

Energy Consumption Towards a Better Future: Knowledge Practice and Attitude of college students in UAEU

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Abstract— Energy exists in many different forms such as light energy, heat energy, mechanical energy, gravitational energy, electrical energy, sound energy, chemical energy, Nuclear or atomic energy and so on. These forms of energy can be relocated and converted between one another. When source of energy end up as electricity, it moves with many Transformations before it can power the light bulb. The aim of this study was to explore the level of student's awareness on the importance of saving energy as well as to investigate knowledge practice and attitude towards energy consumption. Quantitative and qualitative methods were used to collect the data through interview among students of the United Arab Emirates University (UAEU) in Al Ain. Secondary data's were collected from Al Ain Municipality.

The first outcome of the research was the key cause of overuse of energy consumption is a lack of awareness. The second was that consumers are unable to assess whether their consumption is low, average or high and lastly most of the respondents understand how the energy consumption effects the environment and they will try their best to help manage and control this issue.

Overall the results show the negative effects of overuse of energy consumption to our environment and suggest that to bridge the gap; human beings should change their behavior to save our environment. Therefore, major challenge will be to introduce a set of uniform energy policies to address specific constraints to the household adoption of energy conservation practices.

Keywords- *Attitude Forms of Energy, Knowledge, Practice*

1. INTRODUCTION

Energy is defined as the capacity of a physical system to perform work (Jones, 2016). It exists in several forms such as heat, kinetic or mechanical, electrical, light and potential energy. In other words it may include geothermal and classification of energy as renewable or nonrenewable, (Jones, 2016).

Energy may be our most significant resource, and availability may ultimately limit economic and population growth. Abundant energy makes it easy to be sustainable because it can be used to produce essential resources such as

food and potable water where they are scarce. For example, countries like the United Arab Emirates are turning the desert into oasis using desalinization plants because they have little fresh water but abundant seawater and power stored in oil. However, many areas of the world are experiencing energy shortages.

Furthermore, most of our energy comes from burning fossil fuels, which adds the greenhouse gas CO₂ to the atmosphere hence, intensifying global warming. To become sustainable, our society must change from non-renewable fossil fuels to renewable sources, (Ayers, 2011).

Electricity and water usage among UAE households has been growing significantly in the past few years and will be difficult to manage in the future if no effective sustainable measures are undertaken, analysts have warned (Maceda, 2015). It will cause negative consequences for the environment.

A. Energy sources

There are many primary sources of useful energy such as the Sun, the motion and gravitational potential of the Sun, Moon and Earth, geothermal energy from cooling, chemical reactions and radioactive decay in the Earth, human-induced nuclear reactions, and chemical responses from mineral sources, (Twidell & Weir 2015).

Some of the major problems which arise due to over-exploitation of energy resources are the extinction of nonrenewable energy resources. It was predicted that many of nonrenewable sources like crude oil, will completely run out in the next 35 to 40 years as they are limited and get centuries to replenish. Overuse of energy sources results in the emission of CO₂, SO₂, NO_x, particulate matter which causes air pollution, and related problems like acid rains, and global warming, (Wikipedia, 2016).

B. Energy and sustainable development

Sustainable development can be broadly defined as living, producing and consuming in a manner that meets the needs of

the present without compromising the ability of future generations to meet their needs. It has become a main guiding principle for policy in the 21st century. Worldwide, politicians, industrialists, environmentalists, economists, and theologians affirm that the attitude must apply at international, national and local level, (Twidell & Weir 2015).

C. The consumption of electricity and water in the UAE

Energy usage in the UAE has grown at an annual average of 4 percent over the past six years, with projections that it will increase to 5 percent through 2020. Overall electricity consumption has more than doubled in the past 10 years, at a pace that will be difficult to provide for over the long term (Karlsson, at el 2015).

