

## **CHAPTER 1**

### **INTRODUCTION**

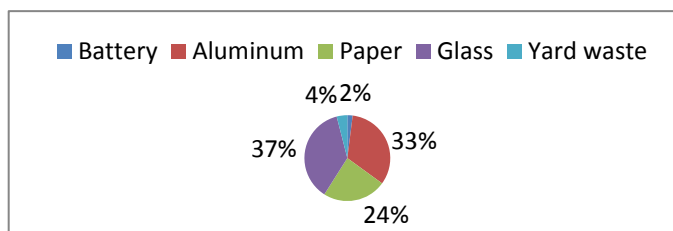
#### **1.1 INTRODUCTION**

Glass is an ideal material for recycling and in some cases can be used repeatedly without any deterioration in its physical properties. In recent years, the demand for glass bottle containers is increasing resulting increase in the desirability of recycling glass. With all markets, pressure from demand can only fulfill and effective if the processors can ensure that using recycled materials meet their customers' quality requirements. Furthermore, the type of glass available for recycling is not always the type most demanded by the end market. The development of new and alternative markets for recycled glass has further contributed to the development of new technologies.

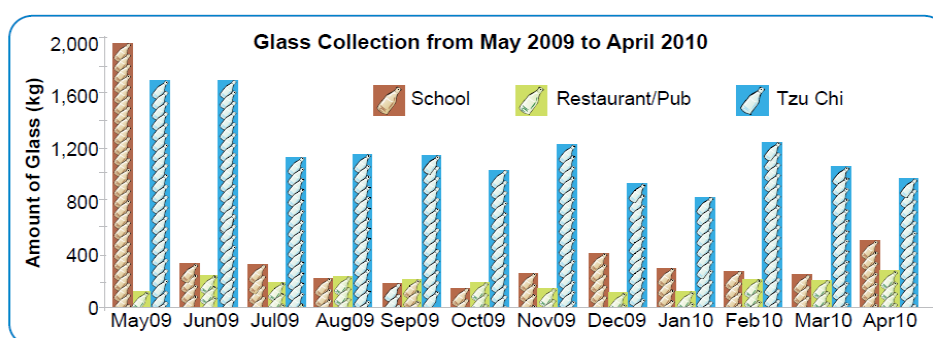
In Kuantan glass is the most recycled household items based on the data given by Kuantan Municipal Council (MPK) (Figure 1.1). Figure 1.2 shows the amount of glass collected at MPK Glass Collection centre (Glass recycling program) per month from May 2009 to April 2010. Based on the figure 1.2 the glass collected at the residential area is the highest followed by schools and then restaurant/hotels. Glass recycling awareness in Kuantan is still low. Many of the used glass bottle end up at landfill or Alam Flora rubbish tank. All the glass that ended at Alam Flora or land fill will be contaminated and are not suitable to recycle as glass container or glass bottle.

Mixed glass cannot be used to make new containers because colour purity is essential. It must go to alternative uses such as a road laying material; glasphalt. Glasphalt contains about 30% recycled glass and it has been estimated that

approximately 14 million used glass bottles is made for Other uses include fibre glass manufacture and material wool insulation.



**Figure 1.1:** Recycled household item in Kuantan

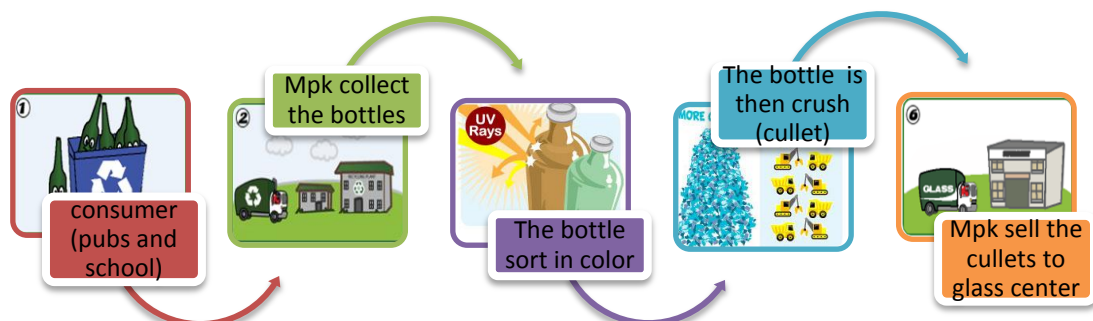


**Figure 1.2:** Glass collection from May 2009 to April 2010

Based on the Figure 1.2, 20 tonnes of glass were being collected throughout the programme or 1.7 tonnes of glass is collected per month for this programme. Recently, in 2011 the amount of glass collected by the MPK Glass Collection Centre is continue to drop drastically especially from schools and residential area. The purpose of this project is to maximize the amount of glass bottle collection through optimizing a new design system of collection in the supply chain (consumer, Municipal council and recycling agents) that is more efficient. This system will ensures that, glass bottles will not be wasted at landfill or Alam Flora rubbish tank which will lead to contamination to the glass and will prohibit the glass from being recycled to glass container such as bottles.

Figure 1.3 shows the flow of conventional glass bottle collection system done by municipal council (MPK). Consumers such as pubs, school and residential area

collected their used bottle glass in provided bin, then MPK lorry comes to pick the provided bins to the customer every once a week. The collected glass bottle is placed in a container and then is crushed for recycling purposes. Consumer voluntarily recycles the bottle without gaining any reward for them. Based on previous study done by Mr Perwira Putra Bin Iskandar, he had confirm by the survey that reward mechanism system is needed in order to promote recycling glass. Figure 1.4 shows the total of respondents are prefer to have reward as a great motivation for recycling glass.



**Figure 1.3 :** MPK conventional glass bottle collection system



**Figure 1.4 :** Reward is great motivation for recycling