal.

2.1 Solid Waste Sources

Solid waste sources divided into five categories such as domestic/residential solid waste, commercial and institutional solid waste, municipal solid waste, industrial solid waste and agricultural residues. Domestic/residential solid waste would be category as the rejected solid material that originates from single and

multifamily household units such as garbage, rubbish/trash, ashes and bulky waste. For commercial and institutional solid waste, the refuse that originates from offices, banks, retail stores, restaurants, schools, hospitals and others. There are two additional categories that are associated with the commercial and institutional wastes like construction and demolition waste and special wastes.

Meanwhile for municipal solid waste would be found from street refuse, dead animals, abandoned vehicles, water and sewage plant residues, park and beach refuse and landscape waste. This solid waste has as same as in domestic/residential solid waste but different type of place. Industrial solid wastes have two general sources of refuse generated at industrial sites, the commercial/institutional component and the process solid waste. The refuse from the agricultural residues would be found at confined animal feeding and crop residues.

2.2 Solid Waste Management

Solid waste management involves into many technologies associated with the control of generation, handling, storage, collection, transfer, transportation, processing and disposal of solid wastes. All this processes have their own operation. The best principles of solid waste management manner as public health, economics, engineering, conservation, aesthetics, and other environmental consideration and also that responsive public attitudes.

Solid waste management also includes all administrative, financial, legal, planning and engineering functions involved in solutions to all problems of solid wastes. The solutions may involve complex interdisciplinary relationships among such fields as political science, city and regional planning, geography, economics, public health, sociology, demography, communications and conservation, as well as engineering and materials science (Tchobanoglous G., Theisen H. & Vigil S.A , 1993).

2.3 Integrated Solid Waste Management (ISWM)

Integrated solid waste management is managed through four ways which are source reduction, recycling or composting, waste transformation and lanfilling. According to Rainbow (1994), integrated waste management should be supported through national and plans within which energy recycling should play a key role.

2.3.0 Source Reduction

Source reduction is the highest rank of the ISWM hierarchy where it involves reducing the amount and/or toxicity of the wastes. It is the first in hierarchy because the most effective way to reduce the quantity of waste, the cost associated with its handling and its environmental impacts. Waste reduction may occur through the