FACTORS AFFECTING ENERGY CONSERVATION BEHAVIOUR OF STUDENTS IN MALAYSIAN UNIVERSITIES

LOW SHEAU TING

UNIVERSITI TEKNOLOGI MALAYSIA

FACTORS AFFECTING ENERGY CONSERVATION BEHAVIOUR OF STUDENTS IN MALAYSIAN UNIVERSITIES

LOW SHEAU TING

A thesis submitted in fulfilment of the
requirements for the award of the degree of
Doctor of Philosophy (Facilities Management)

Faculty of Geoinformation and Real Estate
Universiti Teknologi Malaysia

SEPTEMBER 2012

For our children and their’ children

ACKNOWLEDGEMENTS

I owe my sincere gratitude and thanks to many people who come forward with their friendship, advice, and help to guide me through the journey. Firstly, my sincerest appreciation and thank to Professor Dr Abdul Hakim Mohammed for his insight, guidance, and encouragement while guiding me through the dissertation process. He is truly a gifted professional.

I am grateful to Sawtooth Software for the Student Grant awarded. I deeply thank Jefferson Forkner and Brian Orme, their outstanding consultation and assistance provided. Also, I sincerely appreciate Prof T. Ramayah, for all he taught me and advices on my work. Personal thank you to Universiti Teknologi Malaysia and Ministry of Higher Education of Malaysia for financially support my research. My research would not have been possible without their helps.

I was blessed to have the love and support of my family during this journey. My deepest appreciations go to Dad, Mum, both sisters, and brother-in-law for their endless patient, unending encouragement and support. Finally, I would like to thank my husband who was always stood by me through the good times and bad. I would never have been able to finish my dissertation without the support of them. Their many sacrifices and unceasing patient helped me to remain focused on my work and bring this journey to a successful completion.

I extend my heartfelt gratitude to all of these kind wonderful people.

ABSTRACT

This study focuses on promoting energy conservation using the behavioural approach. Globally, various energy issues such as the depletion of energy resources, degradation of the ecosystem, rise in energy prices, and increase in the world population, which lead to a higher energy demand, are causing a threat and leading to an unsustainable energy future. Among the immediate routes to minimize the adverse impacts of the energy threats and contribute to a sustainable energy future is the reduction of the energy consumption by promoting energy conservation behaviour. The scope of this study is Malaysian universities, which comprise thousands of building blocks equipped with massive facilities that consume a huge amount of energy. Three objectives to be achieved were established. The first objective is to propose key determinants and social marketing mix strategies to promote energy conservation behaviour. This is followed by the second objective of examining the causal relationship of the identified key determinants of energy conservation behaviour and the third objective of investigating the preferred combination of social marketing mix strategies to promote energy conservation behaviour. The first objective is achieved through the synthesis of theories and concepts in the literature review. For objective two and objective three, a questionnaire survey was conducted among students in five selected universities in Malaysia, which involved 2,000 respondents. The data collected for the second objective are analysed using structural equation modelling and the third objective is achieved using conjoint analysis. Three key determinants were found significant to predict energy conservation behaviour that are attitude, subjective norm, and perceived behavioural control. Choice-based conjoint analysis identified a mix of five social marketing strategies to promote energy conservation behaviour that are product, price, place, promotion, and post-purchase maintenance.

ABSTRAK

Kajian ini menumpu kepada menggalakkan penjimatan tenaga dengan menggunakan pendekatan tingkah laku. Di peringkat global, pelbagai isu tenaga seperti kehabisan sumber tenaga, kerosakan ekosistem, kenaikan harga tenaga, dan peningkatan populasi dunia, membawa kepada permintaan tenaga yang lebih tinggi, menyebabkan ancaman dan membawa kepada masa depan tenaga yang tidak lestari. Antara laluan segera untuk meminimumkan kesan buruk daripada ancaman tenaga dan menyumbang kepada masa depan tenaga yang mampan adalah pengurangan penggunaan tenaga dengan mempromosikan tingkah laku penjimatan tenaga. Skop kajian ini adalah universiti Malaysia, yang terdiri daripada beribu-ribu blok bangunan yang dilengkapi dengan kemudahan yang mengguna jumlah tenaga yang besar. Tiga objektif untuk dicapai telah ditetapkan. Objektif pertama adalah mencadangkan penentu-penentu utama dan strategi campuran pemasaran sosial untuk mempromosikan tingkah laku penjimatan tenaga. Ini diikuti dengan objektif kedua menguji hubungan sebab dan akibat penentu-penentu utama tingkah laku penjimatan tenaga yang dikenal pasti dan objektif ketiga untuk mengkaji kombinasi pilihan strategi campuran pemasaran sosial untuk menggalakkan tingkah laku penjimatan tenaga. Objektif pertama dicapai melalui sintesis teori dan konsep dalam kajian literatur. Bagi objektif dua dan objektif tiga, soal selidik telah dijalankan di kalangan lima buah universiti terpilih di Malaysia, yang melibatkan 2,000 responden. Data yang dikumpul untuk objektif kedua dianalisis menggunakan pemodelan persamaan struktur dan objektif ketiga dicapai dengan menggunakan analisis konjoin. Tiga penentu utama telah dikenalpasti berkesan untuk meramalkan tingkah laku penjimatan tenaga iaitu sikap, norma subjektif, dan persepsi kawalan tingkah laku. Analisis konjoin berdasar pilihan mengenalpasti lima strategi campuran pemasaran sosial untuk menggalakkan penjimatan tenaga iaitu produk, harga, tempat, promosi, dan penyelenggaraan selepas pembelian.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AGFI	Adjusted Goodness of Fit
AHP	Analytical Hierarchy Process
AMOS	Analysis of Moment Structures
ANP	Analytical Network Process
CB	Covariance Based
CBC	Choice-based Conjoint
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CMM	Commercial Marketing Mix
EFA	Exploratory Factor Analysis
GDP	Gross Domestic Product
GFI	Goodness of Fit
HB	Hierarchy Bayes
HIV	Human Immunodeficiency Virus
NFI	Normed Fit Index
NNFI	Non-normed Fit Index
PLS	Partial Least Squares
PMV	Program for Marketing Volunteering
RMSEA	Root Mean Square Error of Approximation
SEM	Structural Equation Modelling

SMM	Social Marketing Mix
SMRT	Sawtooth Software Market Research Tools
SPSS	Statistical Package for Social Sciences
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TTM	Transtheoretical Model
UM	Universiti Malaya
UKM	Universiti Kebangsaan Malaysia
UPM	Universiti Putra Malaysia
USM	Universiti Sains Malaysia
UTM	Universiti Teknologi Malaysia
VB	Variance Based
4Ps	Product, Price, Place and Promotion

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Introduction

This research focuses on energy conservation from the behavioural dimension. Pressure is mounting in the global community to act immediately to save the energy-exhausted planet. At present, the world is afflicted by critical energy problems, including the depletion of energy resources, energy security, climate change, as well as the degradation of the quality of the environment. The well-known report *Our common future* defines sustainable development as meeting the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987). In preserving global sustainability, the major challenge is derived from energy sustainability, for which the ever-rising energy demand must be reduced. A systematic review of the literature suggested that social marketing is an emerging method that can be incorporated into fostering energy conservation behaviour to reduce the energy demand significantly, therefore pursuing energy sustainability. Nevertheless, the research conducted in this area is very limited and scarce (Marcell *et al*., 2004). The absence of such research implies that it is important to study energy conservation behaviour incorporating the social marketing approach. Social marketing is among the effective approaches to fostering energy conservation behaviour, particularly from the energy user's point of interest (Marcell *et al*., 2004; Kotler *et al*., 2002). Considering that the process of human behavioural change is complex, a set of strategies is essential. This chapter highlights the energy issues as well as the rationale to conduct this study.

1.2 Background of the Study

The International Facilities Management Association defines facilities management as "a profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, process and technology". The four elements (people, place, process, and technology) play a central role in facilities management. The key function of facilities management is to integrate and manage all the available facilities and support services to support their core business in both the long and the short run (Chotipanich, 2004). Generally, the core business means the central or main activities of an organization, while the support services are those services that must be in place to support and ensure the functionality of the core business. For instance, the core business of a university is education and its support services include housekeeping, accommodation, property maintenance, energy management, and other non-core business activities.

Facilities management is not stand-alone but encompasses real estate management, safety and health management, environmental management, risk management, change management, value management, security management, energy management, and a broad range of disciplines. In an organization, a facilities manager is responsible for integrating the people, place, process, and technology within all the relevant disciplines. All the elements must be integrated appropriately and adequately to support the organization and ensure that it is able to perform well in its core businesses. Hence, it is important for facilities management professionals to be equipped with the knowledge and skills necessary to perform well in their integrated support role (Kincaid, 1994).

The intention of facilities management is to provide an effective and high-quality environment on a cost-effective basis (expending the fewest resources) in order to enhance organizational effectiveness (Atkin and Brooks, 2005; Leung *et al*., 2005). Here, facilities management professionals play a vital role in providing high-quality and high-performance facilities. To ensure facilities efficiency, energy performance, especially the energy cost, is one of the major areas to be observed and monitored closely. According to Payne (1980), "… when many costs are escalating and difficult to control, energy is often one area where effective savings can be made

and costs can be contained …". By reducing facilities' energy cost, organizations will be able to achieve a higher level of productivity and efficiency. Hence, energy management is undeniably essential in the facilities management cycle. Today, the responsibility of a facilities manager is not only limited to managing facilities and buildings, but also covers the management of energy and people (Choong *et al*., 2006). Geethanjali *et al.* (2007) describe energy management as "an essential focus of contemporary facilities management".

Broad ranges of definitions of energy management have been published historically. Henry *et al*. (1980) define energy management as "the strategy of adjusting and optimizing energy-using systems and procedures so as to reduce energy requirements per unit of output while holding constant or reducing total costs of providing the output from these systems". Thumann and Metha (1997) define energy management as "the effective use of energy to maximize profits and to enhance competitive positions". In a recent publication, Capehart *et al*. (2008) describe it as "the efficient and effective use of energy to maximize profits (minimize costs) and enhance competitive positions". Collectively, the definitions reveal a shared common point that the basic aim of energy management is to reduce energy consumption and the total costs, thereby maximizing the profits. This entails using the minimum quantity of energy required to perform a task to its required standard and quality.

Energy management is a discipline that has experienced steady growth during the last century. Nowadays, energy management is vital to every organization. Considering that energy represents a significant cost to building operations (Fenerty-McKibbon and Khare, 2005), energy management has become one of the essential aspects of outstanding building operation. Today, one of the most promising profit improvement and cost reduction activities is energy management (Capehart *et al*., 2008). According to McKay and Khare (2004), "the most appealing aspect of energy management is the reduction in operating costs through reducing energy consumption". Energy management provides considerable opportunities that assist large public institutions (universities, hospitals schools, etc.) and high energy consumption private operations to cut costs considerably.

By reducing the overall energy consumption, proper energy management is able to help conserve our valuable natural resources (Patrick, *et al.* 2007). It helps to lead to resource sustainability (McKay and Khare, 2004). Through that, it also raises the public image of the organization, which thus gains added value from its contribution to the achievement of energy sustainability in the long run. An additional token gained is the subsequent mitigation of the overall carbon emission, therefore providing protection for the exhausted planet. This is in line with the Government of Malaysia's recent focus on becoming and being green. As going green always comes at a cost, effective energy management can ease the high invention cost involved in going green by simple steps to reduce energy consumption with a more efficient energy usage pattern. To reduce energy consumption effectively through energy management, first, facilities management professionals must identify the important areas to emphasize. Energy conservation is certainly an important part of energy management (Capehart *et al*., 2008).

Failure to implement proper energy management can contribute to the partial failure of an organization's business. To manage energy effectively, a facilities manager must always be alert to the emerging global energy issues, including the rollercoaster energy prices, depletion of energy resources, unpredictable energy supplies, and host of major environmental problems. These energy issues are alarming and are attracting overriding public concern. In fact, they have become the focus of many discussions, such as the Kyoto Conference, the Johannesburg Earth Summit, the Bali Global Warming Conference, and the latest United Nations Climate Change Conference 2011 in Durban, South Africa (COP 17). Overall, energy problems can be divided into four categories, which are economy, security, environment, and social. The following discussion provides details of each of them.

Generally, the oil price is the main indicator of the energy price. World oil prices have risen steeply since the end of the 1990s (IEA and OECD, 2007). During the global recession in late 2008 and early 2009, the oil prices responded strongly to the perception that the worst of the global recession was over after reaching a low of USD$36 a barrel on 27 February 2009; despite that, the oil prices started to rebound in March and climbed to USD$70 a barrel by mid-2009 (IMF, 2009). A continuous trend of high and unstable energy will affect the global and local socio-economy

significantly. Malaysia, even as one of the oil exporter countries, is not immune to the effects of the world's steadily increasing oil prices. In 2008, the Malaysian Government revised the petrol price when the international oil price reached a new historic peak of US$147.29 (RM470.87) a barrel.

Throughout this century, the world energy security has been alarming and worrying as more energy resources are being extracted than being discovered. As the continuity of the energy supply still remains in doubt for the world, the ever-rising level of energy consumption will exhaust the limited energy resources sooner or later. Non-renewable energy sources, such as oil, natural gas, and coal, remain the main source of energy supply, accounting for 84% of the overall increase in global demand between 2005 and 2030 (IEA and OECD, 2007). Shafiee and Topal (2009) predict that the reserves of fossil fuels will be depleted in the range of 40 to 200 years, in which oil reserves will only last a further 40 years, natural gas a further 70 years, and coal a further 200 years. Malaysia is also involved in the wave of energy security challenges that the world is confronting. The *National energy balance 2007* projected that Malaysia's crude oil reserve had declined from 5.524 billion barrels to 4.326 billion barrels (Ministry of Energy Green Technology and Water, 2007). Also, it was envisaged in *National energy balance 2007* that with such a limited reserve, Malaysia's crude oil supply could only be sustained for another 18 years. To cope with the increasing national energy demand, Malaysia has begun importing natural gas and coal from other countries (Ministry of Energy Green Technology and Water, 2007). Although the picture of uncertainty regarding the supply of energy is clear to the world, no effective efforts are being undertaken to reduce the energy demand.

Another energy-related issue is environmental degradation, of which climate change is the most emerging issue. The environmental concern was highlighted as long ago as the 1970s in the British Scientific Journal *Nature*: "the release of CO2 to the atmosphere by the burning of fossil fuels is conceivably the most important environmental issue in the world today" (*Nature*, 1979). The increasing threat of climate change has become a major, worldwide, and ongoing concern (Halicioglu, 2009). "It is considered to be one of the most serious threats to sustainable development" (Davenport *et al.*, 2009). The climate change due to the concentration of greenhouse gases in the atmosphere is largely due to the combustion of fossil fuels

(IEA and OECD, 2007; IPCC, 2007; Halicioglu, 2009; Malla, 2009; Moriarty and Honnery, 2009; Yang, 2009). The burning of fossil fuels is recognized as the primary contributor to global warming (Leiserowitz, 2007). Worryingly, it is projected that the current energy-related emissions trend will push up the average global temperature by 6 °C in the long run and global energy-related CO_2 emissions will peak in 2025 (IEA, 2008). Malaysia's total CO_2 emissions are tripling from 42 million tons of carbon in 2004 to 130 million tons of carbon in 2030 (Gan and Li, 2007). Malaysia's share of CO_2 emissions in the world grew by 231.5% between 1990 and 2007, placing it among the top ten countries with the highest CO_2 emissions growth between 1990 and 2007 (IEA, 2009a).

Another energy problem concerns social energy issues, which include steady increases in the world population and food security issues. The doubt regarding the continuous supply and availability of energy has become crucial as the world's population rises. As projected in the *International energy outlook 2009*, between 2005 and 2030, the projected world population growth rate is approximately 3.9%–6% every 5 years (Energy Information Administration, 2009). According to Say and Yucel (2006), energy consumption is inevitably expanding in parallel to the increasing world population, industrialization, and prosperity level. People must be fed, clothed, and housed (Ayres, 2008). Such basic needs stimulate higher food and energy demand. There is a possibility that the climate change contributed by fossil energy production will lead to a reduction in the food yield. The scarcity in food production and the high energy price will give rise to high food prices. Rising food prices affect poor people in low-income countries who are less able to afford adequate diets, increasing the risk of food deficiency and malnutrition (Braun, 2009). Human overpopulation, combined with energy-dependent lifestyle patterns, is one of the critical challenges when approaching sustainability (Krajnc *et al.*, 2008). If this scenario continues without any limitations, the finite energy resources are likely to be exhausted faster and earlier.

Having discussed energy issues from the four perspectives – economic, security, environmental, and social – it can be concluded that each of them is threatening the world's sustainability status. Therefore, it is appropriate to classify them as energy sustainability issues. Sustainability is becoming the dominant issue

of the century (Mendler *et al.* 2006). As defined in the Bruntland report, *Our common future* (World Commission on Environment and Development, 1987), "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs". When approaching sustainable development, energy consumption represents a major challenge (Krajnc *et al*., 2008). The current pattern of overconsumption of natural resources is threatening the sustainability status (Sardianou, 2007). According to Krajnc *et al*. (2008), it might be impossible for the world to complete the journey towards sustainable development if the patterns of energy consumption remain unchanged. Hence, energy acts as the main contributor and driver for the world to achieve a sustainable status.

Figure 1.1 summarizes the previous discussion: the range of threats is striving to attack the core of the diagram – energy sustainability. If such energy threats are not eliminated, the world will be vulnerable to sustainable risk and confront an unsustainable energy future. For that reason, appropriate efforts are necessary to ensure that the threats are solved immediately before they happen and without any adverse impacts on the ecosystem. Only then do we have a chance to sustain the uncertain energy future. Considering the various significant pieces of evidence threatening energy sustainability, management to conserve energy is one of the immediate solutions (Durand and Sharma, 1982; Jochem, 2000; Geethanjali *et al*., 2007; Capehart *et al*., 2008). Although inherently unable to solve all the threats, "it can ease the strain on our environment and give us time to develop new energy resources" (Capehart *et al*., 2008).

