Exploring the Relationship between Energy Cost and People's Consumption Behaviour

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Exploring The Relationship Between Energy Cost and People's Consumption Behaviour

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Abstract

The international drive to reduce carbon emission and improve energy security is focusing the attention on consumer behaviour, where significant energy savings are expected by a simple modification in attitude at minimal costs. Energy consumption in buildings in most countries accounts for 20% to 40% of the total consumption, as a result this makes household energy conservation an opportunity to reduce energy consumption. Most countries try to drive behavioural change via different strategies such as educating the public, improving feedback to consumers, enhancing building insulation, the use of smart meters and in some cases by increasing energy prices. This paper investigates the relationship between energy cost and people's consumption behaviour. Normally, energy cost is changed incrementally in most societies which makes the relationship between energy cost and behaviour a complex relationship; because it is linked to many factors such as inflation and the increase in average household's income. The increase in energy prices risks the introduction of fuel poverty which could result in many social and health concerns. In order to address the relationship between energy cost and people's behaviour, a unique case study is addressed by focusing on a group of Qatari students living in the UK. The reason behind this is that Qataris have a distinctive situation where they enjoy subsidised electricity in their own home country, but when they move to UK, they are expected to pay for their electricity consumption. When their energy bill becomes a significant part of their monthly income, would this have an influence on their behaviour in comparison to living in Qatar ? This paper has addressed the above question through a survey to Qatari students living in the UK and the results show that electricity cost was a main factor in their behavioural change; however, other factors also play an important role in their consumer behaviour such as values, education, culture and independent life style .

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Keyword: Energy Prices, People's Behaviour, Public Engagement, Fuel Poverty.

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1. Introduction

It is clear from literature that household energy consumption plays an important role in the overall energy use in most countries [1, 2]. Many factors influence the energy consumption in domestic buildings such as building insulation standard, the external environment, number of occupants, style of living and people's attitude and behaviour towards energy consumption and use of appliances. Research has shown that a slight change in behaviour and life style could result in significant energy savings [3]. A recent study has shown that the behaviour of residents with positive environmental values and environmental awareness is more likely to lead to improved energy savings [4]. It has been argued that providing consumption feedback in the means of smart meter reporting would benefit energy efficiency and improve behaviour of people [5]. In particular when it has been argued that daily energy consumption patterns such as the use of heating, air-conditioning, TVs and lights are largely habitual [6]. Some researchers have argued that the increase in consumer knowledge in sustainability might not always lead to real energy savings [7]. Therefore, most energy policy makers use the financial incentives as a tool to control people's behaviour based on economic theory [8]. However, there is a risk of fuel poverty if economic theory is the main approach to control consumption behaviour. The social Cognitive theory proposes that people are driven by external factors rather than inner forces [9]. Which means the behaviour is related to personal factors as well as the environment. The theory of planned behaviour [10] suggests that the behaviour of consumer is based on the individual's attitude and intentions. Hence behaviour is linked with personal motivation. On the other hand, The Transtheoretical Model [11] defines step-based gradual stages of change. Reference [12] has reviewed household energy use research in relation to decision making within behaviour context, it has been found that there is high complexity in this context and that there are some gaps between people's values and material interest, and their actual consumption behaviour. One of the interesting theories is the Self-Determined Theory (SDT) [13], which is related to a range of self-determination which varies from absence of motivation, to extrinsic motivation and ending up with intrinsic motivation, see Figure 1.

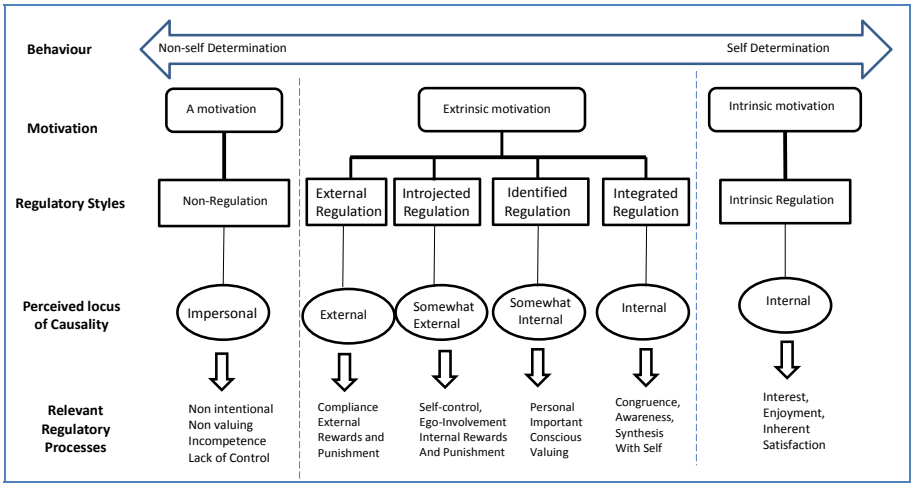

Figure 1: The self-determination theory (reproduced from [13]).

