



## IS HOUSEBUYERS TOWARD RECYCLE CONSTRUCTION MATERIALS

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### ABSTRACT:

The use of recycled construction materials is one of the important parts of green building design specifications. Equally important is the way construction wastes can be reused in construction projects to reduce costs and encourage sustainable use of raw materials. Recycled construction materials can help to reduce air pollution, promote less use of natural resources, and reduce the construction cost in building houses. The respondents in this study are potential house buyers attending a property fair in Sungai Petani, Kedah in June 2008. In all, 208 respondents were involved in this research. The results indicate that the housebuyers in Sungai Petani have a high tendency in recycling used building material for their new houses to save money. A few of them are not sure about recycling the construction materials because of perceived durability issues.

### KEYWORDS:

Green building, recycling material, house buyers.

## 1. INTRODUCTION

Nowadays people have more understanding of the needs to recycle used materials to conserve the environment. Recycling of materials was first documented in the 1790s, and it gradually became a force during the early 1990 (Anderson & Brodin 2005). Despite the efforts made by many governments to promote and increase recycling activities, Blengini (2009) noted that one of the most challenging issues now among policy-makers and public administrators is to decide how to dispose of waste materials from building dismantling activities. The picture does not look rosy – the latest count made by APAT (2005) put the wastes at 40 million tons per year.

In the green building concept, the recycling of construction materials is central to its success. Alamenda County (2002) demonstrated that the recycling and reuse of construction materials could help to save natural resources. Project development must involve the efficient allocation of resources, minimum energy consumption, low embodied energy intensity in building materials, reuse and recycling, and other mechanisms to achieve effective and efficient short- and long-term use of natural resources (Ding, 2008). Troschinetz and Mihelcic (2009), asserted that several technological means exist to divert solid waste typically destined for landfill, such as incineration with energy production, composting of organic wastes, and material recovery through recycling, all having the potential to be more sustainable methods by which to manage Municipal Solid Waste (MSW) than via landfill.

## 2. DEFINITION OF RECYCLING

It has often been said that recycle material determines the way we can use the waste material to become more beneficial and reduces the cost for new products. Recycled material is defined as portion of a product's material (expressed usually as a percentage of its total material content), recovered from pre- or post-consumer waste (Business Dictionary, 2009). Recycle material mean waste materials that are transformed into new products in such a manner that the original products may lose their identity (Omegawiki 2009). Other definition of recycle is to collect and treat (rubbish to produce useful materials which can be used again (Cambridge International Dictionary of English, 1995).

## 3. TYPE OF RECYCLED MATERIAL

According to Pappu *et al.* (2007), in view of the importance of saving of energy and conservation of resources, efficient recycling of all these solid wastes is now a global concern requiring extensive

R&D work towards exploring newer applications and maximizing use of existing technologies for a sustainable and environmentally sound management. The effects from the growth of population, increasing urbanisation, and rising standards of living due to technological innovations have contributed to an increase both in the quantity and variety of solid wastes generated by industrial, mining, domestic and agricultural activities. Use of industrial wastes and by-products as an aggregate or raw material is of great practical significance for developing building material components as substitutes for the traditional materials and providing an alternative or supplementary materials to the housing industry in a cost effective manner.

Some solid wastes can be recycled and reused in the construction industry. Figure 1 shows the types and nature of solid wastes and their recycling and utilisation potentials. Pappu *et al.* 2007 contended that the new and alternative building construction materials were developed by using agro-industrial wastes.

Figure 1. Types and nature of solid wastes and their recycling and utilisation potentials

Sl. No.	Types of solid wastes	Sources details	Recycling and utilisation in building application
1.	Agro waste (organic nature)	Baggage, rice and wheat straw and husk, cotton stalk, saw mill waste, ground nut shell, banana stalk and jute, sisal and vegetable residues	Particle boards, insulation boards, wall panels, printing paper and corrugating medium, roofing sheets, fuel, binder, fibrous building panels, bricks, acid proof cement, coir fibre, reinforced composite, polymer composites, cement board
2.	Industrial wastes (inorganic)	Coal combustion residues, steel slag, bauxite red mud, construction debris	Cement, bricks, blocks, tiles, paint, aggregate, concrete, wood substitute products, ceramic products
3.	Mining/Mineral waste	Coal washeries waste, mining overburden waste tailing from iron, copper, zinc, gold, aluminium industries	Bricks, tiles, lightweight aggregates, fuel
4.	Non hazardous other process waste	Waste gypsum, lime sludge, lime stone waste, marble processing residues, broken glass and ceramics, kiln dust	Gypsum plaster, fibrous gypsum boards, bricks, blocks, cement clinker, super sulfate cement, hydraulic binder
5.	Hazardous waste	Metallurgical residues, galvanised waste, tannery waste	Cement, bricks, tiles, ceramics and board

Resources: Pappu *et al.* (2007).

According to Wilson and Araba (2009), ‘informal sector’ recycling tends to sit uneasily alongside formal, ‘modern’ waste management systems. From the time when local authorities were given legal responsibility to provide regular waste collection systems, motivated by the links between poor sanitation and infectious disease in the second half of the 19<sup>th</sup> century, the new formal systems gradually displaced existing informal sector recycling systems across Europe and North America. Waste management system very import to support recycling and utilisation group of people.