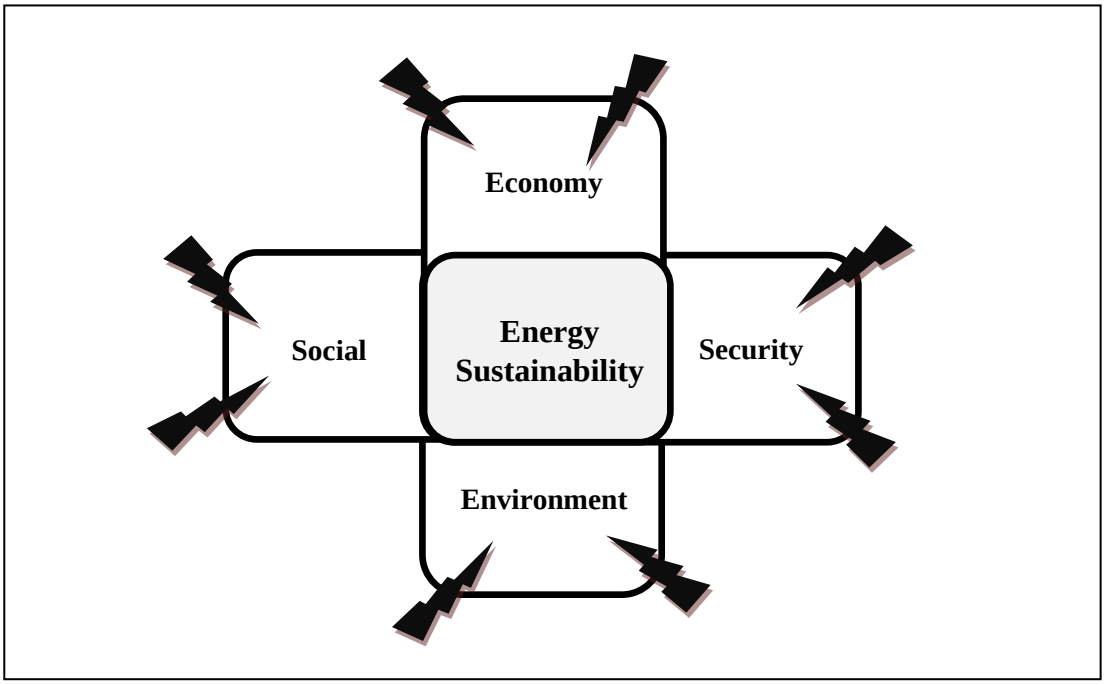

Figure 1.1 Threats to Energy Sustainability

"Energy conservation is the need of the hour" (Nandi and Basu, 2008). Recently, energy conservation has attracted global concern and has emerged as a serious challenge due to the recognition that burning fossil fuels is one of the main contributors to global warming (Kreith and Goswami, 2008; Liao *et al.*, 2008). There is a wide range of studies on the importance and effectiveness of energy conservation in reducing energy consumption, including those by Freiden and Downs (1986); Yang and Hwang (1995); and Alajlan *et al.* (1998). As highlighted by Gyberg and Palm (2009), our world must consume less energy to build a sustainable society. Energy conservation is one of the most necessary, indigenous, and clean energy options (Schumacher, 1985). According to Choong (2008), "the cheapest, fastest and cleanest energy by far is through energy conservation". The rationale is that it always required no cost or a low cost for an organization to gear itself towards reducing its energy consumption (Fenerty-McKibbon and Khare, 2005; Kreith and Goswami, 2008).

A wide range of benefits may be derived from energy conservation efforts. The utmost benefit is financial benefits through energy cost savings (Payne, 1980; Slingerland, 1997; Fenerty-McKibbon and Khare, 2005; Liao *et al.*, 2008; Bhattacharyya, 2009; Erdmenger *et al.*, 2009; Kikuchi *et al.*, 2009; Malla, 2009).

The Carlye Consulting Group (2004) asserts “that energy conserving is one of the top ten ways to reduce facilities budget without sacrificing quality”. Other than reducing the consumption rate and the energy bill, energy conservation also generates other non-monetary benefits. These include promoting environmental preservation (Fenerty-McKibbon and Khare, 2005; Say and Yucel, 2006; IEA and OECD, 2007; Liao *et al*., 2008; Bhattacharyya, 2009; Erdmenger *et al*., 2009; Kikuchi *et al*., 2009; Malla, 2009), creating a positive company image, and fulfilling social responsibility (McKay and Khare, 2004; Fenerty-McKibbon and Khare, 2005).

Besides, the urgency of energy conservation is due to the nature of energy resources. Energy resources are classified into renewable and non-renewable resources. Renewable energy sources are naturally regenerated by nature within a period of time, whereas non-renewable energy sources are those that will be depleted over time (Nemzer *et al.*, 2005). Examples of types of renewable energy resources are geothermal energy, hydropower energy, solar energy, and wind energy. Non-renewable energy sources include coal, oil, natural gas, and nuclear fuels. Due to the energy security issues described earlier, the world is currently eager to shift from non-renewable energy towards renewable energy.

There is no doubt that shifting towards renewable energy can be a solution to replace the depleted non-renewable energy resources and it has the fewest negative environmental detriments; however, any renewable energy, if over consumed, can become non-renewable as well (Hawken, 1993). As suggested by Payne (1980), “sufficient energy may not be available to meet our long-term demands especially if developments in nuclear energy fall behind schedule or if supplies of more conventional fuels are disrupted for political or other reasons”. Payne also states that as the world energy prices are increasing, those newly discovered forms of energy can only secure local demand with a low price for a very short period, and not in the long run. In the end, users will still need to bear a high energy price. The energy future is always filled with uncertainties. No one can guarantee a sustainable energy future or provide a precise prediction about it. Hence, it is necessary to promote energy conservation in the long term (Committee on Civil Engineering and Architecture Science Council of Japan, 2007). Only then will the world’s energy reserves be able to sustain for a longer period from now.

Moreover, for the world to combat the severe environmental issues and achieve a reduction in the building life-cycle cost, energy conservation activities are necessarily associated with buildings to make a significant positive impact (Fenerty-McKibbon and Khare, 2005; Mendler *et al*., 2006; Cai *et al.,* 2009; Kikuchi *et al*., 2009; Ping *et al.,* 2009). The building sector is one of the potential areas in which energy conservation is urgently needed. Building energy conservation is receiving increasing attention across the world (Markis and Paravantis, 2007). Consequently, a recommendation for action was announced at the G8 Summit to enhance the energy efficiency in buildings (IEA, 2007).

Today, among the important strategies to achieve energy sustainability is controlling buildings' energy consumption (Zheng *et al.,* 2010). In developing countries such as Malaysia, energy wastage in the building sector is a norm (Muhieldeen *et al.,* 2008). Hence, energy conservation in buildings is one of the potential areas that can contribute to reducing the threats to energy sustainability. According to the findings of a study by Ryghaug and Sorensen (2009), buildings are important contributors to energy consumption that represent around 40% of energy usage. Globally, the total energy consumption by the building sector is steadily increasing (Committee on Civil Engineering and Architecture Science Council of Japan, 2007; Saidur, 2009). Commercial and residential buildings consume approximately one-third of the world's energy (National Science and Technology Council, 2008).

A similar scenario applies to developed countries, such as Japan and the United States. Buildings are tremendous users of a country's total energy consumption. In Japan, the buildings sector accounts for approximately 30% of the nation's total energy demand and the demand has been increasing persistently over the years (Committee on Civil Engineering and Architecture Science Council of Japan, 2007). In the United States, buildings account for more than 40% of the total energy consumption (National Science and Technology Council, 2008). In European countries, the building sector accounts for over 40% of the final energy consumption in the European Union member states (Poel *et al.,* 2007). Developing countries such as China are not excluded from the trend. In China, the building sector accounts for nearly 25% of the nation's total primary energy consumption, and it is predicted that

the energy demand is very likely to increase to 35% by 2030 (Li, 2007). Such statistics crucially demonstrate that the building energy demand pattern is following an upward trend.

Malaysia, as a developing country, is suffering from the same trend as other countries. As reported in the *National energy balance 2009*, the building sector is the only sector that experienced increases in its final energy use compared with the previous year of 2008: a 2.08% increase was recorded, compared with a 33.72% decrease in the industrial sector, a 36.02% decrease in the agricultural sector, and a 1.71% decrease in the transport sector. Being aware of that, the Malaysian Government is embarking on building energy conservation, particularly in government offices (Mansor, 2008). Moreover, the need to promote energy conservation practice in buildings is emphasized as one of the key actions in the *National Policy on Climate Change 2009* (Ministry of Natural Resources and Environment, 2009) and with the introduction of the Green Building Index. To reduce the energy consumption rate effectively, the areas with the greatest energy conservation potential need to be focused on, most notably those areas that consume a large amount of energy.

There are two approaches to promoting energy conservation, namely structural energy conservation and non-structural energy conservation. Structural energy conservation refers to the application of technological instruments, tools, or alternative energy resources, for which capital investment is generally required, for example replacing conventional fluorescent tubes with high energy efficiency fluorescent tubes, installing remote sensors and energy-saving devices, and so forth. It is undeniable that technological innovation is contributing to a more comfortable, easy, and efficient human lifestyle in some ways. However, most of the technological innovations need a substantial amount of energy to operate. Consequently, these technological innovations are also contributing to the creation of a very unsustainable world (Weenen, 2000).

It should be noted, however, that energy-efficient appliances should not necessarily be regarded as a perfect solution to achieve overall energy reduction. According to Norgard and Christensen (1996), the structural energy conservation

approach using technological innovation or technical options has its limits in conserving energy. One paradoxical aspect is that it creates rebound effects. People tend to use appliances more often when they are labelled as energy saving. The improvement made by efficient appliances may be offset by the growth in the frequency of utilizing the appliances (Peattie and Peattie, 2009). Subsequently, higher energy consumption is a result. Energy-efficient appliances do not necessarily result in overall energy consumption reduction (Abrahamse *et al.*, 2005). To achieve that, it is important to weigh all the possible side effects as well (Steg, 2008).

Technological development is not unidirectional (Dumas, 1976). Although technical innovations always provide solutions for reducing energy consumption, other approaches are still needed (Krajnc *et al*., 2008). There is no doubt that incorporating energy-efficient technologies is necessary to achieve energy savings; energy conservation through technology is insufficient to achieve the maximum energy savings (Finlinson, 2005). Energy conservation that relies on technological fixes to achieve promising energy reduction is claimed to be psychologically naive and overly simplistic (Stern, 1992) as it ignores the human dimensions. The current unsustainable energy system clearly shows that technical options are not a magic stone and a new formula to lower the energy consumption rate substantially (Weenen, 2000). In fact, the non-structural energy conservation approach should be given appropriate consideration for its potential to conserve energy.

Non-structural energy conservation emphasizes changing or improving energy use behaviour to achieve energy reductions, for example thermostat control, switching off unnecessary lighting, putting computers into the hibernate mode or sleep mode when leaving them for a short period, etc. All these energy-saving actions can reduce energy usage substantially. The advantage of this approach is that it involves no or very little capital investment in comparison with the structural approach. Poor energy use behaviour needs to be improved to contribute to a better environment, to obtain a lower energy cost, as well as to realize a more sustainable energy future (Gyberg and Palm, 2009). The urgency of human behavioural change on a large-scale basis to reduce the threats of climate change is acknowledged in a study by Maibach *et al.* (2008). Environmental concern is among the important

attributes in promoting energy conservation behaviour (Lindenberg and Steg, 2007). As many environmental issues are closely linked to human activities, these issues may be reduced through behavioural changes as well (Abrahamse *et al*., 2005).

In Malaysia, a wide range of proven records shows the steady increase in the energy demand over the years (Ministry of Energy Green Technology and Water, 2008; 2009). The best way to meet the rising demand for energy is not to supply more, but to save and monitor the use of energy and achieve energy efficiency. Hansen (2002) mentions that "people are the main factors in achieving energy efficiency". According to Dumas (1976), the excess consumption of energy always arises from wasteful user behaviour. Payne (1980) also asserts that over half of the energy used by man is wasted. Today, energy conservation through behavioural intervention has been acknowledged as one of the cost-effective options to achieve a significant energy reduction (Dietza *et al.,* 2009; Allcott and Mullainathan, 2010). Therefore, through behavioural changes to avoid waste, large energy cost savings can be achieved without significant capital investment (Beggs, 2002; Matutinovic, 2008).

"Consumer behaviour is one of the most important issues with respect to household energy consumption" (Ouyang *et al.,* 2009). Energy conservation consists of a whole range of specific individual options (Slingerland, 1997). Liao *et al*. (2008) state that "energy conservation is an inescapable responsibility for humanity". Every occupant of a building contributes to and therefore is responsible for the increases in the overall energy consumption; consequently, the reduction of energy consumption should be a common responsibility for every occupant (Committee on Civil Engineering and Architecture Science Council of Japan, 2007). According to Bream (1986), human behaviour is an essential ingredient in energy conservation activities whereby an energy cost saving of anything up to approximately 10% can be obtained if building users can be persuaded to conserve more energy. An experimental study carried out by Loozen and Moosdijk (2001) reveals a similar result: 5–10% of energy savings can be obtained by improving energy use behaviour. Another study, conducted by Ouyang *et al*. (2009), reveals the same result (10% of electricity reduction can be easily achieved through the process of improving users' energy use behaviour).

According to Wedge (2003), "outcome of behavioural approach is very effective and helpful in energy conservation". The significance of embracing energy use behaviour has been mentioned and reported by many researchers. A survey carried out by Gaballa (1996) reveals that one of the successful criteria for generating savings is to focus primarily on behavioural changes. A study by Zografakis *et al.* (2008) also suggests that the participants' energy use behaviour improved after their participation in an energy-related project.

Non-structural energy conservation provides immediate energy cost savings. For example, energy users may enjoy an immediate reduction in energy consumption when adjusting the temperature according to the comfort level or putting the computer into the hibernation mode when they leave the room for a short period. The payback is immediate. Unlike structural energy conservation, which always involves capital investment and for which the net savings can only be enjoyed after the return on investment, savings of energy are generated immediately after the appliance's operation. According to Choong (2008), the technology approach is only appropriate as a short-term energy conservation method. Therefore, to achieve long-term benefits, the non-structural energy conservation approach, taking human aspects into consideration, is more appropriate than the structural energy conservation approach.

The behavioural approach can serve as the path for the world to achieve energy sustainability. Human behaviour must be taken into serious consideration in realizing a more sustainable future. The International Energy Agency (2005a) recommends the use of the behavioural approach as one of the strategies to save energy. Also, the IPCC report from 2007 points out that changes in lifestyle and behavioural patterns can make a significant difference and result in energy use reduction along with climate change mitigation (Intergovernmental Panel on Climate Change, 2007). In Malaysia, the promotion of behavioural responses to climate change has been highlighted as one of its strategic thrusts in the *National Policy on Climate Change 2009* (Ministry of Natural Resources and Environment Malaysia, 2009). We must put effort into boosting awareness and stimulate actions towards a sustainable built environment (Abidin, 2009). There is no doubt that the technology approach is able to achieve a considerable amount of energy reduction; however, it

can become inefficient under certain circumstances. As the technology approach requires no behavioural changes on the part of the users, they could consequently still waste energy in the same way (Choong, 2008).

According to Sardianou (2007), the extent of the service that can be derived from an energy-efficient appliance depends not only on its efficiency but also on the consumers' lifestyles. Therefore, more attention should be paid to non-structural energy conservation instead of the structural approach; in fact, installing expensive energy-efficient appliances or insulation is not the ultimate solution to overcoming the energy sustainability issues. Kempton and Schipper (1994) agree with this: "as we develop physical technologies to improve energy efficiencies, we only migrate the effects of energy use by human, not curing the energy problem we are experiencing".

Over the years, evidence has indicated the poor progress made in different countries in energy conservation and the reluctance to change user behaviour has been cited as the reason behind this (Nandi and Basu, 2008). Following this realization, the importance of influencing behavioural change was emphasized during the United Nations Framework Convention on Climate Change held in Copenhagen and it was reported that there has been insufficient debate on reducing energy consumption through behavioural change (Davenport *et al*., 2009). Besides that, the importance of non-structural energy conservation was stressed in the World Energy Outlook 2008, which stated that the nation has to change the way it uses energy (IEA, 2008). The nation needs to shift towards and practice more energy-saving behaviour.

The behavioural barrier present in individuals has been classified as one of the obstacles to achieving efficient use of energy (Weber, 1997). Some examples of the behavioural barriers relevant to energy conservation activities include the failure of consumers to make optional energy efficiency decisions, the separation of building ownership from utility bill responsibility, lack of public awareness, lack of interest in improving building efficiency, lack of knowledge about staff motivation, unclear information, etc. (Kreith, 2008; Ping *et al*., 2009). In fact, all of these energy barriers can be solved simply through improving users' energy use behaviour.

Energy conservation behaviour is especially critical in large organizations that incur multi-level energy expenditure, universities being among them (Finlinson, 2005). The rationale is that such an organizational structure involves multiple categories of users; it comprises both a working and a living environment. Universities are among the organizations that comprise a wide range of facilities and spaces that consume tons of materials and energy. In the twenty-first century, the biggest challenge to universities is sustainable development as they are currently deeply involved in the current worldwide patterns of unsustainability (Weenen, 2000). "Universities will need to play a crucial role in propagating sustainable principles, acting as agents in promoting transformative change" (Krajnc *et al*., 2008).

Additionally, universities are high-density organizations. The human factor is one of the notable aspects of universities since they have large numbers of building users compared with other industries. They have students who are learning and living on the campus. Universities are places where the occupants consume a substantial amount of energy, 24 hours a day, 7 days a week. They have a high degree of control over the electricity use (Petersen *et al.*, 2007). Besides the higher probability of energy wastage due to users' negative energy use behaviour, the lack of direct financial responsibility for energy bills is another issue. Users always have a sense of entitlement to consume energy in accordance with their preferences as there is no direct financial responsibility for energy consumption incurred for the energy users in universities (Finlinson, 2005; Petersen *et al*., 2007; Carrico and Riemer, 2011). As a result, the occupants tend to waste energy as they do not bear the high energy cost. Efforts to control the steadily increasing energy costs are essential.