This paper will investigate the change in behaviour of Qatari students studying in the UK in relation to energy consumption.

2. Qatar and The GCC countries

In less than half a century, the Gulf countries have progressed beyond all recognition with well-developed cities, improved urban planning and enhanced infrastructures [14]. The Gulf states petroleum reserves represent about 41% and 24% of the world's oil and natural gas reserves respectively [15]. The booming economy of the Gulf countries has caused an increase in the energy, gas and water consumption. One of the main challenges facing the Gulf countries the rapid growth in domestic demand for electricity. The peak demand for electricity in summer time and the electricity shortages [16] that are experienced, make the focus on people's behaviour as a key aspect for the short term solution with long term solution related to enhancing renewable energy investment, particularly in solar energy. Qatar, as one of the Gulf countries, is anticipated to experience a large increase in population, which resulting from the high rate of economy growth. This will cause energy demand, including electricity, to rise rapidly [17]. Therefore, with low energy prices, increasing population's knowledge and awareness about energy conservation is essential to reduce resource waste and sustain energy and economic security for Qatar [18].

3. Consumer behaviour in UK versus Qatar.

In the UK electricity consumption has increased over the years and due to energy costs and a number of social and economic factors, the UK has been experiencing a fuel poverty issue [19]. UK has maintained the belief that charging for electricity and other energy sources will help in realising the value of fuel and also develop optimum usage of the resources [20], particularly that the UK is a net importer of oil and gas. The average electricity bill for a small flat or house is approximately 2000kWh which makes the annual bill costing about £800 while for a medium house the average cost per annum is £1163 [21]. It has been found that international students in the UK have to pay 5 to 12% of their total income for electricity which is quite significant. It has been outlined that the cost of living in the UK with high electricity charges imposed would restrict and contain the use of energy [22]. Qatar on the other hand provided free electricity to its citizens and expatriates enjoy also a low rate of energy costs compared to Europe and North America [23]. However, It has been found that the total residential electricity use by all expatriates is approximately equal to that of all Qatari citizens, despite the fact that the number of expatriates are four times more than the number of Qataris [23]. Qatar recently has developed a strategic scheme called '*Tarsheed*' to reduce waste in electricity and water consumption, and drive change to a better future [24].

4. The methodology

This work has been conducted by means of an online survey for Qataris studying in the UK. The self-completed questionnaire was constructed in Arabic and in English to allow all students, regardless of their English language level, to be able to participate. The survey included yes or no answers in addition to additional space to include further details and comments as needed. In total 148 students have responded to the survey. From the survey it has been found that 91.2% of the respondents pay for electricity and gas bills. This indicates that they are aware of their consumption affordability because of their fixed income.

5. Results and Discussion

When the students are asked if they switch off lights and heating or A/C when they leave their house in the UK, 91.2% have answered yes. However, for the same question when they are in Qatar, the response for yes has been mainly 45.2%. This significant drop could easily be related to the economic theory and the need to maintain reasonable financial savings and reduce waste. In UK only 8.8% do not switch the appliances off in comparison to a staggering 54.8% when in Qatar. This is a clear indication of change in behaviour. This can be easily explained by the high energy cost in the UK when compared to the free

electricity in Qatar. This is in-line with a survey conducted by Doha News, where it is observed that about 50% of the respondents do not switch off the TV before leaving home; and one third of the respondent do not even switch off the air-conditioning given that one in 25 of them actually have timer control function [25].

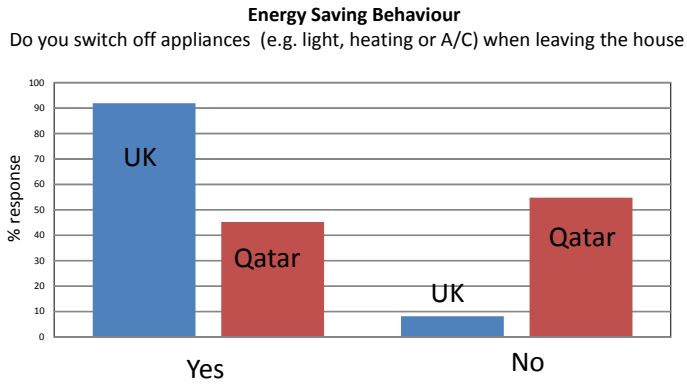

Figure 2: Energy saving behaviour for Qatari students living in the UK or at home.