The latest reports and studies on the rate of per capita consumption of electricity and water in UAE pointed to a per capita consumption of 20-30 kWh electricity per day, while global rates of between 7-15 kWh electricity. The individual consumes about 550 liters of water per day, and the world average of 170-300 liters per day. Studies predicted demand for electricity and water has doubled in Abu Dhabi until 2020 so that the size of the domestic consumption of the Emirate of electricity up to about 20 MW, the total consumption of desalinated water rises to more than 3.1 billion gallons of water a day. The Abu Dhabi power consumption of about 10 MW per day, divided between 33% for domestic consumption, 21% of the government, 30% of the trading 0.8% for both agricultural and industrial sectors. The water amounts of production about 670 million gallons per day, divided between 56% for the residential sector 0.29 % of the government 0.1% of industrial 0.3% for agriculture, 11% for business, (Alkhaleej, 2013).

The UAE's urban population will grow to 7.9 million by 2020, an average annual growth of 2.3 per cent from 2010-20, according to the World Urbanization Prospects report by the UN department of economic and social affairs. City dwellers in the UAE will account for 86.7 per cent of the country's population by 2020; up from 84 per cent in 2010 (Everington, 2013). The UAE, therefore, needs to have integrated infrastructure planning as a prerequisite to any urban master plan, (Karlsson, at el 2015). This study was design to explore the level of student's awareness on the importance of saving energy as well as to investigate knowledge practice and attitude towards energy consumption

D. Study Area

The United Arab Emirates is located in the Middle East region of Asia. It is at the tip of the Arabian Peninsula, having borders with Saudi Arabia and Oman and is one of the GCC (Gulf Co-operation Council) States. It consists of seven emirates, which include Abu Dhabi, Dubai, Sharjah, Ajman, Umm Al Quwain, Ras Al Khaimah, and Fujairah (TEN Guide, 2015).

The UAE lies between 22°30' and 26°10' north latitude and between 51° and 56°25' east longitudes. It shares

a 530-Kilometre (330 mi) border with Saudi Arabia on the west, south, and southeast, and a 450-Kilometre (280 mi) with Oman on the southeast and northeast (Wikipedia, 2016).



Figure 1: Study area (2016 satellite photo for UAEU)

Source: Google Earth 2016

The study area which was UAEU is located in the city of Al Ain and features six separate smaller campuses. The United Arab Emirates University is ranked as the top university in the United Arab Emirates, and the 4th in the GCC. The 2011/12 QS World University Rankings placed UAEU within the Top 50. There are only eight institutions in the world that are younger than UAEU (Wikipedia, 2017). The school is ranked as the 6th in the Arab region. The Deans are the heads of the colleges, which are groupings of academic disciplines, through which the staff teach at undergraduate and graduate levels, and conduct research and scholarship.

II. METHODOLOGY

Before you begin to format your paper, first write and save the content as a separate text file. Keep your text and graphic files separate until after the text has been formatted and styled. Do not use hard tabs, and limit use of hard returns to only one return at the end of a paragraph. Do not add any kind of pagination anywhere in the paper. Do not number text heads- the template will do that for you?

Finally, complete content and organizational editing before formatting. Please take note of the following items when proofreading spelling and grammar:

III. RESEARCH RESULTS

A. Importance of energy saving to students

There were 142 responded who participated in order to investigate awareness on the importance of energy was analyzed. As shown in figure 2, majority 91.5% agreed that energy saving is important, while the remaining 8.5% don't care about energy saving.

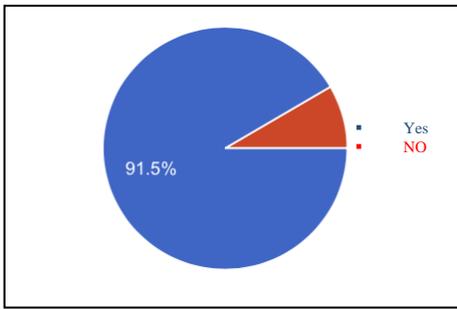


Figure 2: Importance of energy saving

B. Reduce energy use at home

Reducing our energy consumption will not only have a positive effect on the environment but will also help to cut our fuel bills and save money. Figure 3, shows that the percentage of the students who had an opportunity to reduce energy use at home. Majority of them 71.8% practice ways of saving energy at home while 28.2% always ignored to reduce energy consumption at home.