Promoting energy conservation is recognized as one of the current approaches to controlling universities' utility expenses (Marans and Edelstein, 2010). Compared with other industries, local universities make up a huge built-up area consisting of a large number of buildings equipped with many facilities and inhabited by a large population of people. It has been noted that educational facilities always consume a large amount of the energy generated in the country (Muhieldeen *et al*., 2008). Ultimately, one of the challenges faced by universities throughout the world today is the growing energy budget caused by utility costs that are rising faster than

the inflation rate (Marans and Edelstein, 2010). The high utility costs are forcing the university administrators to work to reduce the overall energy consumption.

In 2011, autonomy was granted by the Malaysian Government to Malaysian research universities. The universities with autonomy status have full authority over the university administration as well as over the university expenditure and income. Regrettably, the community that happens to occupy Malaysian universities tends to show poor energy conservation behaviour (Choong, 2008). Immediate action to reduce the increasing energy costs has become of paramount importance in order to maintain the educational quality and standards. Any programme that would deliver an attractive rate of return at the minimum cost is always preferable over another. Promoting energy conservation behaviour within an organizational setting is among the programmes that may draw an economic incentive and yield a substantial energy reduction while incurring little upfront expense (Carrico and Riemer, 2011). Despite the energy bill savings gained from promoting energy conservation in universities, there are many extraordinary benefits still to be earned. The savings in monetary terms can be directed to other beneficial usages, such as upgrading the campus facilities and library database.

Another sentimental value gained is the improvement of the university's overall image. By promoting energy conservation on the campus, the university will contribute to reducing its carbon emission, while at the same time creating a healthy environmentally friendly image. The government's demonstration by leading the energy conservation will encourage the society to pay attention to energy conservation (Cai *et al*., 2009). It will also stimulate public awareness of energy conservation issues (Ping *et al*., 2009). Improving the users' energy conservation behaviour will make them more conscientious about not wasting energy during their lifetime and nurturing good energy use behaviour anywhere. This will provide long-term benefits whereby the graduates will be more receptive and can act as excellent educational agents to influence their family, friends, and community. The need to conserve energy in universities is at its highest level in decades (Finlinson, 2005).

Previously, some research was carried out to examine Malaysian students' energy use behaviour. A survey performed by Choong (2008) in Malaysian

universities reveals that the level of energy awareness and energy use behaviour among the university community is poor. In addition, another study conducted by Muhieldeen and associates (2008) in the Universiti Putra Malaysia confirms that students' behaviour is the main contributor to the large amount of energy wastage in the university. To confirm further the current energy scenario in universities, a preliminary study was conducted at the Universiti Teknologi Malaysia. The aim of the preliminary study is to explore the level of knowledge and energy use behaviour among the university community.

A set of questionnaire which adopted and modified from Choong (2008) was prepared. The questionnaire comprises four sections: (A) demographic questions; (B) cognition questions which to investigate respondent's energy knowledge; (C) questions to investigate the respondent's energy conservation behaviour in three main areas including lighting, air conditioning, and computer; (D) questions to gather respondent's opinion and observation about peers' energy conservation behaviour in campus. A sample of questionnaire is attached in Appendix A. Total of 350 sets of closed ended questionnaire were distributed in the university and total of 166 sets of completed questionnaire were returned, this indicates a valid response rate of 47%.

Generally, the results reveal that the community has poor energy knowledge and energy conservation behaviour practically. Based on the comments from the respondents, majority of the respondents did not practise at least once in a month for all types of energy use behaviour as stipulated in the questionnaire. The results of analysis indicate poor air conditioning and lighting use behaviour among the students; approximately 62% of the students never turn off the lights and fans when they leave the room for a short period of time and only 2.4% of the respondents will always make sure the air conditioning is turned off before they leave the lecture hall. Similarly, only 1.8% of the respondents set the computer to sleep mode after 10 minutes of inactivate automatically and 51.8% of them did not switch off the monitor whenever they do not use it. Overall, the results suggest that majority of the community did not practise good energy conservation behaviour. For greater details on the results of this preliminary study, refers to Low *et al* (2010). As such, they confirm the significance of this study, which serves as an alternative to guide the university community to positive energy conservation behaviour.

1.3 Statement of the Problem

"Energy research focusing on behavioural intervention may prove valuable in improving energy conservation and efficiency" (Allcott and Mullainathan, 2010, p. 1204). Although research and debates have been carried out over the years in regard to energy conservation behaviour, a limited amount dealt with large organizations (De Young, 1993; Liao *et al*., 2008). Energy conservation behaviours in large organizations such as universities have received little attention (Finlinson, 2005). In view of the fact that energy conservation through behavioural change is critically needed in large organizations such as universities to achieve a significant reduction in energy demand, efforts to foster energy conservation behaviour in universities are needed. Noting the importance of fostering energy conservation behaviour in Malaysian universities, the question then arises of how to improve users' energy use behaviour most effectively and which strategies should be fostered regarding energy conservation behaviour.

To foster behavioural change, first it is necessary to identify the determinants forming the behaviour before moving on to determining the strategies needed to facilitate the behavioural change effectively. According to Wang *et al*. (2011), the underlying determinants that form specific behaviour should be identified in order to target behavioural change effectively. Specifically, a number of variables underlie the formation of a specific behaviour. Behavioural theory may be used to serve as guidance for understanding the concept of the determinants for people to behave as they do and what might be needed to change this behaviour (Maibach, 2002). For instances the famous behavioural theory, Theory of Planned Behaviour, behavioural intention is the central determinant of human behaviour and the intention is the formulation of three antecedents: attitude towards the specific behaviour, the subjective norm, and the perceived control over the behaviour.

According to Abrahamse and Steg (2011), the "intentions to reduce energy use are generally linked to the psychological variables". Instead of fostering energy conservation behaviour in general, a better approach would be to target the psychological variables that lead to the specific behaviour. According to Penrod (1986), in order to predict individuals' future behaviour accurately, it is important to

measure the attitudes and normative beliefs specifically. R. Craig Lefebvre once asserted during an interview session, "the more ways you have to think about what determines a behaviour, behaviour change, and then maintenance of behaviour change the more successful you can potentially be in fostering social and individual change" (Bryant, 2004, p. 21). For that, it is important to identify the variables or determinants that form energy conservation behaviour in present context for target the energy conservation behaviour change effectively.

Second, to determine the strategies to facilitate change, an innovative approach is necessary to yield the desired results. Peattie and Peattie (2009) state that "social marketing is rapidly growing and it has considerable potential to contribute to consumption reduction". Additionally, the study by Maibach and associates (2008) confirms the potential of the communication and social marketing approach as an intervention approach for reducing the threats of climate change. There is great potential to reduce energy consumption associated with the concept of social marketing in energy conservation. Interventions incorporating the social marketing principle are always effective in achieving their goal (Arulmani and Abdulla, 2007).

Basically, social marketing is a branch of the marketing school of thought. The concept of social marketing is tailored from the marketing principles. The main aspect distinguishing social marketing from marketing is the medium involved in the exchange process. Social marketing does not market products as marketing does, yet it does market ideas, attitudes, and behaviours; benefits do always not accrue to the marketers or the marketers' organization, but to the individual him- or herself or to society as a whole (Weinreich, 1999).

Social marketing has great potential for fostering sustainable behaviour change (Edgar *et al*., 2009). It has been acknowledged as an effective approach for achieving behavioural change (Mah *et al.*, 2006; Stead *et al.*, 2007). According to Andreasen and Herzberg (2005, p. 4), "social marketers are especially good at influencing behaviour". Social marketing is a powerful tool to influence one to practice a new behaviour, to improve one's existing behaviour, or to abandon one's old behaviour. Philip Kotler, a pioneer in social marketing in the 1970s, defines

social marketing as a "promising framework for planning and implementing social change" (Kotler and Zaltman, 1971). Social marketing's first principle is to change people's behaviour in measurable ways (Morris and Clarkson, 2009).

To date, social marketing has mainly been applied across health-related fields and rarely in fostering environment-related behavioural changes (McKenzie-Mohr, 2011). The social marketing approach is actively being applied in personal health issues such as HIV (human immunodeficiency virus), family health (Glanz *et al.*, 2008), high blood pressure, panic disorder, asthma, depression, heart disease (Long *et al.*, 2008), and childhood immunization (Carroll and Veen, 2002). Some other areas of applications include the promotion of voluntarism (Boehm, 2009), economic reform (Andreasen and Herzberg, 2005), smoking cessation (MacAskill *et al.*, 2002; Lavack *et al.*, 2007; Gruchy and Coppel, 2008); the reduction of driving after drinking (Strand *et al.*, 2004); and emergency preparedness (Ramaprasad, 2005; Marshall *et al.*, 2007). Most of the social marketing interventions result in encouraging outcomes (Gordon *et al.*, 2006a). However, minimal research has been conducted in the discipline of energy conservation; though it has been receiving increased attention over recent years, it has yet to be employed to its full potential. It should be considered that lessons may be learned from other successful applications of social marketing in other fields for the application in consumption reduction behaviour (Peattie and Peattie, 2009). It is important to unlock its potential to be applied in and associated with the energy conservation field.

"Marketing is truly one of the fundamental influences on our lifestyle" (Lazer, 1996, p. 56). It is significant in the development of sustainable consumption (Jones *et al.*, 2008). According to Jones and associates (2008), marketing serves as a pathway to changing consumers' behaviour, attitudes, and beliefs. The use of marketing principles and practices has been demonstrated as the seed to achieve organizational success; therefore, a similar approach should be adopted in social contexts such as fostering energy conservation behaviour (Lefebvre, 2009). The central pillar of marketing is to influence people to purchase something; if used wisely, it can also be used to influence people away from it. Social marketing tailored from the marketing concept is predicted to be a great approach for influencing individuals to "purchase" energy conservation behaviour.

Social marketing promotes voluntary behaviour change. Reverting to the basis of marketing, people will purchase something based on their preferences; only then will the product purchased be used accordingly. If individuals embrace energy conservation behaviour under such forces as promoted in the traditional approach, the individuals will revert to their overt behaviour easily whenever the forces are not applicable or loosen. Contrarily, it is predicted that individuals will be able to sustain the behaviour if it was "purchased" based on their intention and preferences. As such, the social marketing approach that emphasizes voluntary behaviour change has the potential to realize a sustainable behaviour change.

The power of marketing must be acknowledged. Marketing has made remarkable achievements in encouraging people to buy products such as Coca Cola and Nike trainers (MacFadyen *et al.,* 2003). Another good example is McDonald's restaurant, which is currently one of the best-known restaurants in the world. Approximately seventy years ago, two brothers, Richard and Maurice McDonald, began a small drive-in, McDonald's Hamburgers, in California (Vignali, 2001). Today, McDonald's has more than 30,000 restaurants in over 100 countries. Credit should be given to their marketing efforts. The effective blend of the marketing mix deployed by McDonald's makes the success; it has changed the world in the past half century. Considering that marketing may contribute to extraordinary success, "it can also encourage people to adopt behaviours that will enhance their own and their fellow citizen's lives" (MacFadyen *et al*., 2003, p. 694).

Today, limited resource allocation remains a major challenge for most organizations. To ensure that the scarce resources are utilized in an efficient way, the optimum mix of marketing strategies is critical. The decision on the optimum marketing mix is considered to be among the most critical challenges for marketers (Balachandran and Gensch, 1974). In general, the commercial marketing mix consists of four basic ingredients: product, price, place, and promotion. The parts of the mix are interdependent from each other (Morden, 1987). Each part of the marketing mix contributes to the success (Chartered Institute of Marketing, 2009). According to Byrne (2004), an effective combination of the marketing mix creates the desired view of the organization. Organizations today actually utilize the mixture of marketing mix elements to compete with each other for success. It has been used

as a tactical toolkit for positioning themselves in the competitive market (Kotler and Armstrong, 1993).

However, a question that marketing managers face continually is "what level or combination of marketing mix would maximize sales or profit?" (Tellis, 2006). This also applies to the social marketing context, in which social marketers deal with the question of "what is the optimum combination of social marketing mix to foster the desired behavioural change?" Thus, an optimum mix of strategies is necessary as guidance to success in a social marketing intervention. To foster positive energy conservation behaviour effectively, an optimum social marketing mix is essential. According to Grier and Bryant (2005), social marketing interventions are supposedly designed to integrate the full marketing mix. The employment of the marketing mix concept in social marketing intervention is acknowledged as one of the eight essential aspects of the social marketing process suggested by Lefebvre and Flora (1988). Kotler *et al.* (2002) and Phillipson *et al.* (2009) confirm the necessity to consider the entire mix (all the Ps) in an intervention aimed at influencing behaviour. Additionally, a review undertaken by the English Government in 2004 on the social marketing potential reveals the consideration of the marketing mix's ability to provide a valuable framework that ensures the resources are used to their greatest potential, besides which the significance of the set of comprehensive strategies in sustaining positive behavioural change is also endorsed throughout the review (French and Blair-Stevens, 2006).

The great contribution of the marketing mix to a programme's success has been evidenced and acknowledged in numerous interventions: the purchasing and installation of smoke alarms (Camit, 2002); communication for healthy living (Glanz *et al*., 2008); physical activity (Tucker and Irwin, 2005); quit and win contests for smoking cessation (Lavack *et al*., 2007); and so forth. To date, the social marketing literature provides limited exploration of the optimum social marketing mix that should be applied in a specific context, particularly in fostering energy conservation behaviour. Members of management are uncertain which part of the mix is more important in fostering energy conservation behaviour. As such, it is important to consider which ingredients are necessary to formulate the best combination to achieve effective behavioural change.

The study bridges the absence by developing an optimum social marketing mix for fostering energy conservation behaviour and determining the relative weight of each part of the social marketing mix. This research could serve as a basis for a sustainable society. This is intended as a long-term mechanism to cultivate the nation's long-lasting sustainable energy use behaviour. Besides the aim of achieving a considerable reduction in energy consumption, it also intends to enhance the nation's awareness of the emerging energy sustainability issues.

Three research questions have been derived for the aforementioned process of identifying the variables that form energy conservation behaviour and effective strategies for fostering energy conservation behaviour using the concept of social marketing. The research questions formulated for this study are listed below:

1. What are the key determinants of energy conservation behaviour and social marketing mix strategies to promote energy conservation behaviour?
2. What is the causal relationship of the identified key determinants of energy conservation behaviour?
3. What is the preferred combination of social marketing mix strategies to promote energy conservation behaviour?

The research objectives have been designed to answer the research questions addressed above and generate knowledge for this research.

1.4 Objectives of the Study

The objectives of the study are as follows:

1. To propose key determinants of energy conservation behaviour and social marketing mix strategies to promote energy conservation behaviour through the synthesis of theories and concepts.
2. To examine the causal relationship of the identified key determinants of energy conservation behaviour.

3. To investigate the preferred combination of social marketing mix strategies to promote energy conservation behaviour.

1.5 Scope of the Study

The scope of this study is a total of five Malaysian research universities. The respondents consist of university students. The rationale to select the student community is because they are the main contributor to the university's total energy use as the community is about three to four times bigger than the staff community in Malaysian universities. Moreover, students are more receptive and have a great ability to take the lead in society after they graduate from university. It is expected that students with positive energy conservation behaviour will be able to lead the society towards a better future for tomorrow's generation. Considering that the central concept of social marketing is from the target audience's point of view, the opinions from the students themselves are essential to enable effective behavioural change. Hence, improving energy use behaviour among students is a wise decision in the attempt to conserve energy, subsequently reducing university utility bills.

1.6 Significance of the Study

Research has found that the major energy wastage on campuses is largely due to the users' negative energy conservation behaviour (Muhieldeen *et al*., 2008). Additionally, students hold a high degree of control over the energy consumption on the campus. An appropriate approach with the optimum set of strategies is needed to foster positive energy conservation behaviour among the community of universities. The literature search reveals that the social marketing approach is effective in achieving behavioural change. However, the literature on the application to fostering energy conservation on campuses is limited. This study will potentially contribute to the limited application in the area of energy conservation behaviour in a university setting. Meanwhile, this research is significant in that it addresses such a gap in the

energy conservation literature as well as in facilities management by incorporating the concept of social marketing into the fostering of energy conservation behaviour. The completeness of this research will be able to generate a new insight by adapting and combining the essence from different bodies of knowledge: facilities management, social marketing, environmental psychology, and behavioural management. This could enrich the diversification of social science research in the context of energy conservation, particularly non-structural energy conservation.

Additionally, the attempt of this study to identify the optimum social marketing mix for energy conservation behaviour fills the gap in the social marketing literature. Previous research in the area of social marketing is mainly concentrated on the social marketing process rather than on strategies. There has been relatively little research on the optimum marketing mix specifically for social marketing. The majority of social marketing campaigns adapt a commercial marketing mix. This is, however, not appropriate as the commercial product is different from the product (behaviour) in the social marketing context (Peattie and Peattie, 2009). Hence, this research is significant in bridging the absence of a specific set of social marketing strategies in the social marketing literature.

Another point regarding the significance of this research is its association of behavioural theory from the psychology field with the management of energy conservation. The well-established theory of planned behaviour (Ajzen, 1985) proposes three determinants to form an intention towards behaviour: attitude towards behaviour, subjective norm, and perceived behavioural control towards a specific behaviour. The theory has been widely applied across various behaviours. Also, the theory is acknowledged to be useful in identifying the determinants that influence specific behaviour and the inter-relationships between the determinants. However, most studies are conducted based on a specific context but are limited regarding energy conservation behaviour. Thus, the generalizability of the theory across energy conservation behaviour is subject to testing. The study provides insights into the linkage between the three determinants and energy conservation intention and behaviour. The identification of the determinants of energy conservation behaviour in this study, which systematically incorporates the essence of the established behavioural theory, will add value to the growing literature in this discipline.