#### 4. CONSUMER BEHAVIOUR

Consumer’s behaviour is central to the success of any recycling and utilisation activities. The government can only do thus much, but the final determinant would need to come from the consumers. In this research, age and gender of the respondents are the important variables in determining the attitude of house buyers to recycled materials. Barr and Gilg (2006), said these factors have been conceptually developed over almost 40 years of research by social-psychologists and sociologist and can be categorized into: the situational circumstances in which individual are placed (including social-demographic situation) the socio-environmental values individual hold and attitudes towards specific behaviors. According to Blenggini (2009), in order to achieve the best environmental solution and to define the right proportion between the natural and recycled raw materials that are necessary for the economic and social development of mankind, all life cycle phases, from-cradle-to-grave, must be considered. Only with such an approach is it possible to establish whether mankind is currently over-exploiting natural raw materials and energy resources or, on the other hand, is pursuing a dream of full recycling that cause secondary materials to be more environmentally harmful than the corresponding primary materials.

Sterner and Bartelings (1998) found that although economic incentives are important to promote recycling, they are not the driving force behind the observed reduction of waste. It was suggested that given proper infrastructure to facilitate recycling, consumers are willing to participate more than purely by saving on their waste management expenses. There are many alternatives to make people become more environmentally friendly, as suggested by Jensen (2008) who maintained that campaigns have encouraged people for example to turn off the light when it is not being used, to buy energy saving bulbs, to take the bicycle to the baker on Sundays, and most recently to reduce the stand-by consumption. All of these things are often referred to as “green lifestyle”, “environmental awareness” or “good energy behaviour”.

### 5. AGE

Definition of the age is the period of time someone has been alive or something has existed (Cambridge International Dictionary of English, 1995). Most people change their attitude and behaviour by following the progression of their age. According to Straughan and Robert (1999), younger individuals are likely to be more sensitive to environmental issues and the most common explanation of this finding is that “since solutions to environmental problems often are view as threatening the existing social order, possibly requiring substantial changes in traditional values, habitual behaviors, and existing institutions... it is logical to expect youth to support environmental reform and accept pro environmental ideologies more readily than elders” (Van Lierre and Dunlap, 1980).

### 6. GENDER

Gender the most important thing to look different of view among the house buyer. According to Straughan, R.D & Roberts, J.A (1999), the typical profile given for green consumers -young, mid- to high-income, educated, urban women- is totally dependent upon demographic profiling. Cleveland *et al.* (2005) said pro-environment Behavior (PEB) typically focused on traditional demographic segmentation variables, such as age gender, income, marital status, social class and education.

Recent studies found that females tend be more ecologically conscious than men (Banerjee and McKeage, 1994). According to Balderjahn (1988), the relationship between environmentally conscious attitudes and the use of non-polluting products was more intensive among men than among women. This statements show that men more conscious than women in aspect of the environmentally.

### 7. METHODOLOGY

The survey was conducted during the property fair held from 5<sup>th</sup> June 2008 until 8<sup>th</sup> June 2008 in Central Square shopping complex at Sungai Petani, Kedah. Structured questionnaires were administered face-to-face to potential housebuyers attending the property fair. In all, 208 questionnaires were answered by the respondents.

### 8. RESULTS

Figure 2 shows the comparison between ages and recycle attitude of housebuyers in Sungai Petani. From table, 63% of the respondents agree and strongly agree to use recycled materials instead of new ones because they save money, natural resources and energy. Others 21% undecided and the remaining 16% disagree and strongly disagree to use recycled materials instead of new materials. Housebuyers aged between 25 to 29 years are the highest to agree and strongly agree. The percentage is about 14%. For elders respondents not many of them involved in this survey, just 7% above 50 years old involved. It could be seen that, 86% of those aged above 50 years old agree and strongly agree to use recycled.

Figure 2. Comparison between ages and the recycled attitude of the house buyer in Sungai Petani

Likert Scale	Age								
	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	Above 60
Strongly disagree	2	3	2	0	1	1	0	0	0
Disagree	10	5	4	2	2	0	1	0	0
Undecided	12	13	9	3	4	2	1	0	0
Agree	13	20	16	20	8	6	4	3	0
Strongly Agree	7	10	8	7	1	3	2	1	2
Total	44	51	39	32	16	12	8	4	2

Figure 3 shows the spread of opinions based on gender. Out of the 208 respondents, 130 respondents are male and 78 are female. The results indicate that, 68% male respondents agreed and strongly agreed with the recycling concept, whereas only 55% female respondents agreed or strongly agreed to it. About one-fifth (21%) of the respondents were undecided whether they want to recycle or not. Other than that, 16% respondents disagreed or strongly disagreed to use recycled materials instead of new materials. From this simple analysis, it is clear that, males are more likely to recycle than females.

Figure 3. Comparison between gender ages and the recycled attitude of the house buyer in Sungai Petani

Likert Scale	Gender		Total
	Male	Female	
Strongly disagree	5	4	9
Disagree	12	12	24
Undecided	25	19	44
Agree	60	30	90
Strongly Agree	28	13	41
Total	130	78	208

## 9. CONCLUSION

From this article, it can be concluded that house buyers in Sungai Petani are generally happy to use recycled materials instead of new materials because they believe it can help to save money, natural resources and energy. The findings of this research revealed that males are more likely to recycle materials than females. This is supported by the existing literatures that assert the tendency of males to recycle and support green initiatives than females. The findings also indicated that the younger generations are more likely to recycle than the older generations. Again, this finding is in line with existing literatures on recycling tendencies.

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