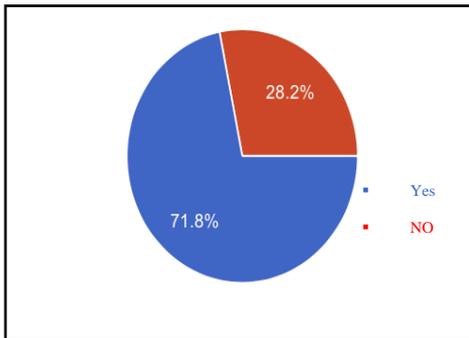


Figure 3: Reduce energy use at home

C. Turn off lights when you leave a room

If you wanted to reduce your energy consumption at home, the first thing to consider is turning off lights when they are not needed, the TV, and other unused appliances. However, the appliances that will save you the most energy are the ones you rarely think to switch off. Through asking about if they turn off the light when they leave a room, they gave different answers. 53% of students said always, 20% usually said, 18% said sometimes and 7% said never.

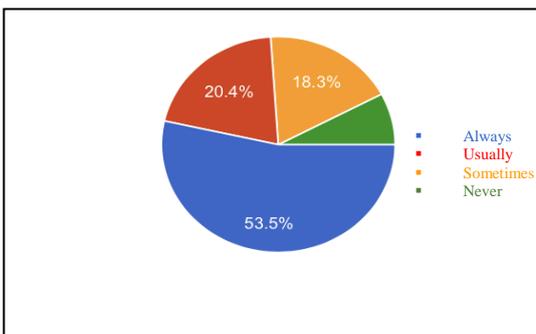


Figure 4: Turn off lights when you leave a room

D. Monitor the use of energy at home

The home energy monitoring system helps to take control of the house, or an apartment and all the energy it uses. Through asking students about if they had monitored the use of energy at home, would help to become more aware of about the importance of energy saving? The majority of them 96.5% said yes, they monitor at home (Figure 5).

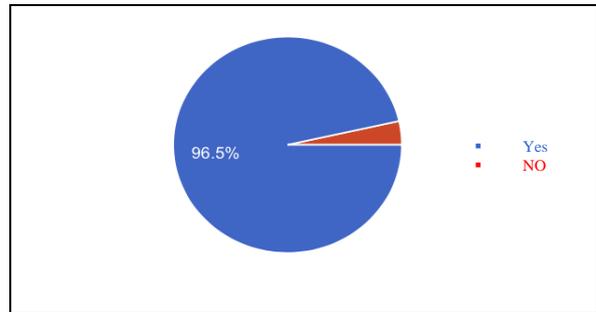


Figure 5: Monitor the use of energy at home

E. Energy Saving Awareness

In the societies power is misused each day due to lack of awareness and energy awareness is important in energy preservation program (Vesma, 2002, Wong, 1997, El Halimi et al., 2000). If you want to save energy in your organization, it's important that your staff become aware of the consumption that they are responsible for and motivating employees to save energy through awareness is one of the most successful means of motivating employees to conserve energy (Williams 1993). Awareness is defined as knowledge; lack of knowledge also means lack of awareness. The process of creating awareness would require a review of the relationship between learning and awareness (Wai, et al, 2009). The table1 shows that about 34% of students aware of some basic knowledge of saving energy, 24% knows many ways, 32% agreed that they know few ways while 10% of them not aware of any ways of saving energy.

Table1: Ways of saving energy

Are you aware of ways of saving energy?	Count	Percentage
I'm know of a lot of ways of saving energy	33	24%
I'm aware of 3-4 ways of saving energy	43	32%
I'm familiar of some basic ways of saving energy	49	34%
I'm not aware of any ways of saving energy	17	10%

F. Energy saving techniques at home

Using energy saving techniques is very significant these days because in general, people consume more energy. Wong (1997), suggested that awareness is the seed for changes and behavioral approach in energy saving is the first step in to raise awareness. The results in figure 6 shows that most of the

students 68.3% of students can save energy by applying energy saving techniques at their homes while. 31.7% said they don't use any energy saving methods.