Furthermore, the findings of this study are able to provide directions that inspire the management to make the right decisions in designing a cost-effective energy conservation programme or developing universities' utility policies and maximizing the desired outcome by targeting the key determinants of the behaviour change as well as focusing on the optimal social marketing mix. The identification of the key determinants of energy conservation behaviour and targeting of the optimum social marketing mix allowed the energy conservation programme conducted to be more focused and specific, and hence more likely to target the behavioural change effectively. Previous research has found that a range of savings between 5 and 10% can be easily achieved by improving users' energy use behaviour. For example, the Universiti Teknologi Malaysia spent 10 million of Malaysia Ringgit on its yearly energy bill. Thus, by improving user behaviour, energy saving up to 1 million can be achieved. Subsequently, this will contribute to the carbon emission reduction overall.

Lastly, another reason for the research's significance is that it gears the society towards enhancing global energy sustainability and complementing universities' social responsibility. It provides a novel way of looking at changing energy conservation behaviour. The key determinants of energy conservation behaviour identified in this study could serve as a better energy conservation behaviour change methodology, benefiting both organizations and the environment. Ultimately, it paves the way for a better future for future generations.

1.7 Limitation of the Study

There are several limitations of this study that are worth acknowledging.

The first limitation is the sampling methodology used in this study. Though self-reported data are common in social science research, they may contain inherent biases. The convenience sample used in this study encounters the same challenge. In this case, the students may report that they are practising energy conservation behaviour frequently even though this might not exactly be the truth. To reduce the

impact of self-reported data, this research emphasized the importance of acting honestly in answering the questionnaire during the survey and collected many data as a high response rate would confer a compensatory advantage.

This research only focuses on students from Malaysian universities; other building users, such as academic staff and support staff, are not included. For that reason, the results of the study are best applied and targeted to students only. According to Lin (2007), the determinants of behaviour are context-dependent. This is true for the application of these results to foreign universities: the generalizability of the results across countries may be limited due to cultural differences. Thus, the implementation of the results in foreign universities requires further investigation.

Another limitation is that the social marketing mix identified in this study is for energy conservation behaviour purposes. Amendments and modifications to the combination of social marketing mix strategies are needed if there is an attempt to apply the results to other behavioural domains. As the proposed social marketing mix was designed based on energy conservation behaviour, other behaviours may differ in terms of the constraints, available resources, and characteristics of the specific behaviour itself.

1.8 Research Methodology

This section provides an overview of the research methodology. The details of each stage will be further discussed and explained in Chapter Four. The research methodology of the present study is divided into two parts according to the research objective as the research procedures to achieve each objective differ. Generally, the research methodology consists of five stages: (I) literature review; (II) survey instrument establishment; (III) data collection; (IV) data analyses; and (V) findings and conclusion. Figure 1.2 shows a diagram of the research methodology overview.

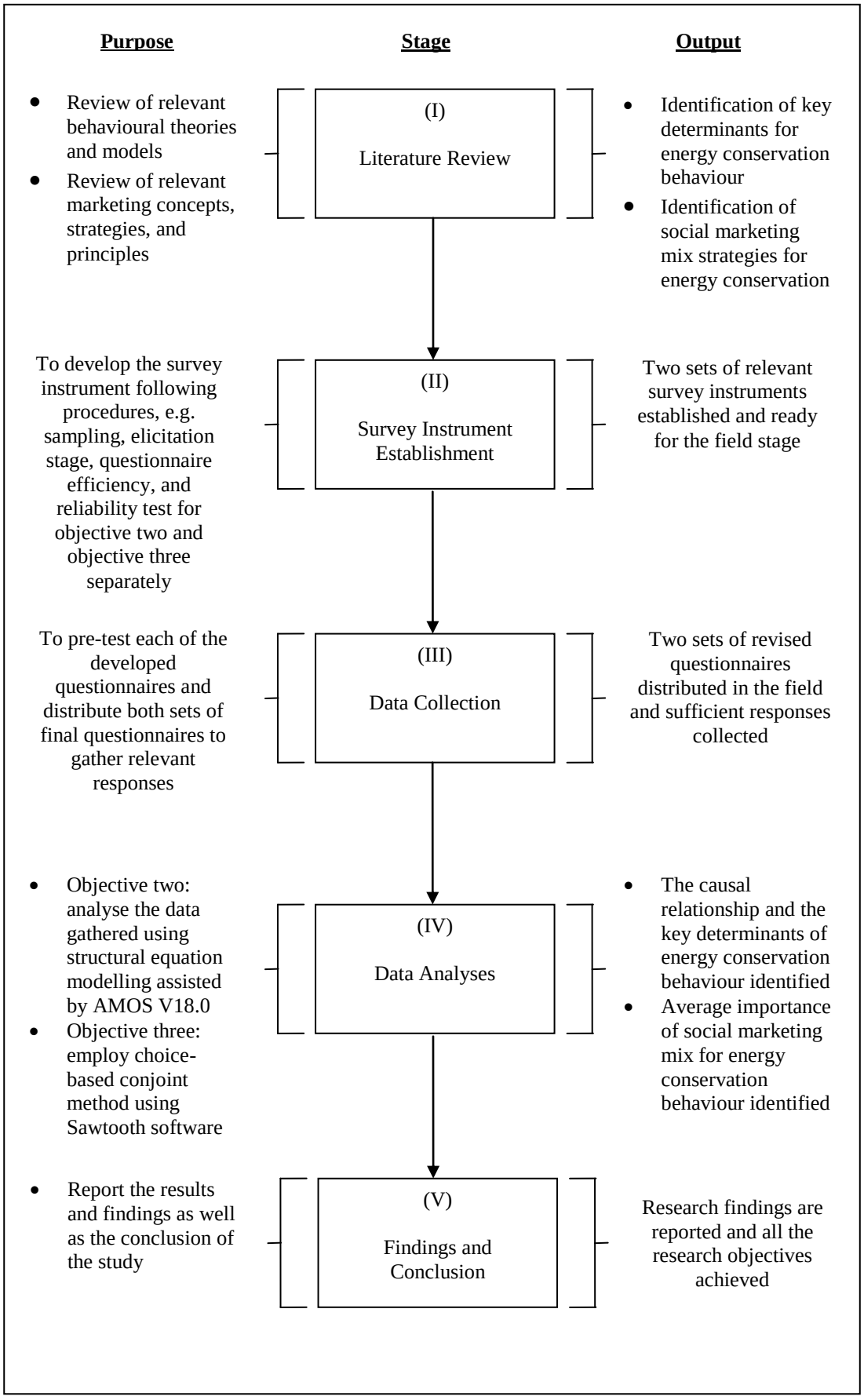

Figure 1.2 Overview of the research methodology

1.8.1 Literature Review

This stage aims to propose the key determinants of energy conservation behaviour and the social marketing mix strategies of energy conservation behaviour. For objective one, an extensive and comprehensive theoretical review is carried out of the relevant behavioural theories and models. Throughout the literature review, relevant and established theories and models are reviewed, including the transtheoretical model and the theory of planned behaviour.

Following, a systematic literature review is performed on the commercial and social marketing concepts, principles, and strategies. The social marketing mix is derived from the comprehensive literature. The relevant reference channels are social marketing, commercial marketing, environmental psychology, and non-structural energy conservation. The fundamentals of commercial marketing are included in the scope of the literature review as social marketing is a branch of commercial marketing. Therefore, the literature review for the social marketing mix covers both commercial marketing and social marketing. In the end of this stage, researcher propose key determinants and social marketing mix strategies to promote energy conservation behaviour through the synthesis of theories and concepts.

1.8.2 Survey Instrument Establishment

The second stage of the research methodology is to establish the survey instrument. After the theoretical structure has been established from the literature review, the researcher will need to establish a relevant survey instrument to verify the respective elements in the local context. A questionnaire survey is selected as the instrument to achieve both objectives in this study. An appropriate sampling strategy is used to select a sufficient sample that could be representative of the population. For objective two, an elicitation questionnaire is developed for the purpose of gathering input to formulate the final questionnaire. Then, the final questionnaire constructed is subjected to a reliability test to ensure the internal consistency of the items before submitting it to the field stage.

For the third objective, similar research procedures are involved. The survey instrument stage to achieve objective three does not involve an elicitation stage. The questionnaire is developed using Sawtooth Software, with the total number of questions and choice tasks per question to appear to the respondent being pre-set by the researcher in advance. Afterwards, the questionnaire developed is submitted to an efficiency test and advance test for the questionnaire efficiency using the Sawtooth software. The questionnaire will need further improvement if the results indicate that the questionnaire is inefficient. Thus, the researcher needs to repeat the earlier research procedures until questionnaire efficiency is achieved.

1.8.3 Data Collection

After the questionnaires for the study have been established, both questionnaires will be subject to a pre-test before being distributed to the Malaysian research universities' students. The pre-testing stage for the two sets of questionnaires will be conducted separately. The feedback gathered from the pre-testing stage will be used to improve the questionnaire and then it will be distributed at field. The improved version of the questionnaires will be distributed in the five Malaysian research universities. The targeted responses are 400 from each university, which will sum up to a total of 2,000 responses. The purpose of data collection is to gather responses from the students to identify the determinants that influence their energy conservation intention and behaviour as well to identify the students' preferred social marketing mix that can support them in performing energy conservation behaviour on the campus.

1.8.4 Data Analyses

Raw data collected from the field will be submitted to analyses using statistical software. The structural equation modelling (SEM) technique will be used for objective two and the choice-based conjoint analysis method for objective three.

For the SEM, the analysis is performed with the assistance of the AMOS V18.0 software. Confirmatory factor analysis will be used to identify the measurement model and then followed by the structural equation model assessment. As a result, the beta coefficient between the variables will be established; therefore, the key determinants of energy conservation behaviour will be identified.

For the third objective, Sawtooth software was selected to perform the choice-based conjoint analysis. The raw data collected from the field will firstly be imported into the Statistical Package for Social Sciences (SPSS) and then exported to the Sawtooth software for the relevant analyses. Next, the imported raw data will undergo part-worth utilities estimation using the Sawtooth Hierarchical Bayes program and the calculation of the average importance of attributes using the Sawtooth Software Market Research Tool (SMRT) program. Subsequently, the importance of each social marketing mix will be identified.

1.9 Outline of the Chapters

This thesis is organized and presented in seven chapters.

Chapter One, the introductory chapter, consists of nine subsections. It begins with an introduction, background of study, statement of the current energy conservation issues and the research gap, a list of research objectives, the scope of this research, the significance of the research, limitations of the research, an overview of the research methodology, and lastly the outline of the chapter.

Chapter Two includes a comprehensive literature review on the fundamental aspects of energy conservation, which mainly focuses on the behavioural aspect. The review includes the literature on energy conservation as well as relevant models and theories for the behavioural determinants. Moreover, the challenges in fostering energy conservation behaviour are pointed out in this chapter. The sources of reference are mainly from scholarly literature such as academic journals and books. Objective one is achieved in this chapter.

Chapter Three covers a theoretical review of the social marketing and commercial marketing mix. In particular, it discusses the rationale to include the commercial marketing mix in the literature mainly due to the fact that social marketing is a branch of commercial marketing and most existing social marketing campaigns adopt the commercial marketing mix as the essential marketing strategy. The social marketing mix identified will serve as a foundation to develop the questionnaire and will be subject to verification through a field survey.

Chapter Four highlights the design of the methodology of this research. This chapter details the research procedures and flow of arrangements in every stage to achieve each of the objectives in this study.

Chapter Five presents the results and findings of the analyses for objective two, which is to identify the key determinants of energy conservation behaviour. In brief, this chapter includes four main sections: the overall survey responses, the respondent profile, the results and findings from the field survey, and the discussion of the results.

Chapter Six covers the results and findings of the choice-based conjoint analyses for the third objective of this study. This chapter contains three sections: the overall responses, the results and findings from the choice-based conjoint analysis, and discussion of the results.

Finally, Chapter Seven concludes the main findings of this research and provides recommendations for future research.

Abidin, N. Z. (2009). Awareness on environment in construction: Commitment and progress. *Asset Management Policy,* 44(1), 8–13.

Abrahamse, W., and Steg, L. (2011). Factors related to household energy use and intention to reduce it: The role of psychological and socio-demographic variables. *Human Ecology Review,* 18(1), 30–40.

Abrahamse, W., and Steg, L. (2009). How do socio-demographic and psychological factors relate to households' direct and indirect energy use and savings? *Journal of Economic Psychology,* 30(5), 711–720.

Abrahamse, W., Steg, L., Vlek, C., and Rothengatter, T. (2005). A review of intervention studies aimed at household energy conservation. *Journal of Environmental Psychology*, 25(3), 273–291.

Aiken, K. D., and Koch, E. C. (2009). A conjoint approach investigating factors in initial team preference formation. *Sport Marketing Quarterly*, 18(2), 81–91.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl and J. Beckmann (Eds.), *Action-control: From cognition to behavior* (pp. 11–39). Heidelberg: Springer.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.

Ajzen, I. (2001). Nature and operation of attitudes. *Annual Review of Psychology, 52,* 27–58.

Ajzen, I. (2005). *Attitudes, personality, and behavior*. Maidenhead, Berkshire, England: Open University Press.

Ajzen, I. (2008). Consumer attitudes and behavior. In C. P. Haugtvedt, P. M. Herr, and F. R. Cardes (Eds.), *Handbook of consumer psychology* (pp. 525–548). New York: Lawrence Erlbaum Associates.

Ajzen, I., and Cote, N. G. (2008). Attitudes and the prediction of behaviour. In W. D. Crano and R. Prislin (Eds.), *Attitudes and attitude change* (pp. 289–311). New York: Psychology Press.

Ajzen, I., Brown, T. C., and Carvajal, F. (2004). Explaining the discrepancy between intentions and actions: The case of hypothetical bias in contigent valuation. *Personality and Social Psychology Bulletin*, 30(9), 1108–1121.

Ajzen, I., Czasch, C., and Flood, M. G. (2009). From intentions to behavior: Implementation intention, commitment, and conscientiousness. *Journal of Applied Social Psychology*, 39(6), 1356–1372.

Ajzen, I., and Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, N.J.: Prentice Hall.

Ajzen, I., and Madden, T. J. (1986). Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioural control. *Journal of Experimental Social Psychology*, 22(5), 453–474.

Alajlan, S. A., Smiai, M. S., and Elani, U. A. (1998). Effective tools towards electrical energy conservation in Saudi Arabia. *Energy Conversion and Management*, 39(13), 1337–1349.

Allcott, H., and Mullainathan, S. (2010). Behavior and energy policy. *Science, 327*, 1204–1205.

Allen, D. G., Mahto, R. V., and Otondo, R. F. (2007). Web-based recruitment: Effects of information, organizational brand, and attitudes toward a web site on application attraction. *Journal of Applied Psychology*, 92(6), 1696–1708.

Alriksson, S., and Oberg, T. (2008). Conjoint analysis for environmental evaluation: A review of methods and applications. *Environmental Science and Pollution Research*, 15(3), 244–257.

American Marketing Association (AMA). (2007). *Dictionary*. Retrieved June 10, 2010, from the American Marketing Association website: http://www.marketingpower.com. Date Retrived:

American Psychological Association (APA). (2009). *APA college dictionary of psychology*. Washington, DC: American Psychological Association.

Anda, J., Golub, A., and Strukova, E. (2009). Economics of climate change under uncertainty: Benefits of flexibility. *Energy Policy,* 37(4), 1345–1355.

Andersen, P. P. (2009). Food security: Definition and measurement. *Food Security, 1*, 5–7.

Anderson, J. C., and Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommend two-step approach. *Psychological Bulletin*, 103(3), 411–423.

Andreasen, A. R. (1994). Social marketing: Its definition and domain. *Journal of Public Policy and Marketing,* 13(1), 108–114.

Andreasen, A. R. (1995). *Marketing social change: Changing behavior to promote health, social development, and the environment*. San Francisco: Jossey-Bass Publishers.

Andreasen, A. (2000). *Social marketing: A new/old approach to social change.* Paper presented at the Nonprofit Marketing Summit Conference, Tampa, Florida.

Andreasen, A. R. (2002a). Marketing social marketing in the social change marketplace. *Journal of Public Policy and Marketing*, 21(1), 3–13.

Andreasen, A. R. (2002b). Commercial marketing and social change. *Social Marketing Quarterly*, 8(2), 41–45.

Andreasen, A. R., and Herzberg, B. (2005). Social marketing applied to economic reforms. *Social Marketing Quarterly,* 11(2), 3–17.

Anker, T. B., and Stead, M. (2009, 14–15 July 2009). *What is commercial social marketing? And it is a force for good or bad?* Paper presented at the Sustainable Social Enterprise – International Nonprofit and Social Marketing Conference 2009, Victoria University.

Armstrong, G., and Kotler, P. (2000). *Marketing: An introduction*. Upper Saddle River, NJ: Prentice Hall.

Aron, A., Aron, E. N., and Coups, E. J. (2009). *Statistics for psychology* (5th ed.). Upper Saddle River, N.J.: Pearson Prentice Hall.

Arulmani, G., and Abdulla, A. (2007). Capturing the ripples: Addressing the sustainability of the impact of social marketing. *Social Marketing Quarterly,* 13(4), 84–107.

ASEAN Secretariat. (2009). *ASEAN plan of action on energy cooperation 2010–2015*. Retrieved July 10, 2011, Retrieved from: http://www.aseansec.org/22675.pdf

Atkin, B., and Brooks, A. (2005). *Total facilities management* (2nd ed.). Malden, MA: Blackwell Publishing Ltd.

Austin, J., Sigurdsson, S. O., and Rubin, Y. S. (2006). An examination of the effects of delayed versus immediate prompts on safety belt use. *Environment and Behavior,* 38(1), 140–149.

Ayres, I., Raseman, S., and Shih, A. (2009). *Evidence from two large field experiments that peer comparison feedback can reduce residential energy usage*. SSRN Working Paper Series.

Ayres, R. U. (2008). Energy and economic growth. In F. B. S. Ulgiati (Ed.), *Sustainable energy production and consumption: Benefits, strategies and environmental costing*. Netherlands: Springer.

Bagozzi, R. P., and Yi, Y. (1988). On the evaluation of structural equation models. *Academy of Marketing Science*, 16(1), 74–94.

Balachandran, V., and Gensch, D. H. (1974). Solving the "marketing mix" problem using geometric programming. *Management Science*, 21(2), 160–171.

Banfi, S., Farsi, M., Filippini, M., and Jakob, M. (2008). Willingness to pay for energy-saving measures in residential buildings. *Energy Economics*, 30(2), 503–516.

