

Level of Awareness of Energy Saving Measures of Electricity Users At Universities In Kenya

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Abstract

Energy is a crucial factor for economic competitiveness and employment and hence a large amount of it is required in countries with faster economic growth. Higher institutions of learning such as universities spent a lot of money on energy bills because of the nature of their daily activities. This study sought to determine the level of awareness of saving measures of electricity users at universities in Kenya. A survey research design was used in this study. Questionnaires, interview schedules and personal observation methods were employed in collection of data and the collected data was analysed using descriptive statistics and were done with the help of the statistical package for the social sciences (SPSS) computer program. The findings revealed that End-users had not been trained on electric energy saving measures and that there was no university policy on energy saving that could guide the users. The study therefore concluded that the level of awareness of energy saving measures of electricity users at the universities in Kenya was too low and that there was an urgent need for universities to take action to save wastage of electric energy in the institutions

of higher learning.

Keywords: Electric energy, Saving, Level of awareness, Universities, Kenya

1. Introduction

Availability of energy has been identified as an important component of social, economic and political sustainability of any nation and therefore as the world experiences a higher demand and cost of energy, there is an urgent need to reduce the energy consumption as means to control cost and sustainability. As global energy demand continues to grow, actions to increase energy efficiency will be essential. The need for electricity has been on the increase in the last two decades in developing countries because of economic and industrial developments (Adekunle, 2008). While one way of meeting the projected demand is through increased generation, extension of the grid, strengthening the grid to cope with increased generation, another very important way is to apply a parallel strategy of using available technologies and sensitizing end users to benefits of saving energy.

Electrical energy is wasted each day due to lack of awareness among societies and in fact, energy awareness is the first step to achieve energy sustainability. Without energy awareness, efforts to promote energy conservation can be difficult and lead to energy wastage. Public and private universities in Malaysia are confronting with issues of energy wastage due to the lack of awareness among the students and no specific model is available to guide facilities and energy managers to improve the situation (Choong, 2010). Meeting rooms, storage areas and corridors in particular are often lit unnecessarily, as there is often no one person responsible for them. Whittle, (2013) propagates that the reason for high energy consumption in the university of Sheffield buildings was that the occupants cited a lack of awareness about the energy consumption of the building and a lack of personal control over and responsibility for energy conservation.

In the past, education has played a role in bringing awareness regarding energy conservation and environmental issues, but has not necessarily resulted in sustained behavioural changes, for example, among students across university campuses (Emeakaroha, 2012). Raising awareness is significant, however, most managers still do not pay much attention to the its benefits because facility tend to be sceptical of behavioural approach and have little understanding of them and their potential (Choong, 2007).

The current installed electricity capacity in Kenya under normal hydrology is 2298 MW (Muthike, 2015). According to the Institute of Economic Affairs (2015) the peak load is projected to grow to about 15,000 MW by 2030 and to meet this demand, the projected installed capacity should increase gradually to 19,200 MW by 2030. The cost of electricity in Kenya is four times that of South Africa, the country's main competitor in the region, and more than three times that of China (Kenya Institute for Public Policy Research and Analysis, 2005). This high cost of energy is one of the biggest bottlenecks to economic activities.

There are 63 universities in Kenya, 33 of which are public and 30 private (Kenya Universities and Colleges Central Placement Service, 2016) with a total population of 446,183 students, 400,218 of which are in public and 45,965 in private universities (Kenya National Bureau of Statistics, 2015). This large population constitutes high electric energy consumption in hostels, offices, tuition blocks, libraries, laboratories and workshops. The result of this high energy consumption is that the universities spend a large proportion of their budget on electricity bills. The purpose of this research, therefore, was to establish the level of awareness of electric energy measures of end-users at universities in Kenya with the view of reducing to minimum the budget on electricity bills.

2. Methodology

This study was carried out in selected public and private universities in Nairobi, Uasin Gishu and Nandi counties of Kenya. Purposive sampling technique was used to select one private and two public universities to participate in the study. The selection was based on the objectives of the study, the years of existence, the population, types of programmes offered and the set up of the university, that is, whether it was in a rural or urban set up.

Quantitative data concerning electrical energy consumption and energy saving measures was obtained from structured questionnaires given to both staff and students in each of the universities involved in the research. On the other hand, the qualitative data concerning the electrical energy users' level of awareness of energy saving measures were obtained from structured interviews administered to students, staff and administrators. The researcher was interested in collecting in-depth data and therefore undertook intensive interviews among the students, staff and administrators in each of the institutions. The qualitative data was analysed thematically. Themes refer to topics or major subjects that come up in discussions. This form of analysis categorizes related topics and by using it, major concepts or themes are identified (Kombo and Tromp, 2009). The researcher went through the collected data and identified information that was relevant to the research questions and objectives; classified major issues; highlighted key quotations; placed the data under the major themes identified and lastly used descriptions and direct quotations to present the findings.

