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(ENT600)**

**BLUEPRINT OF PROPOSED PROJECT TITLE:
REVERSE & REWARD VENDING MACHINE (R²VM)**

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CHAPTER 1

PRODUCT DESCRIPTION

1.1 Introduction

The plastics industry has developed considerably since the invention of various routes for the production of polymers from petrochemical sources. Plastics have substantial benefits in terms of their low weight, durability and lower cost relative to many other material types (Andrady & Neal 2009; Thompson et al. 2009a). Worldwide polymer production was estimated to be 260 million metric tonnes per annum in the year 2007 for all polymers including thermoplastics, thermoset plastics, adhesives and coatings, but not synthetic fibres (PlasticsEurope 2008b). This indicates a historical growth rate of about 9 per cent p.a. Thermoplastic resins constitute around two-thirds of this production and their usage is growing at about 5 per cent p.a. globally (Andrady 2003).

Today, plastics are almost completely derived from petrochemicals produced from fossil oil and gas. Around 4 per cent of annual petroleum production is converted directly into plastics from petrochemical feedstock (British Plastics Federation 2008). As the manufacture of plastics also requires energy, its production is responsible for the consumption of a similar additional quantity of fossil fuels.

Approximately 50 per cent of plastics are used for single-use disposable applications, such as packaging, agricultural films and disposable consumer items, between 20 and 25% for long-term infrastructure such as pipes, cable coatings and structural materials, and the remainder for durable consumer applications with intermediate lifespan, such as in electronic goods, furniture, vehicles, etc. Post-consumer plastic waste generation across the European Union (EU) was 24.6 million tonnes in 2007 (PlasticsEurope 2008b).

Recycling is clearly a waste-management strategy, but it can also be seen as one current example of implementing the concept of industrial ecology, whereas in a natural ecosystem there are no wastes but only products (Frosch & Gallopoulos 1989; McDonough & Braungart 2002). Recycling of plastics is one method for reducing environmental impact and resource depletion. Fundamentally, high levels of recycling, as with reduction in use, reuse and repair or re-manufacturing can allow for a given level of product service with lower material inputs than would otherwise be required. Recycling can therefore decrease energy and material usage per unit of output and so yield improved eco-efficiency (WBCSD 2000). Although, it should be noted that the ability to maintain whatever residual level of material input, plus the energy inputs and the effects of external impacts on ecosystems will decide the ultimate sustainability of the overall system.

1.2 Purpose of Development

Due to the importance of recycling in overcome the current delinquent of plastic waste, Reverse & Reward Vending Machine (R²VM) were engineered to facilitate the movement and goals toward recycling. R²VM placed in strategic location with the higher rate of plastic bottled produced and reward its user such as housing areas, education facilities, shopping malls, bus stops, airports, railway stations, worship buildings, healthcare facilities, *tamu*, and sport matches' arenas. This machine are expected to increase the concept of recycling in everywhere, thus reducing the increases demand of new landfill to dispose there plastic waste.

1.3 Product Concept

- Vending machine that accept used plastic bottle;
- Rewarding its user; and
- Convenient to be used anywhere as it is power up with two type of energy sources.