Beamish, K., Ashford, R., and Chartered Institute of Marketing. (2007). *Marketing planning, 2007–2008*. Oxford; Burlington: Elsevier/Butterworth-Heinemann.

Beck, L., and Ajzen, I. (1991). Predicting dishonest actions using the theory of planned behavior. *Journal of Research in Personality*, 25(3), 285–301.

Becker, L. J. (1978). Joint effect of feedback and goal setting on performance: A field study of residential energy conservation. *Journal of Applied Psychology*, 63(4), 428–433.

Beggs, C. (2002). *Energy: Management, supply and conservation*. Oxford: Butterworth-Heinemann.

Benders, R. M. J., Kok, R., Moll, H. C., Wiersma, G., and Noorman, K. J. (2006). New approaches for household energy conservation—In search of personal household energy budgets and energy reduction options. *Energy Policy*, 34(18), 3612–3622.

Bentler, P. M., and Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88(3), 588–606.

Bennett, P. D., and Moore, N. K. (1981). Consumers' preferences for alternative energy conservation policies: A trade-off analysis. *Journal of Consumer Research*, 8, 313–321

Bentz, J. W., Dorfman, L., Denniston, R., and Novelli, W. (2005). Opportunities for social change through upstream partnerships. *Social Marketing Quarterly,* 11(3–4), 17–25.

Berry, T. D., Geller, E. S., Calef, R. S., and Calef, R. A. (1992). Moderating effects of social assistance on verbal interventions to promote safety belt use: An analysis of weak plys. *Environment and Behavior,* 24(5), 653–669.

Bhattacharyya, S. C. (2009). Fossil-fuel dependence and vulnerability of electricity generation: Case of selected European countries. *Energy Policy, 37*(6), 2411–2420.

Bielecki, J. (2002). Energy security: Is the wolf at the door? *Quarterly Review of Economics and Finance,* 42(2), 235–250.

Bigsby, H., and Ozanne, L. K. (2002). The purchase decision: Consumers and environmentally certified wood products. *Forest Products Journal*, 52, 100–105.

Black, R. (10 December 2009). Emissions "higher than reported". *BBC News*, Retrieved 12 December, 2009 from http://news.bbc.co.uk/2/hi/science/nature/8405921.stm

Bloom, P. N., and Novelli, W. D. (1981). Problems and challenges in social marketing. *Journal of Marketing,* 45(2), 79–88.

Blunch, N. J. (2008). *Introduction to structural equation modelling using SPSS and AMOS*. Thousand Oaks, California: SAGE Publications Ltd.

Boehm, A. (2009). Applying social marketing in the development of a volunteer program. *Social Marketing Quarterly,* 15(3), 67–84.

Booms, B. H., and Bitner, M. J. (1981). Marketing strategies and organization structures for service firms. In J. H. Donnelly and W. R. George (Eds.), *Marketing of services* (pp. 47–51). Chicago, IL: American Marketing Association.

Borden, N. H. (1964). The concept of the marketing mix. *Journal of Advertising Research,* 4(2), 2–7.

Braun, J. v. (2009). Addressing the food crisis: Governance, market functioning, and investment in public goods. *Food Security*, 1(1), 9–15.

Braun, B., and Williams, S. (1979). *Changing household energy use.* Paper presented at the Second International Conference on Energy Use Management, Los Angeles, California.

Bream, C. F. (1986). Energy management in buildings – Techniques and priorities. In A. F. C. Sherratt (Ed.), *Energy management in buildings*. London: Hutchinson.

Bright, A. D. (2000). The role of social marketing in leisure and recreation management. *Journal of Leisure Research*, 32(1), 12–17.

Broadens, K. S., and Abbott, B. B. (2008). *Research design and methods: A process approach* (7th ed.). New York: McGraw-Hill.

Bryant, C. A. (2004). An interview with R. Craig Lefebvre. *Social Marketing Quarterly,* 10(1), 17–30.

Byrne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (2nd ed.). New York: Routledge.

Byrne, K. (2004). Managing your marketing mix. *Chartered Accountants Journal,* 83(1), 57–58.

Cai, W. G., Wu, Y., Zhong, Y., and Ren, H. (2009). China building energy consumption: Situation, challenges and corresponding measures. *Energy Policy,* 37(6), 2054–2059.

Camit, M. (2002). Smoke alarms wake you up if there's a fire: A smoke alarm campaign targeting Arabic, Chinese, and Vietnamese communities in New South Wales. *Social Marketing Quarterly,* 8(1), 52–54.

Capehart, B. L., Turner, W. C., and Kennedy, W. K. (2008). *Guide to energy management*. United States of America: Fairmont Press.

Carlye Consulting Group. (2004). *The top 10 ways to reduce the facility budget (without sacrificing quality)*. Carlye Consulting Group.

Carrico, A. R., and Riemer, M. (2011). Motivating energy conservation in the workplace: An evaluation of the use of group-level feedback and peer education. *Journal of Environmental Psychology*, 31(1), 1–13.

Carroll, T. E., and Veen, L. V. (2002). Public health social marketing: The immunise Australia program. *Social Marketing Quarterly*, 8(1), 55–61.

Chartered Institute of Marketing. (2009). *Marketing and the 7Ps: A brief summary of marketing and how it works*. Berkshire.

Chau, C. K., Tse, M. S., and Chung, K. Y. (2010). A choice experiment to estimate the effect of green experience on preferences and willingness-to-pay for green building attributes. *Building and Environment*, 45(11), 2553–2561.

Cheng, H., Kotler, P., and Lee, N. (2011). *Social marketing for public health: Global trends and success stories*. Sudbury, MA: Jones and Bartlett.

Cherry, L., and Redmond, S. P. (1994). A social marketing approach to involving Afghans in community-level alcohol problem prevention. *Journal of Primary Prevention*, 14(4), 289–310.

Cheung, S. F., Chan, D. K. S., and Wong, Z. S. Y. (1999). Reexamining the theory of planned behavior in understanding wastepaper recycling. *Environment and Behavior*, 31(5), 587–612.

Cheung, H. D., and Chung, T. M. (2008). A study on subjective preference to daylit residential indoor environment using conjoint analysis. *Building and Environment*, 43, 2101–2111

Chiang, W.-y., K., and Li, Z. (2010). An analytic hierarchy process approach to assessing consumers' distribution channel preference. *International Journal of Retail and Distribution Management*, 38(2), 78–96.

Chin, W. W. (1998). Issues and Opinion on Structural Equation Modeling. *MIS Quarterly*, *22*(1), 7-16.

Chin, W. W. (2010). How to write up and report PLS analyses. In V. Esposito Vinzi et al. (Eds.), *Handbook of partial least squares* (pp. 655–690). Springer-Verlag Berlin Heidelberg: Springer Handbooks of Computational Statistics.

China vows climate change action. (22 September 2009). *BBC News*, Retrieved 5 December, 2009 from: http://news.bbc.co.uk/2/hi/science/nature/8268077.stm

Choong, W. W. (2008). *Conceptual model of energy awareness development process.* Unpublished Doctor of Philosophy, Universiti Teknologi Malaysia.

Choong, W. W. (2011). *The process of fostering sustainable awareness and behaviour among urban communities*. Paper presented at the 17th International Symposium on Society and Resource Management, Sabah.

Choong, W. W., Abdul Hakim Mohammed, and Buang Alias. (2006). Energy Conservation: A Conceptual Framework of Energy Awareness Development Process. *Malaysian Journal of Real Estate*, 1(1), 58-67.

Chopra, R. (2005). *Academic dictionary of psychology*. Delhi: Isha Books.

Chotipanich, S. (2004). Positioning facility management. *Facilities*, 22(13/14), 364–372.

Chrzan, K., and Orme, B. (2000). *An overview and comparison of design strategies for choice-based conjoint analysis.* Paper presented at the Sawtooth Software Conference 2000, Hilton Head Island, South Carolina.

Cleveland, C. J., and Morris, C. G. (2006). *Dictionary of energy*. Amsterdam; London: Elsevier.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Cohen, J. (1992). Quantitative methods in psychology: A power primer. *Psychological Bulletin, 112*(1), 155-159.

Committee on Civil Engineering and Architecture Science Council of Japan. (2007). *Policy recommendations for reducing energy consumption by the building sector*. Japan.

Consumer Affairs Victoria (2006). *Social marketing and consumer policy: Research paper no. 4*. Melbourne: Consumer Affairs Victoria.

Corder, G. W., & Foreman, D. I. (2009). *Nonparametric statistics for non-statisticians: A step by step approach*. Hoboken, new Jersey: John Wiley & Sons.

Cork, S. (2008). Beating the barriers to social marketing. *Social Marketing Quarterly*, 14(1), 38–49.

Corsini, R. J. (2002). *The dictionary of psychology*. Philadelphia, PA: Brunner/Mazel.

Cruez, A. F. (2005, Aug 24). "TAK NAK" CAMPAIGN: Up in smoke. *New Straits Times.* p. 011.

Cudeck, R., and Toit, S. H. C. d. (2009). General structural equation models. In R. E. Millsap, and A. Maydeu-Olivares (Eds.), *The SAGE handbook of quantitative methods in psychology* (pp. 515–539). London: SAGE Publications Ltd.

Curtis, T. (2008). *Marketing for engineers, scientists and technologists*. England: John Wiley & Sons.

Dahlberg, H. (1979). *Education and changing energy use.* Paper presented at the Second International Conference on Energy Use Management, Los Angeles, California.

Dann, S. (2008). Adaptation and adoption of the American Marketing Association (2007) definition for social marketing. *Social Marketing Quarterly*, 14(2), 92–100.

Dann, S. (2009). Redefining social marketing with contemporary commercial marketing definitions. *Business Research, Article in Press*.

Dannecker, E. A., Hausenblas, H. A., Connaughton, D. P., and Lovins, T. R. (2003). Validation of a stages of exercise change questionnaire. *Research Quarterly for Exercise and Sport,* 74(3), 236–247.

Davenport, D., Morgera, E., and Wagner, L. (13 December 2009). Summary of Copenhagen Business Day 11 December 2009. *Business Day Bulletin*, *160*.

Davie, M. G. (2008). *Evaluating a group-based sustainability intervention using the theory of planned behaviour.* Victoria University of Wellington, Wellington, New Zealand

Delprato, D. J. (1977). Prompting electrical energy conservation in commercial users. *Environment and Behavior,* 9(3), 433–440.

Denniston, R. (2004). Planning, implementing, and managing an unprecedented, government-funded prevention communications initiative. *Social Marketing Quarterly,* 10(2), 7–12.

Department of Statistics Malaysia. (2010). Population distribution and basic demographic characteristics. Putrajaya: Department of Statistics, Malaysia.

Dern, D. P. (1991). How to select the best marketing mix. *Home Office Computing,* 9(9), 18-20.

Deshpande, S., Rothschild, M. L., and Brooks, R. S. (2004). New product development in social marketing. *Social Marketing Quarterly,* 10(3–4), 39–49.

De Young, R. (1993). Changing behaviour and making it stick: The conceptualization and management of conservation behaviour. *Environment and Behaviour,* 25(4), 485–505.

DiClemente, C. C., Prochaska, J. O., Fairhurst, S. K., Velicer, W. F., Velasquez, M. M., and Rossi, J. S. (1991). The process of smoking cessation: An analysis of precontemplation, contemplation, and preparation stages of change. *Journal of Consulting and Clinical Psychology,* 59(2), 295–304.

Dietza, T., Gardnerb, G. T., Gilliganc, J., Sternd, P. C., and Vandenberghe, M. P. (2009). Household actions can provide a behavioral wedge to rapidly reduce US carbon emissions. *Proceedings of the National Academy of Sciences,* 106(44), 18452–18456.

Domegan, C. T. (2008). Social marketing: Implications for contemporary marketing practices classification scheme. *Journal of Business and Industrial Marketing*, 23(2), 135–141.

Dotinga, A., Schrijvers, C. T. M., Voorham, A. J. J., and Mackenbach, J. P. (2005). Correlates of stages of change of smoking among inhabitants of deprived neighbourhoods. *European Journal of Public Health,* 15(2), 152–159.

Drummond, J. R., Higgins, S. J. W., and Hubert, E. (2009). The healthy ecosystems, healthy people project: Using social marketing to promote environmentally active living. *International Review on Public and Nonprofit Marketing*, 6(2), 167-180.

Dumas, L. J. (1976). *The conservation response: Strategies for the design and operation of energy-using systems.* Lexington, MA: Lexington Books.

Duncan, S. F., and Goddard, H. W. (2005). *Family life education: Principles and practices for effective outreach*. Thousand Oaks, CA: Sage Publications.

Durand, R. M., and Sharma, S. (1982). Conservation or energy development: consumer perceptions of alternate solutions to the energy crisis. *Journal of the Academy of Marketing Science,* 10(4), 410-431.

Durdan, C. A., Reeder, G. D., and Hecht, P. R. (1985). Litter in university cafeteria: Demographic data and the use of prompts as an intervention strategy. *Environment and Behavior*, 17(3), 387–404.

Edgar, T., Boyd, S. D., and Palame, M. J. (2009). Sustainability for behaviour change in the fight against antibiotic resistance: A social marketing framework. *Journal of Antimicrobial Chemotherapy*, 63(2), 230–237.

El-Ansary, A. I. (1974). Towards a definition of social and societal marketing. *Journal of the Academy of Marketing Science*, 2(2), 316–321.

Energy Information Administration (EIA). (2009). *International energy outlook 2009*. Publication & Information Sales.

Erdmenger, C., Lehmann, H., Muschen, K., Tambke, J., Mayr, S., and Kuhnhenn, K. (2009). A climate protection strategy for Germany – 40% reduction of CO2 emissions by 2020 compared to 1990. *Energy Policy*, 37(1), 158–165.

Evans, D., and Norman, P. (2003). Predicting adolescent pedestrians' road-crossing intentions: An application and extension of the theory of planned behavior. *Health Education Research Theory and Practice*, 18(3), 267–277.

Evans, W. D., Wasserman, J., Bertolotti, E., and Martino, S. (2002). Branding behaviour: The strategy behind the truth SM campaign. *Social Marketing Quarterly*, 8(3), 17–29.

Fenerty-McKibbon, B., and Khare, A. (2005). Canada post delivers energy conservation. *Energy and Buildings*, 37(3), 221–234.

Fielding, K. S., McDonald, R., and Louis, W. R. (2008). Theory of planned behaviour, identity and intentions to engage in environmental activism. *Journal of Environmental Psychology*, 28(4), 318–326.

Finlinson, S. M. (2005). *Increasing organizational energy conservation behaviors: Comparing the theory of planned behavior and reasons theory for identifying specific motivational factors to target for change.* Ohio University, United States.

Fischer, C. (2008). Feedback on household electricity consumption: A tool for saving energy? *Energy Efficiency*, 1(1), 79–104.

Formoso, G., Marata, A. M., and Magrini, N. (2007). Social marketing: Should it be used to promote evidence-based health information? *Social Science & Medicine*, 64(4), 949–953.

Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50.

Foxall, G. (2002). Consumer behavioural analysis and social marketing. In G. C. Bartels and W. Nelissen (Eds.), *Marketing for sustainability: Towards transactional policy-making* (pp. 304–320). Amsterdam; Tokyo: IOS; Ohmsha.

Frame, B. (2004). The Big Clean Up: Social marketing for the Auckland region. *Local Environment*, 9(6), 507–526.

Freiden, J. B., and Downs, P. E. (1986). Testing the social involvement model in an energy conservation context. *Academy of Marketing Science*, 14(3), 13–20.

French, J., and Blair-Stevens, C. (2006). From snake oil salesmen to trusted policy advisors: The development of a strategic approach to the application of social marketing in England. *Social Marketing Quarterly*, 12(3), 29–40.

Fu, H.-P., and Lin, S.-W. (2009). Applying AHP to analyze criteria of performance measurement for national energy promotion projects. *International Journal of Electronic Business Management*, 7(1), 70–77.

Fuss, S., Johansson, D. J. A., Szolgayova, J., and Obersteiner, M. (2009). Impact of climate policy uncertainty on the adoption of electricity generating technologies. *Energy Policy*, 37(2), 733–743.

Gaballa, M. S. (1996). *Public education programs: A study of energy conservation in Tuscon, Arizona.* Master, University of Arezona, Tempe.

Gadenne, D., Sharma, B., Kerr, D., and Smith, T. (2011). The influence of consumers' environmental beliefs and attitudes on energy saving behaviours. *Energy Policy*, 39(12), 7684–7694.

Gan, P. Y., and Li, Z. D. (2007). An econometric study on long-term energy outlook and the implications of renewable energy utilization in Malaysia. *Energy Policy*, 36(2), 890–899.

Garver, M. S., and Mentzer, J. T. (1999). Logistics research methods: Employing structural equation modeling to test for construct validity. *Journal of Business Logistics*, 20(1), 33–57.

Gatersleben, B., and Appleton, K. M. (2007). Contemplating cycling to work: Attitudes and perceptions in different stages of change. *Transportation Research Part A – Policy and Practice*, 41(4), 302–312.

Gatersleben, B., Steg, L., and Svlek, C. (2002). Measurement and determinants of environmentally significant consumer behaviour. *Environment and Behaviour*, 34(3), 335–362.

Geethanjali, B., Hansa, L. M., and Daniel, M. (2007). An optimization of effective energy management as a tool to facilitate managers. In C. A. Brebbia and V. Popov (Eds.), *Energy & sustainability*. Southampton: WIT Press.

Glanz, K., Rimer, B. K., Viswanath, K., and Ebooks, C. (2008). *Health behavior and health education: Theory, research, and practice*. Hoboken: John Wiley & Sons, Inc.

Glassman, T., Braun, R. E., Dodd, V., Miller, J. M., and Miller, E. M. (2010). Using the theory of planned behavior to explain the drinking motivations of social, high risk, and extreme drinkers on game day. *Journal of Community Health*, 35(2), 172–181.

Goett, A. A., Hudson, K., and Train, K. E. (2000). Customer's choice among retail energy suppliers: The willingness to pay for service attributes. *The Energy Journal*, 21(4), 1–28.