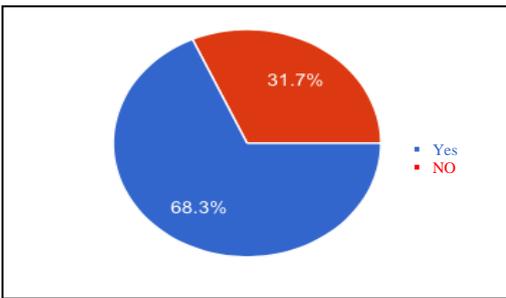


Figure 6: Energy saving techniques

G. Student's behavioral change to reduce energy use

In fact, the behavioral approach is one of the keys of success in energy management and this approach can be an alternative method to conserve energy. Compare to the technology approach, the behavioral approach is a more simple way to save energy (Mohammed, 2010).

The central causes of what can change student's behavior to reduce the energy use were collected and result in table 2 shows that 64% agreed that environmental reasons could switch the student's behavior, 26% said by still increasing the cost of it, whereas 10% said through public relations.

Table 2: Main causes can change student's behavior to reduce energy use

	Count	Percentage
Environmental reasons	87	64
Still increasing cost of it	38	26
Public relations	17	10

H. General attitude to energy saving

Majority of the respondents agreed that they would be more motivated to save electricity if they knew how much it costs to use an appliance and motivation contributes significant roles in awareness development. The result in Figure7 shows students general attitude towards energy their different opinions. 23.9% of students said they have positive attitude towards energy saving while students who are aware and positive were 47.2%. In return, students who have negative attitude were 12.7%. About 16.2% of students showed neutral attitude.

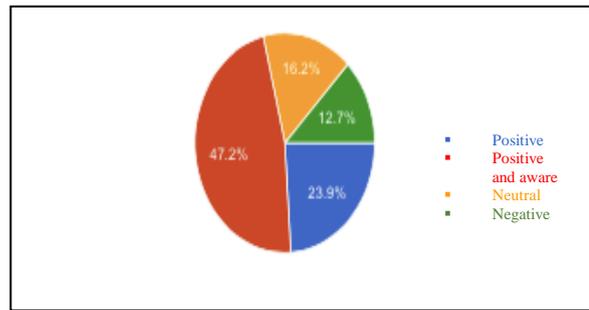


Figure 7: General mindset to energy saving

I. Participating energy saving activities in the future

By asking students about if they are interested in joining energy saving activities in the future we will know students who care about energy. The majority of them said yes with 91.5% while on another hand, 8.5% of them thought that they would not participate in energy activities in the future Figure 8.

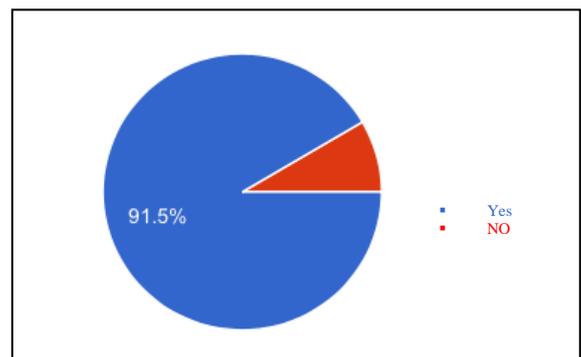


Figure 8: Participating energy saving activities in the future

J. Use the ways of saving energy outside home

The majority of the respondents about 33.1% indicate that they usually use the ways of saving energy outside their home. On the other hand, 5.6% they never use any ways of saving energy outside their home. Furthermore, 25.4% of students sometimes use the ways of saving energy outside their homes Table 3.

Table 3: Use the ways of saving energy outside home

	Frequency	%
Always	37	26.1
Usually	47	33.1
Sometimes	36	25.4
Rarely	14	9.8
Never	8	5.6

K. Conclusion

This study concluded that awareness campaigns need wider attention to the entire important stockholder and should be the culture of the communities. Many previous studies support the result that achieved in this study that the awareness of energy consumption in the society and the impacts of energy consumption play an important role to save the energy. Most of the students are aware how the energy consumption affect environment and they try their best to manage and control this issue, while some of them still have negative and unsafe habits of dealing with energy use.

L. Recommendations

This study accomplished what is set out to do, and that is to provide some inspiration for the future control of energy conservation. There are many suggestions to avoid the impact of energy consumption such as family should educate their children about the consumption behavior and how the energy over use is bad behavior because they need awareness from an early age. Moreover, for the long term, it is important to motivate and make the habit of turning off all lights and electronics in order to reduce household's energy consumption.

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