This result also means that economic theory is not the only relevant theory within this context. Some of the respondents have indicated that switching off appliances when not in use is more of a principle based activity (that is to save energy and help the environment) rather than a cost cutting activity. Based on the self-determination theory, this could be defined as being an intrinsic motivation. Therefore, it can be argued that among the 45.2% who switch off the electricity and take energy saving behaviour are driven by internal personal motivation and sustainability awareness. Some of the respondents have replied with integrity and stated that switching off electricity appliances when not in use was not a daily habit. It is evident that during some of the respondents' stay in the UK, saving energy became an important objective.

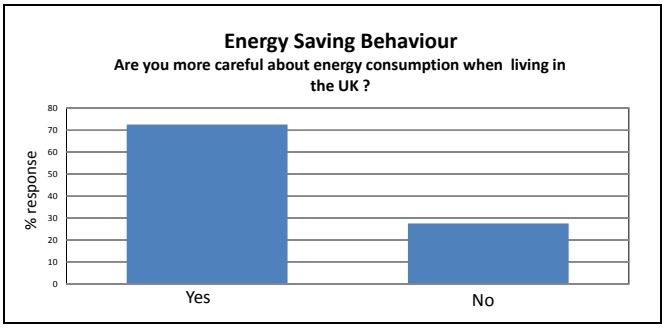

Figure 3: Personal perception of Energy Saving behaviour for Qatari students living in the UK.

When the respondents are asked if they consider themselves more careful in relation to energy consumption when in the UK in comparison when living in Qatar, 72.5% indicated that they consider themselves more careful in the UK, see Figure 3. This indicates that the respondents try to save more energy while in the UK and hence driven by the economic theory. This opinion is supported by the survey carried out by Doha News [25]. It is revealed that the heavily subsidised energy for Qataris, does not encourage their change of behaviour towards sustainability. Therefore, it can be concluded that energy

cost has contributed to energy conservation behaviour in the UK. However, some other comments indicated other factors; where one of the respondents stated that by living independently as a student he or she would have more control over the lifestyle and the switching off of appliances when not in use. Other comments is that while living the UK, some of the respondents became more aware via their studies of climate change, global warming and sustainability issues. Therefore, when they are asked about the negative effect of fossil fuel on the environment, only 61.5% have been found aware of the damage that could be caused by fossil fuel such as carbon emission, global warming and pollution, see Figure 4. Taking the self-determination theory into consideration, it is evident that this awareness is part of the 'integrated regulation' of 'internal' nature.

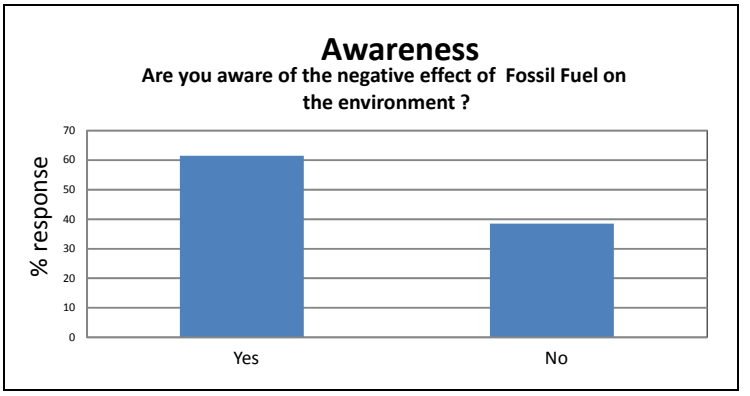

Figure 4: Awareness of Qatari Students to the effect of Fossil Fuel on the environment.

Conclusion

Improving People's behaviour is considered an effective method to reduce energy consumption and carbon emission. There are many theories and research related to people's behavioural change. This study has included a unique survey of Qatari students living in the UK. It is evident from the results that the expense of the electricity in the UK has made the respondents more careful about energy consumption; hence supporting the economic theory and the self-deterministic theory in relation to external motivation. However, it is evident that intrinsic motivation plays an important role in the behaviour of the students when they are in Qatar in relation to saving energy regardless of the cost issues. The recent strategic development of the launching of *Tarsheed*, the National Campaign for the Conservation and Efficient Use of Water and Electricity in Qatar, is expected to enhance the awareness, improve sustainability and reduce daily consumption of water and electricity.

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Biography

Professor Amin Al-Habaibeh is a professor of Intelligent Engineering Systems at Nottingham Trent University. He is currently the Director of the Doctoral Training Alliance for Energy (DTA-Energy) within the UK University Alliance universities. Amin is also leading the Innovative and Sustainable Built Environment Technologies research group (iSBET). Amin's interest includes, in addition to energy, condition monitoring, intelligent systems, sustainable technologies, product design and advanced manufacturing technologies.