Gordon, R., McDermott, L., Stead, M., Angus, K., and Hastings, G. (2006a). *A review of the effectiveness of social marketing physical activity interventions*. London: National Social Marketing Centre.

Gordon, R., McDermott, L., Stead, M., and Angus, K. (2006b). The effectiveness of social marketing interventions for health improvement: What's the evidence? *Public Health,* 120(12), 1133–1139.

Granda-Orive, J. I. d., Peña-Miguel, T., Jiménez-Ruiz, D. C., Solano-Reina, D. S., et al. (2004). Distribution of stages of change in smoking behavior in a group of young smokers (transtheoretical model). *Military Medicine,* 169(12), 972–975.

Green, P. E., and Rao, V. R. (1971). Conjoint measurement for quantifying judgmental data. *Journal of Marketing Research,* 8(3), 355–63.

Green, P. E., and Srinivasan, V. (1990). Conjoint analysis in marketing: New developments with implications for research and practice. *Journal of Marketing,* 54(4), 3–19.

Green, P. E., and Wind, Y. (1975). New way to measures consumers' judgements. *Harvard Business Review,* 53, 107–117.

Grier, S., and Bryant, C. A. (2005). Social marketing in public health. *Annual Review of Public Health,* 26, 319–339.

Grossman, C., Hadley, W., Brown, L., Houck, C., Peters, A., Tolou-Shams, M., et al. (2008). Adolescent sexual risk: Factors predicting condom use across the stages of change. *AIDS and Behavior,* 12(6), 913–922.

Gruchy, J. D., and Coppel, D. (2008). "Listening to reason": A social marketing stop-smoking campaign in Nottingham. *Social Marketing Quarterly,* 14(1), 6–17.

Guidotti, T. L., Watson, L., Wheeler, M., and Jhangri, G. S. (1996). The Fort McMurray demonstration project in social marketing: Health-and safety-related behaviour among oil sands workers. *Occupational Medicine*, 46(4), 265–274.

Gundlach, G. T., Block, L. G., and Wilkie, W. L. (2007). *Explorations of marketing in society*. Mason, Ohio: Thomson.

Gunnerson, R. (1989). Finding the right marketing mix. *Home Office Computing*, 7(8), 37–40.

Gustafsson, A., Herrmann, A., and Huber, F. (2007). Conjoint analysis as an instrument of market research practice. In A. Gustafsson, A. Herrmann, and F. Huber (Eds.), *Conjoint measurement: Methods and applications* (pp. 3–30). Berlin, Heidelberg, New York: Springer.

Gyberg, P., and Palm, J. (2009). Influencing households' energy behaviour – How is this done and on what premises? *Energy Policy*, 37(7), 2807–2813.

Hair, J. F. J., Anderson, R. E., Tatham, R. L., and C., B. W. (1998). *Multivariate data analysis* (5th ed.). New Jersey: Prentice Hall.

Hair, J. F., Ringle, C. M., and Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 139–151.

Haldeman, T., and Turner, J. W. (2009). Implementing a community-based social marketing program to increase recycling. *Social Marketing Quarterly*, 15(3), 114–127.

Halicioglu, F. (2009). An econometric study of CO2 emissions, energy consumption, income and foreign trade in Turkey. *Energy Policy*, 37(3), 1156–1164.

Han, H., Hsu, L.-T., and Sheu, C. (2010). Application of the theory of planned behavior to green hotel choice: Testing the effect of environment friendly activities. *Tourism Management*, 31(3), 325–334.

Hansen, S. J. (2002). *Manual for intelligent energy services*. Lilburn, GA: Fairmont Press.

Harland, P., Staats, H., and Wilke, H. A. M. (1999). Explaining proenvironmental intention and behavior by personal norms and the theory of planned behavior. *Journal of Applied Social Psychology*, 29(12), 2505–2528.

Hawken, P. (1993). *The ecology of commerce: A declaration of sustainability*. New York, NY: HarperBusiness.

Henry, H. W., Symonds, F. W., Bohm, R. A., Gibbons, J. H., Moore, J. R. and Snyder, W. T. (1980). *Energy Management Theory and Practice.* Energy, power, and environment, 8. New York: M. Dekker.

Henseler, J. R., Ringle, C. M., and Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *Advances in International Marketing*, 20, 277–319.

Herzog, T. A., and Blagg, C. O. (2007). Are most precontemplators contemplating smoking cessation? Assessing the validity of the stages of change. *Health Psychology*, 26(2), 222–231.

Hinton, P. R., Brownlow, C., McMurray, I., and Cozens, B. (2004). *SPSS explained*. Madison, New York: Taylor & Francis Group.

Ho, H.-F., and Hung, C.-C. (2008). Marketing mix formulation for higher education: An integrated analysis employing analytic hierarchy process, cluster analysis and correspondence analysis. *International Journal of Educational Management*, 22(4), 328–340.

Hoe, S. L. (2008). Issues and procedures in adopting structural equation modeling technique. *Journal of Applied Quantitative Methods*, 3(1), 76–83.

Holdershaw, J., Gendall, P., and Wright, M. (2011). Predicting blood donation behaviour: Further application of the theory of planned behaviour. *Journal of Social Marketing*, 1(2), 120-132.

Hooper, D., Coughlan, J., and Mullen, M. R. (2008). Structural equation modelling: guidelines for determining model fit. *Electronic Journal of Business Research Methods*, 6(1), 53–50.

Hopper, J. R., and Nielsen, J. M. (1991). Recycling as altruistic behaviour: Normative and behavioral strategies to expand participation in a community recycling program. *Environment and Behavior*, 23(2), 195–220.

House, M. (1995). Marketing mix. In J. V. Mellillo and P. Lavender (Eds.), *Market the arts!* (pp. 46–54). New York: Publication of ARTS Action Issues.

Howell, J. (2009). CBC/HB for beginners. Retrieved Aug 15, 2011, from http://www.sawtoothsoftware.com/download/techpap/CBCHBbeginners.pdf

Hoyer, W. D., and MacInnis, D. J. (2010). *Consumer behavior*. Australia; Mason, OH: South-Western Cengage Learning.

Hu, L. T., and Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*, 3(4), 424–453.

Hughes, M. A., Price, R. L., and Marrs, D. W. (1986). Linking theory construction and theory testing: Models with multiple indicators of latent variables. *Academy of Management Review*, 11(1), 128–144.

Hunt, S. D., Sparkman, R. D., and Wilcox, J. J. B. (1982). The pretest in survey research: Issues and preliminary findings. *Journal of Marketing Research*, 19(2), 269–273.

Hsu, M. K. (2010). Structural equation modelling with IBM SPSS Amos: A methodology for predicting behavioral intentions in the services sector. Retrieved Nov 11 2011, from IBM Corporation http://public.dhe.ibm.com/common/ssi/ecm/en/ytw03074usen/YTW03074USEN.PDF

Intergovernmental Panel on Climate Change (IPCC). (2007). Summary for policymakers. In: [S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor, and H. L. Miller (Eds.)], *Climate change 2007: The physical science basis*. *Contribution of Working Group I to the fourth assessment report*. Cambridge, United Kingdom; New York, NY, USA: Cambridge University Press.

International Energy Agency (IEA). (2005a). *Saving electricity in a hurry*. Paris, France: International Energy Agency.

International Energy Agency (IEA). (2007). *IEA energy efficiency policy recommendations to the G8 2007 summit*. Heligendamm.

International Energy Agency (IEA). (2008). *World energy outlook 2008*.

International Energy Agency (IEA). (2009a). *CO2 emissions from fuel combustion: Highlights*. International Energy Agency.

International Energy Agency (IEA). (2009b). *Oil market report*.

International Energy Agency (IEA), and Organisation for Economic Co-operation and Development (OECD). (2007). *World energy outlook 2007: China and India insights*. Paris: OECD/IEA.

International Monetary Fund (IMF). (October 2009). *World economic outlook.*

Ismail, M. (2009). The gendered nature of careers: Evidence from a Malaysian university. *Journal of International Management Studies,* 4(2), 175–184.

Jackson, S. L. (2009). *Research methods and statistics* (Third ed.). Belmont, USA: Wadsworth Cengage Learning.

Jager, W. (2007). The four P's in social simulation, a perspective on how marketing could benefit from the use of social simulation. *Journal of Business Research,* 60(8), 868–875.

Jayaraman, T. K., and Keong, C. C. (2009). Growth and oil price: A study of causal relationships in small Pacific Island countries. *Energy Policy,* 37(6), 2182–2189.

Jensen, M. B. (2008). Planning of online and offline B2B promotion with conjoint analysis. *Journal of Targeting, Measurement and Analysis for Marketing*, 16(3), 203–213.

Jesson, J. (2007). Creating a demand for better health by using social marketing techniques. *Pharmaceutical Journal,* 278(7458), 776–777.

Jin, J. C., Choi, J.-Y., and Yu, E. S. H. (2009). Energy prices, energy conservation, and economic growth: Evidence from the postwar United States. *International Review of Economics and Finance,* 18(4), 691–699.

Jochem, E. (2000). Energy end-use effiiency. In J. Goldenberg (Ed.), *World Energy Assessment: Energy and the challenge of sustainability* (pp. 173-217): United Nations Development Project, New York.

Johansson, M., and Henningsson, M. (2011). Social-psychological factors in public support for local biodiversity conservation. *Society and Natural Resources*, 24(7), 717–733.

Johnson, R. M., and Orme, B. (1996). How many questions should you ask in choice-based conjoint studies? Retrieved July 20, 2011, from Sawtooth Software, Inc. http://www.sawtoothsoftware.com/download/techpap/howmanyq.pdf

Johnson, R., and Orme, B. (2003). *Getting the most from CBC*. Retrieved August 6, 2011, from Sawtooth Software, Inc.: http://www.sawtoothsoftware.com/download/techpap/cbcmost.pdf

Johnson, R., and Orme, B. (2010). *Including holdout choice tasks in conjoint studies*. Retrieved August 9, 2011, from Sawtooth Software, Inc.: http://www.sawtoothsoftware.com/download/techpap/inclhold.pdf

Jones, P., Clarke-Hill, C., Comfort, D., and Hillier, D. (2008). Marketing & sustainability. *Marketing Intelligence and Planning,* 26(2), 123.

Jones, L. V., and Thissen, D. (2007). A history and overview of psychometrics. In C. R. Rao and S. Sinharay (Eds.), *Handbook of statistics: Vol 26*. Oxford, UK: Elsevier. B.V.

Joreskog, K. G. (1969). A general approach to confirmatory maximum likelihood factor analysis. *Psychometrika*, 34(2), 183–202.

Joreskog, K. G. (1973). Analysis of covariance structures. In P. R. Krishnaiah (Ed.), *Multivariate analysis--IlI* (pp. 263–285). New York: Academic Press, Inc.

Joreskog, K. G. (1978). Structural analysis of covariance and correlation matrices. *Psychometrika*, 43(4), 443–477.

Joreskog, K., and Sorbom, D. (1993). *LISREL 8: Structural equation modeling with the SIMPLIS command language*. Lincolnwood, USA: Scientific Software International, Inc.

Kanning, U. P., Vogler, S., Bernhold, T., Gellenbeck, K., and Schlockermann, B. (2008). Determinants of the implementation of facility management in German communes. *Facilities,* 26(9/10), 418–425.

Kantola, S. J., Syme, G. J., and Campbell, N. A. (1982). The role of individual differences and external variables in a test of the sufficiency of Fishbein's model to explain behavioral intentions to conserve water. *Journal of Applied Social Psychology,* 12(1), 70–83.

Kataria, M., and Larsen, K. (2009). Effects of social marketing on battery collection. *Resources, Conservation and Recycling,* 53, 429–433.

Kaufman, L. (2009). Utilities Turn Their Customers Green, With Envy Retrieved 15 January 2011, from The New York Times http://www.nytimes.com/2009/01/31/science/earth/31compete.html

Kautonen, T., Gelderen, M. v., and Tornikoski, E. T. (2013). Predicting entrepreneurial behaviour: A test of the theory of planned behaviour. *Applied Economics,* 45(6), 697–707.

Kempton, W., and Schipper, L. (1994). *Expanding the human dimensions research agenda.* Paper presented at the Proceedings of the ACEE 1944 Summer Study on Energy Efficiency in Buildings.

Kikuchi, E., Bristow, D., and Kennedy, C. A. (2009). Evaluation of region-specific residential energy systems for GHG reductions: Case studies in Canadian cities. *Energy Policy,* 37(4), 1257–1266.

Kincaid, D. (1994). Integrated facility management. *Facilities,* 12(8), 20–23.

Klopper, H. B., Berndt, A., Chipp, K., Ismail, Z., Roberts-Lombard, M., Subramani, D., Hern, L. (2006). *Marketing: Fresh perspectives*. Cape Town: Pearson/Prentice Hall South Africa.

Kotler, P. (1984). *Marketing essentials*. Englewood Cliffs, NJ: Prentice-Hall.

Kotler, P. (2003). *Marketing insights from A to Z: 80 concepts every manager needs to know*. Hoboken, NJ: John Wiley & Sons.

Kotler, P., and Armstrong, G. (1993). *Marketing: An introduction*. Englewood Cliffs, NJ: Prentice Hall.

Kotler, P., and Lee, N. (2007). *Marketing in the public sector: A roadmap for improved performance*. Upper Saddle River, NJ: Wharton School Pub.

Kotler, P., and Lee, N. R. (2008). *Social marketing: Influencing behaviors for good*. Los Angeles: Sage Publications.

Kotler, P., Roberto, N., and Lee, N. (2002). *Social marketing: Improving the quality of life* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Kotler, P., and Zaltman, G. (1971). Social marketing: An approach to planned social change. *Journal of Marketing*, 35, 3–12.

Krajnc, D., Lukman, R., and Glavic, P. (2008). Approaches to sustainable energy consumption patterns. In F. Kreith and D. Y. Goswami (Eds.), *Energy management and conservation handbook*. Boca Raton: Taylor & Francis Group.

Kreith, F. (2008). Introduction to energy management and conservation. In F. Kreith and D. Y. Goswami (Eds.), *Energy management and conservation handbook*. Boca Raton: Taylor & Francis Group.

Kreith, F., and Goswami, D. Y. (2008). *Energy management and energy conservation handbook*. Boca Raton: Taylor & Francis Group.

Krejcie, R. V., and Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607–610.

Kremers, S. P., Bruijn, G.-J. d., Visscher, T. L., Mechelen, W. v., Vries, N. K. d., and Brug, J. (2006). Environmental influences on energy balance-related behaviors: A dual-process view. *International Journal of Behavioral Nutrition and Physical Activity,* 3(9), 1-10.

Krummel, D. A., Semmens, E., Boury, J., Gordon, P. M., and Larkin, K. T. (2004). Stages of change for weight management in postpartum women. *Journal of the American Dietetic Association,* 104(7), 1102–1108.

Kruyt, B., Vuuren, D. P. v., Vries, H. J. M. d., and Groenenberg, H. (2009). Indicators for energy security. *Energy Policy,* 37(6), 2166–2181.

Kuriyama, K., and Ishii, Y. (2000). Estimation of the environmental value of recycled wood wastes: A conjoint analysis study. *Journal of Forest Research,* 5(1), 1–6.

Lagarde, F. O., Lotenberg, L. D., Albion, M., and Hastings, G. (2007). It's all about the customer . . . and the context. *Social Marketing Quarterly,* 13(3), 51–57.

Landers, J., Mitchell, P., Smith, B., Lehman, T., and Conner, C. (2006). "Save the crabs, then eat 'em": A culinary approach to saving the Chesapeake Bay. *Social Marketing Quarterly,* 12(1), 15–28.

Lauffer, A. (1997). *Grants, etc*. Thousand Oaks, CA: Sage Publications.

Lavack, A. M., Watson, L., and Markwart, J. (2007). Quit and win contests: A social marketing success story. *Social Marketing Quarterly,* 13(1), 31–52.

Lazer, W. (1996). Marketing's changing social relationships. *Marketing Management,* 5(1), 52–57.

Lee, S. W. (2005). *Encyclopedia of school psychology*. Thousand Oaks, CA: Sage Publications.

Leech, N. L., Barrett, K. C., and Morgan, G. A. (2008). *SPSS for intermediate statistics: Use and interpretation* (3rd ed.). Madison, New York: Taylor & Francis Group.

Lefebvre, R. C. (2009). The change we need: New ways of thinking about social issues. *Social Marketing Quarterly*, 15(3), 142–144.

Lefebvre, R. C., and Flora, J. A. (1988). Social marketing and public health intervention. *Health Education Quarterly*, 15(3), 299–315.

Leiserowitz, A. (2007) *International public opinion, perception, and understanding of global climate change*. Occasional Paper: Human Development Report Office 2007.

Leung, M.-Y., Lu, X., and Ip, H.-Y. (2005). Investigating key components of the facility management of secondary schools in Hong Kong. *Facilities*, 23(5/6), 226–238.

Li, J. (2007). *Sustainable energy future in China's building sector*. Paper presented at the International Conference for Enhanced Building Operations, San Francisco.

Liao, C.-W., Yao, K.-C., and Chin, D.-F. (2008). *Optimal planning of energy conservation for vocational high schools in Taiwan*. Paper presented at the 2nd International Conference on Innovative Computing, Information and Control, ICICIC 2007. Retrieved from: http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=04427741

Lin, H.-F. (2007). Predicting consumer intentions to shop online: An empirical test of competing theories. *Electronic Commerce Research and Applications*, 6(4), 433–442.

Lindenberg, S., and Steg, L. (2007). Normative, gain and hedonic goal frames guiding environmental behavior. *Journal of Social Issues*, 63(1), 117–137.

Lippke, S., Ziegelmann, J. P., Schwarzer, R., and Velicer, W. F. (2009). Validity of stage assessment in the adoption and maintenance of physical activity and fruit and vegetable consumption. *Health Psychology,* 28(2), 183–193.

Lokhorst, A. M., Staats, H., Dijk, J. v., Dijk, E. v., and Snoo, G. d. (2011). What's in it for me? Motivational differences between farmers' subsidised and non-subsidised conservation practices. *Applied Psychology: An International Review,* 60(3), 337–353.

Long, T., Taubenheim, A. M., Wayman, J., Temple, S., and Ruoff, B. A. (2008). The heart truth: Using the power of branding and social marketing to increase awareness of heart disease in women. *Social Marketing Quarterly,* 14(3), 3–29.

Loozen, A and Moosdijk, C.V.D. (2001). A Consumer Advise on Energy Efficient Use and Purchase of Household Appliances and Lighting. In: Bertoldi, P., Ricci, A. and Almeida, A.D. *Energy Efficiency in Household Appliances and Lighting* (pp. 468-474). Berlin: Springer.

Lotenberg, L. D. (2010). Place: Where the action is. *Social Marketing Quarterly,* 16(1), 130–135.

Low, S. T., Mohammed, A. H. B., Choong, W. W., and Alias, B. B. (2010). *The energy knowledge and conservation behaviour among community in university*. Paper presented at the International University Social Responsibility Conference and Exhibition 2010.

Luce, R. D., and Tukey, J. W. (1964). Simultaneous conjoint measurement: A new type of fundamental measurement. *Journal of Mathematical Psychology*, 1(1), 1–27.

MacAskill, S., Stead, M., MacKintosh, A. M., and Hastings, G. (2002). "You cannae just take cigarettes away from somebody and no'gie them something back": Can social marketing help solve the problem of low-income smoking? *Social Marketing Quarterly*, 8(1), 19–34.

Macfadyen, L., Stead, M., and Hastings, G. (1999). *A synopsis of social marketing* [Electronic Version].

MacFadyen, L., Stead, M., and Hastings, G. (2003). Social marketing. In M. J. Baker (Ed.), *The marketing book*. Oxford: Butterworth-Heinemann.

Maellaro, R. (2008). *Determining the ideal combination of interpersonal skills for MBA graduates: A conjoint analysis study of hiring manager preferences.* Doctor of Philosophy, Fielding Graduate University, Santa Barbara.

Mah, M. W., Deshpande, S., and Rothschild, M. L. (2006). Social marketing: A behaviour change technology for infection control. *American Journal of Infection Control*, 34(7), 452–457.

Maibach, E. W. (2002). Explicating social marketing: What is it, and what isn't. *Social Marketing Quarterly*, 8(4), 7–13.

Maibach, E. W., Renouf, C. R., and Leiserowitz, A. (2008). Communication and marketing as climate change–intervention assets: A public health perspective. *American Journal of Preventive Medicine*, 35(5), 488–500.

Malla, S. (2009). CO2 emissions from electricity generation in seven Asia-Pacific and North American countries: A decomposition analysis. *Energy Policy*, 37(1), 1–9.

Mansor, S. A. (21 October 2008). *Keynote speech at Powergen Asia 2008 conference*. Kuala Lumpur, Malaysia: Ministry of Energy Green Technology and Water.

Marans, R. W., and Edelstein, J. Y. (2010). The human dimension of energy conservation and sustainability. *International Journal of Sustainability in Higher Education*, 11(1), 6–18.

Marcell, K., Agyeman, J., and Rappaport, A. (2004). Cooling the campus: Experiences from a pilot study to reduce electricity use at Tufts University, USA, using social marketing methods. *International Journal of Sustainability in Higher Education*, 5(2), 169–89.

Markis, T., and Paravantis, J. A. (2007). Energy conservation in small enterprises. *Energy and Buildings*, 39(4), 404–415.

Marshall, R. J., Petrone, L., Takach, M. J., Sansonetti, S., Wah-Fitta, M., Bagnall-Degos, A., et al. (2007). Make a kit, make a plan, stay informed: Using social marketing to change the population's emergency preparedness behavior. *Social Marketing Quarterly,* 13(4), 47–64.

Matthews, D. (2008). *Special event production: The process*. Amsterdam; Boston: Elsevier Butterworth-Heinemann.

Matthews, B., and Ross, L. (2010). *Research methods: A practical guide for the social sciences*. England: Pearson Education Limited.

Matutinovic, I. (2008). Lifestyles, energy, and sustainability: The exploration of constraints. In F. Kreith and D. Y. Goswami (Eds.), *Energy management & conservation handbook*. Boca Raton: Taylor and Francis Group.

Mazzocchi, M. (2008). *Statistics for marketing and consumer research*. Thousand Oaks: SAGE Publications Ltd.

McAllister, J. M., Lindsay, G. B., Merrill, R. M., and Perego, U. A. (2002). Cigarette smoking and stages of change among men and women in Kiev, Ukraine. *European Journal of Public Health,* 12(4), 302–307.

McCarthy, E. J., and Perreault, W. D. (1985). *Essentials of marketing*. Homewood, IL: R.D. Irwin.

McCarthy, J. (1978). *Basic marketing: A managerial approach*. Homewood, IL: Irwin.

McDonald, R. P., and Ho, M.-H. R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods*, 7(1), 64–82.

McKay, S., and Khare, A. (2004). Awareness development for an energy management program for social housing in Canada. *Energy and Buildings,* 36(3), 237–250.

McKenzie-Mohr, D. (2011). *Fostering sustainable behavior: An introduction to community-based social marketing* (3rd ed.). Canada: New Society Publishers.

McMakin, A. H., Malone, E. L., and Lundgren, R. E. (2002). Motivating residents to conserve energy without financial incentives. *Environment and Behavior*, 34(6), 848–863.

McMillan, B., and Conner, M. (2003). Using the theory of planned behaviour to understand alcohol and tobacco use in students. *Psychology, Health & Medicine,* 8(3), 317–328.

Mendler, S., Odell, W., and Lazarus, M. A. (2006). *The HOK guidebook to sustainable design*. Hoboken, NJ: J. Wiley.

Merritt, R., Christopoulos, A., and Thorpe, A. (2009). Where are all the products? Are we really doing social marketing or are we doing social sales? *Social Marketing Quarterly,* 15(2), 5–13.

Messerlian, C., and Derevensky, J. (2006). Social marketing campaigns for youth gambling prevention: Lessons learned from youth. *International Journal of Mental Health and Addiction,* 4(4), 294–306.

Mhurchu, C. N., Margetts, B. M., and Speller, V. M. (1997). Applying the stages-of-change model to dietary change. *Nutrition Reviews,* 55(1), 10–16.

Miller, J. A., Austin, J., and Rohn, D. (2004). Teaching pedestrian safety skills to children. *Environment and Behavior,* 36(3), 368–385.

Miller, K. L. (2010). *The nonprofit marketing guide: High-impact, low-cost ways to build support for your good cause*. San Francisco, CA: Jossey-Bass.

Ministry of Energy Green Technology and Water. (2007). *National energy balance 2007*. Selangor: Malaysia Energy Centre.

Ministry of Energy Green Technology and Water. (2008). *National energy balance 2008 Malaysia*. Selangor: Malaysia Energy Centre.

Ministry of Energy Green Technology and Water. (2009). *National energy balance 2009 Malaysia*. Putrajaya: Ministry of Energy, Green Technology and Water.

Ministry of Natural Resources and Environment Malaysia. (2009). *National policy on climate change*. Malaysia: Ministry of Natural Resources and Environment Malaysia.

Mohamed Samsudeen Sajahan, Mohd Radzi Mohd Khir, Nur Rashidi Johari, & Elias Jaafar. (2012). Social Marketing practice in "Anti Drug campaign" as an alternative of continuous improvement in public awareness. *Interdisciplinary Journal of Contemporary Research in Business, 3*(9), 58-70.

Montano, D. E., and Kasprzyk, D. (2008). Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. In K. Glanz, B. K. Rimer, and K. Vismanath (Eds.), *Health behavior and health education: Theory, research, and practice* (pp. 67–96). San Francisco: Jossey-Bass.

Moore, C. (2010). *Analysing pick n' mix menus via choice models to optimise the client portfolio – theory and case study*. Paper presented at the Sawtooth Software Conference 2010, Newport Beach, California.

Morden, A. R. (1987). *Elements of marketing*. Eastleigh [England]: DP Publications.

Moriarty, P., and Honnery, D. (2009). What energy levels can the Earth sustain? *Energy Policy*, 37(7), 2469–2474.

Morris, Z. S., and Clarkson, P. J. (2009). Does social marketing provide a framework for changing healthcare practice? *Health Policy*, 91(2), 135–141.

Moskowitz, H. R., and Silcher, M. (2006). The applications of conjoint analysis and their possible uses in sensometrics. *Food Quality and Preference*, 17(3–4), 145–165.

Mosler, H.-J., Tamas, A., Tobias, R., Rodríguez, T. C., and Miranda, O. G. (2008). Deriving interventions on the basis of factors influencing behavioral intentions for waste recycling, composting, and reuse in Cuba. *Environment and Behavior*, 40(4), 522–544.

Motiwala, A. (2008). *The dictionary of marketing*. Guajarat, India: IKON Marketing Consultants.

Moxnes, E. (2004). Estimating customer utility of energy efficiency standards for refrigerators. *Journal of Economic Psychology*, 25(6), 707–724.

Muhieldeen, M. W., Adam, N. M., Salleh, E., Tang, S. H., and Kwong, Q. J. (2008). *Student behavior that leads to energy abuse at a teaching institution in Malaysia.* Paper presented at the International Seminar in Sustainable Environment and Architecture (9th SENVAR + 2ND ISESEE 2008: Humanity and Technology), Uitm Shah Alam.

Mullan, E., and Markland, D. (1997). Variations in self-determination across the stages of change for exercise in adults. *Motivation and Emotion*, 21(4), 349–362.

Murphy, P. E., Laczniak, G. R., and Lusch, R. F. (1979). Ethical guidelines for business and social marketing. *Journal of the Academy of Marketing Science*, 6(3), 195–205.

Nakatani, K. (2004). Energy security and Japan: The role of international law, domestic law, and diplomacy. In B. Baton, C. Redgwell, A. Ronne, and D. N. Zillman (Eds.), *Energy security: Managing risk in a dynamic legal and regulatory environment* (pp. 413–427). United States: Oxford University Press.

Nandi, P., and Basu, S. (2008). A review of energy conservation initiatives by the Government of India. *Renewable and Sustainable Energy Reviews,* 12(2), 518–530.

National Science and Technology Council. (2008). Federal research and development agenda for net-zero energy, high performance green buildings. United States of America: National Science and Technology Council.

National Social Marketing Centre. (2008). *Effectively engaging people: Views from the World Social Marketing Conference 2008*. London: National Social Marketing Centre.

Nature. (1979). Opinion. *Nature, 279*(1).

Nehl, E. J., Blanchard, C. M., Peng, C.-Y. J., Rhodes, R. E., Kupperman, J., Sparlinng, P. B., et al. (2009). Understanding nonsmoking in African American and Caucasian college students: An application of the theory of planned behavior. *Behavioural Medicine,* 35(1), 23-29.

Nemzer, M., Page, D., and Carter, A. (2005). *Energy for keeps: Electricity from renewable energy: An illustrated guide for everyone who uses electricity*. Tiburon, CA: Energy Education Group.

Niblett, G. R. (2005). Stretching the limits of social marketing partnerships, upstream and downstream: Setting the context for the 10th innovations in social marketing conference. *Social Marketing Quarterly,* 11(3–4), 9–15.

Nieuw-Amerongen, M. E. v., Kremers, S. P. J., Vries, N. K. d., and Kok, G. (2011). The use of prompts, increased accessibility, visibility, and aesthetics of the stairwell to promote stair use in a university building. *Environment and Behavior*, 43(1), 131–139.

Norgard, J. S., and Christensen, B. L. (1996). Technological options and sustainable energy welfare. In R. Samuels and D. K. Prasad (Eds.), *Global warming and the built environment*. Hoboken: Spon Press.

North, E., and Vos, R. d. (2002). The use of conjoint analysis to determine consumer buying preferences: A literature review. *Journal of Family Ecology and Consumer Sciences*, 30, 32–39.

Nowak, G., Janssen, A., and Allen, C. (2001). Rapid application of an integrated social marketing framework: Lessons learned from the 2000-2001 U.S. influenza vaccine delay. *Social Marketing Quarterly*, 7(3), 111–115.

O'Connell, S., Henchion, M., and Collins, A. (2006). Optimising the service mix for Irish hoteliers: The challenge for small food suppliers. *International Journal of Contemporary Hospitality Management*, 18(3), 219–230.

O'Guinn, T. C., Allen, C. T., and Semenik, R. J. (2009). *Advertising and integrated brand promotion* (5th ed.). Australia; Mason, OH: South-Western Cengage Learning.

Olshefsky, A. M., Zive, M. M., Scolari, R., and Zuniga, M. (2007). Promoting HIV risk awareness and testing in Latinos living on the US-Mexico border: The Tu No Me conoces social marketing campaign. *Aids Education and Prevention*, 19(5), 422–435.

Organisation for Economic Co-operation and Development (OECD), and International Energy Agency (IEA). (1989). *Energy and the environment: Policy review*. Paris: OECD and International Energy Agency.

Orme, B. (2006). *The Sawtooth Software market simulator (A Supplement to the CBC v2.6 Manual)*. Sequim, WA: Sawtooth Software, Inc.

Orme, B. (2009). *Which conjoint method should I use?* (Technical Paper). Retrieved July 20, 2011, from Sawtooth Software, Inc.: http://www.sawtoothsoftware.com/download/techpap/whichmth.pdf

Orme, B. (2010). *Getting started with conjoint analysis: Strategies for product design and pricing research.* (Second ed.). Madison, Wis: Research Publishers LLC.

Orme, B. (2011). *SSI Web 7.0 user manual: Software for web interviewing and conjoint analysis*. Sequim, WA: Sawtooth Software, Inc.

Ouyang, J., Gao, L. L., Yan, Y., Hokao, K., and Ge, J. (2009). Effects of improved consumer behavior on energy conservation in the urban residential sector of Hangzhou, China. *Journal of Asian Architechure and Building Engineering,* 8(1), 243–249.

Ozaki, R. (2011). Adopting sustainable innovation: What makes consumers sign up to green electricity? *Business Strategy and the Environment*, 20(1), 1–17.

Ozaki, R., and Sevastyanova, K. (2011). Going hybrid: An analysis of consumer purchase motivations. *Energy Policy*, 39(5), 2217–2227.

Painter, J., Semenik, R., and Belk, R. (1983). Is there a generalized energy conservation ethic? A comparison of the determinants of gasoline and home heating energy conservation. *Journal of Economic Psychology*, 3(3-4), 317–331.

Patrick, D. R., Fardo, S. W., Richardson, R. E., and Patrick, S. R. (2007). *Energy conservation guidebook*. Lilburn, GA: Fairmont Press.

Pastorino, E., and Doyle-Portillo, S. (2010). *What is psychology? Essentials*. Australia; Bemont, CA: Wadsworth Cengage.

Paul, H., Henk, S., and Henk, A. M. W. (1999). Explaining proenvironmental intention and behavior by personal norms and the theory of planned behavior. *Journal of Applied Social Psychology,* 29(12), 2505–2528.

Payne, G. A. (1980). *The energy managers' handbook* (2nd ed.). England: Westbury House.

Peattie, K., and Peattie, S. (2009). Social marketing: A pathway to consumption reduction? *Journal of Business Research,* 62(2), 260–268.

Peattie, K., Peattie, S., and Clarke, P. (2001). Skin cancer prevention: Reevaluating the public policy implications. *Journal of Public Policy & Marketing,* 20(2), 268–279.

Pelling, E. L., and White, K. M. (2009). The theory of planned behavior applied to young people's use of social networking web sites. *CycberPsychology & Behavior*, *12*(6), 755–759.

Penrod, S. (1986). *Social psychology*. Englewood Cliffs, NJ: Prentice-Hall.

Peter, J. P., and Donnelly, J. H. (2009). *Marketing management knowledge and skills* (9th ed.). New York, NY: McGraw-Hill/Irwin.

Petersen, J. E., Shunturov, V., Janda, K., Platt, G., and Weinberger, K. (2007). Dormitory residents reduce electricity consumption when exposed to real-time visual feedback and incentives. *International Journal of Sustainability in Higher Education,* 8(1), 16–33.

Phillipson, L., Jones, S. C., and Wiese, E. (2009). Effective communication only part of the strategy needed to promote help-seeking of young people with mental health problems. *Social Marketing Quarterly,* 15(2), 50–62.

Pierce, J. P., Farkas, A. J., and Gilpin, E. A. (1998). Beyond stages of change: The quitting continuum measures progress towards successful smoking cessation. *Addiction (Abingdon, England)*, 93(2), 277–286.

Ping, F. Y., Yong, W., and Bin, L. C. (2009). Energy-efficiency supervision systems for energy management in large public buildings: Necessary choice for China. *Energy Policy*, 37(6), 2060–2065.

Pinnell, J. (2005). Comment on Huber: Practical suggestions for CBC studies. Retrieved August 9 2011, from Sawtooth Software, Inc http://www.skimgroup.com/images/stories/pdf/techn_papers/cbc_related_papers/pinnell.pdf

Plotnikoff, R. C., Lippke, S., Johnson, S. T., Hotz, S. B., Birkett, N. J., and Rossi, S. R. (2009). Applying the stages of change to multiple low-fat dietary behavioral contexts. An examination of stage occupation and discontinuity. *Appetite*, 53(3), 345–353.

Poel, B., Cruchten, G. v., and Balaras, C. A. (2007). Energy performance assessment of existing dwellings. *Energy and Buildings*, 39(4), 393–403.

Polat, G., and Donmez, U. (2010). ANP-based marketing activity selection model for construction companies. *Construction Innovation*, 10(1), 89–111.

Poortinga, W., Steg, L., Vlek, C., and Wiersma, G. (2003). Household preferences for energy-saving measures: A conjoint analysis. *Journal of Economic Psychology*, 24, 49–64.

Previte, J., and Dann, S. (2005). *Confronting the challenges in social marketing theory and practice*. Paper presented at the Australian and New Zealand Marketing Academy Conference (ANZMAC) 2005: Social, Non-profit and Political Marketing.

Price, N. (2001). The performance of social marketing in reaching the poor and vulnerable in AIDS control programmes. *Health Policy and Planning,* 16(3), 231-239.

Prochaska, J. O. (1979). *Systems of psychotherapy: A transtheoretical analysis*. Homewood, IL: Dorsey Press.

Prochaska, J. O., and Diclemente, C. C. (1982). Transtheoretical therapy: Toward a more integrative model of change. *Psychotherapy: Theory, Research and Practice,* 19(3), 276–288.

Prochaska, J. O., and DiClemente, C. C. (1983). Stages and processes of self change of smoking: Toward an intergrative model of change. *Journal of Consulting and Clinical Psychology,* 51(3), 390–395.

Prochaska, J. O., and Diclemente, C. C. (1984). *The transtheoretical approach: Crossing traditional boundaries of treatment*. Homewood, IL: Dow Jones-Irwin.

Prochaska, J. O., and Diclemente, C. C. (1986). Toward a comprehensive model of change: Processes of change. In W. R. Miller and N. Heather (Eds.), *Treating addictive behaviors* (pp. 3–27). New York: Plenum Publishing Corporation.

Prochaska, J. O., and Diclemente, C. C. (1992). Stages of change in the modification of problem behaviors. In M. Hersen, R. M. Eisler, and P. M. Miller (Eds.), *Progress in behavior modification* (pp. 184–214): Sycamore, IL: Sycamore Press.

Prochaska, J. O., and Velicer, W. F. (1997). The transtheoretical model of health behavior change. *American Journal of Health Promotion,* 12(1), 38–48.

Prochaska, J. O., Diclemente, C. C., and Norcross, J. C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist,* 47(9), 1102–1104.

Prochaska, J. O., DiClemente, C. C., Velicer, W. F., and Rossi, J. S. (1993). Standardized, individualized, interactive, and personalized self-help programs for smoking cessation. *Health Psychology,* 12(5), 399–405.

Prochaska, J. O., Redding, C. A., and Evers, K. E. (2008). The transtheoretical model and stages of change. In K. Glanz, B. K. Rimer, and K. Viswanath (Eds.), *Health behavior and health education: Theory, research, and practice* (pp. 97–121). San Francisco: Jossey-Bass.

Prochaska, J. O., Velicer, W. F., DiClemente, C. C., and Fava, J. (1988). Measuring processes of change: Applications to the cessation of smoking. *Journal of Consulting and Clinical Psychology,* 56(4), 520–528.

Prochaska, J. O., Velicer, W. F., Rossi, J. S., Goldstein, M. G., Marcus, B. H., Rakowski, W., et al. (1994). Stages of change and decisional balance for 12 problem behaviors. *Health Psychology,* 13(1), 39–46.

Prue, C. E., and Daniel, K. L. (2006). Social marketing: Planning before conceiving preconception care. *Maternal and Child Health Journal,* 10(1), 79–84.

Quine, L., Rutter, D. R., and Arnold, L. (1998). Predicting and understanding safety helmet use among schoolboy cyclists: A comparison of the theory of planned behaviour and the health belief model. *Psychology & Health,* 13(2), 251–269.

Quinn, G. P., Thomas, K. B., Hauser, K., Rodriguez, N. Y., and Rodriguez-Snapp, N. (2009). Evaluation of educational materials from a social marketing campaign to promote folic acid use among hispanic women: Insight from Cuban and Puerto Rican ethnic subgroups. *Journal of Immigrant and Minority Health,* 11(5), 406–414.

Qureshi, N., and Shaikh, B. T. (2006). Myths, fallacies and misconceptions: Applying social marketing for promoting appropriate health seeking behaviour in Pakistan. *Anthropology & Medicine,* 13(2), 131–139.

Ramaprasad, J. (2005). Warning signals, wind speeds and what next: A pilot project for disaster preparedness among residents of central Vietnam's lagoons. *Social Marketing Quarterly,* 11(2), 41–53.

Raghavarao, D., Wiley, J. B., and Chitturi, P. (2010). *Choice-based conjoint analysis: Models and designs*. Boca Raton:Taylor and Francis.

Redding, C. A., Rossi, J. S., Rossi, S. R., Velicer, W. F., and Prochaska, J. O. (2000). Health behavior models. *International Electronic Journal of Health Education,* 3(Special Issue), 180–193.

Richards, J., Hackett, A., Duggan, B., Ellis, T., Forrest, D., and Grey, P. (2009). An evaluation of an attempt to change the snacking habits of pre-school children using social marketing. *Public Health,* 123(1), 31–37.

Rogers, T. B. (1995). *The psychological testing enterprise: An introduction*. Pacific Grove, Calif: Brooks/Cole Pub. Co.

Rothschild, M. L. (1999). Carrots, sticks, and promises: A conceptual framework for the management of public health and social issue behaviours. *Journal of Marketing,* 63(4), 24–37.

Rumm, P. D. (2005). Mass communication and social marketing strategies to improve men's health. *Journal of Men's Health and Gender,* 2(1), 121–123.

Ryghaug, M., and Sorensen, K. H. (2009). How energy efficiency fails in the building industry. *Energy Policy,* 37(3), 984–991.

Saaty, T. L. (1977). A scaling method for priorities in hierarchical structures. *Journal of Mathematical Psychology,* 15(3), 234–281.

Saaty, T. L. (1999, August 12–14). *Fundamentals of the analytic network process.* Paper presented at The International Symposium on the Analytic Hierarchy Process, Kobe, Japan.

Saidur, R. (2009). Energy consumption, energy savings and emission analysis in Malaysian office buildings. *Energy Policy,* 37(10), 4104–4113.

Sardianou, E. (2007). Estimating energy conservation patterns of Greek households. *Energy Policy*, 35(7), 3778–3791.

Sawtooth Software. (2008). CBC v6.0 technical paper: The CBC system for choice-based conjoint analysis. Retrieved August 3, 2011, from Sawtooth Software, Inc http://www.sawtoothsoftware.com/download/techpap/cbctech.pdf

Say, N. P., and Yucel, M. (2006). Energy consumption and CO2 emissions in Turkey: Empirical analysis and future projection based on an economic growth. *Energy Policy*, 34(18), 3870–3876.

Schelly, C., Cross, J. E., Franzen, W. S., Hall, P., and Reeve, S. (2011). Reducing energy consumption and creating a conservation culture in organizations: A case study of one public school district. *Environment and Behavior*, 43(3), 316–343.

Schifter, D. E., and Ajzen, I. (1985). Intention, perceived control, and weight loss: An application of the theory of planned behavior. *Journal of Personality and Social Psychology*, 49(3), 843–851.

Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., and Griskevicius, V. (2007). The constructive, destructive, and reconstructive power of social norms. *Pscyhological Science,* 18(5), 429-434.

Schumacher, D. (1985). *Energy: Crisis or opportunity? An introduction to energy studies*. London: Macmillan.

Schumacker, R. E., and Lomax, R. G. (2004). *A beginner's guide to structural equation modeling* (2nd ed.). New York: Taylor & Francis, Inc.

Seligman, C., and Darley, J. M. (1977). Feedback as a means of decreasing residential energy consumption. *Journal of Applied Psychology,* 62(4), 363–368.

Shafiee, S., and Topal, E. (2009). When will fossil fuel reserves be diminished? *Energy Policy,* 37, 181–189.

Shakespeare, T. (23 October 2009). Climate change and disability: A burning issue. *BBC News.*

Siero, F. W., Bakker, A. B., Dekker, G. B., and Burg, M. T. C. v. d. (1996). Changing organization energy consumption behaviour through comparative feedback. *Journal of Environmental Psychology,* 16(3), 235–246.

Sipahi, S., and Timor, M. (2010). The analytic hierarchy process and analytic network process: An overview of applications. *Management Decision*, 48(5), 775–808.

Siti Nur Diyana Mahmud, and Kamisah Osman. (2010). The determinants of recycling intention behaviour among the Malaysian school students: An application of theory of planned behaviour. *Procedia Social and Behavioral Sciences*, 9, 119–124.

Slingerland, S. (1997). Energy conservation and organization of electricity supply in the Netherlands. *Energy Policy,* 25(2), 193–203.

Smith, A. J., and Henry, L. (2009). "Setting the guinea pigs free": Towards a new model of community-led social marketing. *Public Health,* 123(supplement 1), 1–5.

Smith, B. (2006). Notes from the field: How do I explain social marketing to my boss? *Social Marketing Quarterly,* 12(4), 78–81.

Smith, W. A. (2002). Social marketing and its potential contribution to a modern synthesis of social change. *Social Marketing Quarterly*, 8(2), 46–48.

Spearman, C. (1904). "General Intelligence", objectively determined and measured. *The American Journal of Psychology*, 15(2), 201–292.

Srinivapseatneg, V., Flachsbart, P. G., Dajani, J. S., and Hartley, R. G. (1981). Forecasting the effectiveness of work-trip gasoline conservation policies through conjoint analysis. *Journal of Marketing*, 45(3), 157–172.

Stead, M., Hastings, G., and McDermott, L. (2006). The meaning, effectiveness and future of social marketing. *Obesity Reviews*, 8(1), 189–193.

Steg, L. (2008). Promoting household energy conservation. *Energy Policy*, 36(12), 4449–4453.

Stead, M., Gordon, R., Angus, K., and McDermott, L. (2007). A systematic review of social marketing effectiveness. *Health Education,* 107(2), 126–191.

Steg, L., Dreijerink, L., and Abrahamse, W. (2006). Why are energy policies acceptable and effective? *Environment and Behavior*, 38(1), 92–111.

Stern, P. C. (1992). What psychology knows about energy conservation. *American Psychologist*, 47(10), 1224–1232.

Strand, J., Rothschild, M. L., and Nevin, J. R. (2004). "Place" and channels of distribution. *Social Marketing Quarterly,* 10(3–4), 8–13.

Sustainability Office. (2006). *A review of community based social marketing research for the reduction of energy consumption*. Retrieved 4 May, 2010, from: http://sustainability.utoronto.ca/Assets/Sustainability+Digital+Assets/Projects/rewire/rwlitpdf.pdf

Talbot, M. J. (1986). Energy conservation activity in the government estate. In A. F. C. Sherratt (Ed.), *Energy management in buildings*. London: Hutchinson.

Tan, E. J., Tanner, E. K., Seeman, T. E., Xue, Q. L., Rebok, G. W., Frick, K. D., Fried, L. P. (2010). Marketing public health through older adult volunteering: Experience corps as a social marketing intervention. *American Journal of Public Health, 100*(4), 727–734. doi: 10.2105/ajph.2009.169151

Taylor, S., and Todd, P. (1995). An integrated model of waste management behavior: A test of household recycling and composting intentions. *Environment and Behavior,* 27(5), 603–630.

Tellis, G. J. (2006). Modelling marketing mix. In R. Grover and M. Vriens (Eds.), *The handbook of marketing research: Uses, misuses, and future advances* (pp. 506–522). United States: Sage Publications.

Thumann, A., and Mehta, D. P. (1997). *Handbook of energy engineering*. Lilburn, GA: Fairmont Press.

Tikir, A., and Lehmann, B. (2011). Climate change, theory of planned behaviour and values: A structural equation model with mediation analysis. *Climate Change*, 104(2), 389–402.

Tobias, R., Brügger, A., and Mosler, H.-J. (2009). Developing strategies for waste reduction by means of tailored interventions in Santiago de Cuba. *Environment and Behavior,* 41(6), 836–865.

Tonglet, M., Phillips, P. S., and Read, A. D. (2004). Using the theory of planned behaviour to investigate the determinants of recycling behaviour: A case study from Brixworth, UK. *Resources, Conservation and Recycling*, 41(3), 191–214.

Topa, G., and Moriano, J. A. (2010). Theory of planned behaviour and smoking: Meta-analysis and SEM model. *Substance Abuse and Rehabilitation*, 1, 23–33.

Toral, N., and Slater, B. (2009). Perception of eating practices and stages of change among Brazilian adolescents. *Preventive Medicine*, 48(3), 279–283.

Trafimow, D. (1996). The importance of attitudes in the prediction of college students' intentions to drink. *Journal of Applied Social Psychology*, 26(24), 2167–2188.

Truong, Y. (2009). An evaluation of the theory of planned behaviour in consumer acceptance of online video and television services. *Electronic Journal Information Systems Evaluation*, 12(2), 177–186.

Tucker, P., and Irwin, J. D. (2005). Effective social marketing to promote a campus based physical activity intervention: Students' perspectives. *Social Marketing Quarterly*, 11(2), 55–57.

Vaus, D. D. (2002). *Surveys in social research* (5th ed.). London: Routledge.

Velasquez, M. M. (2001). *Group treatment for substance abuse: A stages-of-change therapy manual*. New York: Guilford Press.

Vignali, C. (2001). McDonald's: "Think global, act local" – The marketing mix. *British Food Journal*, 103(2), 97–111.

Wall, M. M. (2009). Maximum likelihood and Bayesian estimation for nonlinear structural equation models. In R. E. Millsap, and A. Maydeu-Olivares (Eds.), *The SAGE handbook of quantitative methods in psychology* (pp. 540–567). London: SAGE Publications Ltd.

Wang, B.-J., and Hsu, M.-Y. (2003). Application of the analytical network process (ANP) to select a channel type for e-convenient chain stores. *Journal of Academy of Business and Economics*, II(1), 16–21.

Wang, Z., Zhang, B., Yin, J., and Zhang, Y. (2011). Determinants and policy implications for household electricity-saving behaviour: Evidence from Beijing, China. *Energy Policy,* 39(6), 3550–3557.

Weber, L. (1997). Viewpoint: Some reflections on barriers to the efficient use of energy. *Energy Policy,* 25(10), 833–835.

Wedge, R. (2003). Energy efficiency: Key to managing costs. *NZ Forest Industries.*

Weenen, H. v. (2000). Towards a vision of a sustainable university. *International Journal of Sustainability in Higher Education,* 1(1), 20–34.

Weinberg, C. B., and Ritchie, R. J. B. (1999). Cooperation, competition and social marketing. *Social Marketing Quarterly*, 5(3), 117–126.

Weinreich, N. K. (1999). *Hands-on social marketing: A step-by-step guide*. Thousand Oaks, CA: Sage Publications.

Weiten, W., Lloyd, M. A., Dunn, D., and Hammer, E. Y. (2009). *Psychology applied to modern life: Adjustment in the 21st century*. Belmont, CA; London: Wadsworth; Cengage Learning Distributor.

Werner, J. M., and DeSimone, R. L. (2009). *Human resource development*. Mason, OH: South-Western Cengage Learning.

Weston, R., and Gore, P. A. (2006). A brief guide to structural equation modeling. *The Counseling Psychologist*, 34(5), 719–751.

Wheeler, J. J., and Richey, D. D. (2005). *Behavior management: Principles and practices of positive behavior supports*. Upper Saddle River, NJ: Prentice Hall.

Wiebe, G. D. (1951). Merchandising commodities and citizenship on television. *The Public Opinion Quarterly*, 15(4), 679–691.

Williams, J. D., and Kumanyika, S. K. (2002). Is social marketing an effective tool to reduce health disparities? *Social Marketing Quarterly,* 8(4), 14–31.

Wind, Y., and Saaty, T. L. (1980). Marketing applications of the analytic hierarchy process. *Management Science,* 26(7), 641–658.

Winett, R. A., Kagel, J. H., Battalio, R. C., and Winkler, R. C. (1978). Effects of monetary rebates, feedback, and information on residential electricity conservation. *Journal of Applied Psychology,* 63(1), 73–80.

Wood, M. (2008). Applying commercial marketing theory to social marketing: A tale of 4Ps (and a B). *Social Marketing Quarterly,* 14(1), 76–85.

World Commission on Environment and Development. (1987). *Our common future*. Oxford; New York: Oxford University Press.

Wu, K.-S., and Teng, Y.-M. (2011). Applying the extended theory of planned behavior to predict the intention of visiting a green hotel. *African Journal of Business Management,* 5(17), 7579–7587.

Wu, W.-W. (2008). Choosing knowledge management strategies by using a combined ANP and DEMATEL approach. *Expert Systems with Applications*, 35(3), 828–835.

Wymer, W., Gomes, R., and Knowles, P. (2006). *Nonprofit marketing management for charitable and nongovernmental organizations*. Thousand Oaks: Sage Publ.

Xiao, J. J., O'Neill, B., Porchaska, J. M., Kerbel, C. M., Brennan, P., and Bristow, B. J. (2004). A consumer education programme based on the transtheoretical model of change. *International Journal of Consumer Studies,* 28(1), 55–65.

Yang, K. H., and Hwang, R. L. (1995). Energy conservation of buildings in Taiwan. *Pattern Recognition,* 28(10), 1483–1491.

Yang, M. (2009). Climate change and energy policies, coal and coalmine methane in China. *Energy Policy,* 37(8), 2858–2869.

Yavuz, N. (2004). *The use of non-monetary incentives as a motivational tool: A survey study in a public organization in Turkey.* Master of Science, Middle East Technical University.

Young, L., Anderson, J., Beckstrom, L., Bellows, L., and Johnson, S. L. (2004). Using social marketing principles to guide the development of a nutrition education initiative for preschol aged children. *Journal of Nutrition Education and Behavior,* 36(5), 250–257.

Yuan, K.-H., and Bentler, P. M. (2007). Structural equation modelling. In C. R. Rao, and S. Sinharay (Eds.), *Handbook of Statistics: Vol 26* (pp. 297–358). Oxford, UK: Elsevier . B.V.

Zastrow, C. H., and Kirst-Ashman, K. K. (2009). *Understanding human behavior and the social environment*. Belmant, CA: Brooks/Cole Pub Co.

Zhang, Z. X. (2009). How far can developing country commitments go in an immediate post-2012 climate regime? *Energy Policy,* 37(5), 1753–1757.

Zheng, G., Jing, Y., Huang, H., Shi, G., and Zhang, X. (2010). Developing a fuzzy analytic hierarchical process model for building energy conservation assessment. *Renewable Energy,* 35(1), 78–87.

Zimmerman, R. (1997). *Social marketing strategies for campus prevention of alcohol and other drug problems*. Newton, Massachusetts: Higher Education Centre for Alcohol and Other Drug Prevention.

Zografakis, N., Menegaki, A. N., and Tsagarakis, K. P. (2008). Effective education for energy efficiency. *Energy Policy,* 36(8), 3226–3232.