3. Results And Discussion

3.1 Questionnaires

Table 1: University X students' responses to the questions on electric energy saving

Living in energy crisis		
	Frequency	Percent
Yes	257	81.1
No	60	18.9
Total	317	100.0
Trained on energy saving		
Yes	96	30.3
No	221	69.7
Total	317	100.0
Motivation on energy saving		
Increase in cost	131	41.3
Environmental reasons	129	40.7
Public relations	57	18.0
Total	317	100.0
Attitude on energy saving		
Positive	259	81.7
Neutral	55	17.4
Negative	3	0.9
Total	317	100.0

Table 2: University Y students' responses to the questions on electric energy saving

Living in energy crisis		
	Frequency	Percent
Yes	169	86.2
No	27	13.8
Total	196	100.0
Trained on energy saving		
Yes	41	20.9
No	155	79.1
Total	196	100.0
Motivation on energy saving		
Increase in cost	77	39.3
Environmental reasons	90	45.9
Public relations	29	14.8
Total	196	100.0
Attitude on energy saving		
Positive	173	88.3
Neutral	21	10.7
Negative	2	1.0
Total	196	100.0

Table 3: University Z students' responses to the questions on electric energy saving

Living in energy crisis		
	Frequency	Percent
Yes	71	77.2
No	21	22.8
Total	92	100.0
Trained on energy saving		
Yes	23	25
No	69	75
Total	92	100.0
Motivation on energy saving		
Increase in cost	46	50.0
Environmental reasons	36	39.1
Public relations	10	10.9
Total	92	100.0
Attitude on energy saving		
Positive	62	67.4
Neutral	30	32.6
Negative	0	0.0
Total	92	100.0

From tables 1, 2 and 3, it can be concluded that a majority of the respondents accepted that there was an energy crisis in the world today; had not been trained on energy saving techniques; would be motivated by two factors to save energy, that is, the cost of electricity and the environmental impacts and had a positive attitude towards energy saving measures.

Table 4: University X staff responses to the questions on electric energy saving

Living in energy crisis		
	Frequency	Percent
Yes	41	93.2
No	3	6.8
Total	44	100.0
Trained on energy saving		
Yes	4	9.1
No	40	90.9
Total	44	100.0
Motivation on energy saving		
Increase in cost	39	88.6
Environmental reasons	5	11.4
Public relations	0	0.0
Total	44	100.0

Attitude on energy saving		
Positive	40	90.9
Neutral	4	9.1
Negative	0	0.0
Total	44	100.0

Table 5: University Y staff responses to the questions on electric energy saving

Living in energy crisis		
	Frequency	Percent
Yes	32	88.9
No	4	11.1
Total	36	100.0
Trained on energy saving		
Yes	7	19.4
No	29	80.6
Total	36	100.0
Motivation on energy saving		
Increase in cost	17	47.2
Environmental reasons	13	36.1
Public relations	6	16.7
Total	36	100.0
Attitude on energy saving		
Positive	20	55.6
Neutral	15	41.7
Negative	1	2.8
Total	36	100.0

Table 6: University Z staff responses to the questions on electric energy saving

Living in energy crisis		
	Frequency	Percent
Yes	29	90.6
No	3	9.4
Total	32	100.0
Trained on energy saving		
Yes	9	28.1
No	23	71.9
Total	32	100.0

Motivation on energy saving		
Increase in cost	20	62.5
Environmental reasons	8	25
Public relations	4	12.5
Total	32	100.0
Attitude on energy saving		
Positive	23	71.9
Neutral	8	25
Negative	1	3.1
Total	32	100.0

From tables 4, 5 and 6, it can also be concluded therefore that a majority respondents believed that there was energy crisis. Also, most of them had not been trained on energy saving techniques. It is also clear that the high cost of electricity could motivate most respondents to change behaviour so as to save electric energy and that a majority of the respondents had a positive attitude towards energy saving.

3.2 Interviews

3.2.1 Interviews for university students

From the interviews conducted among the university students, a majority of them admitted that they were not aware of energy saving techniques and therefore could not answer the question of whether they were practicing energy saving measures or not. Regarding the question of whether there was wastage of electric energy in the university, all respondents agreed that there was a lot of wastage and gave some of the areas of wastage as: Cooking and warming rooms in hostels, leaving lights on throughout the day and night in hostels, lecture rooms, library, workshops and laboratories.

On the question of the key barriers to adoption of electric energy saving measures in the university, students gave the following answers: It was very difficult to control the usage of electric energy because the wastage was so rampant in the university; ignorance or a do not care attitude among students and other users; the fact that they don't contribute towards electricity bill make them less concerned; it was difficult to control the switching off and on of lights because students study at different intervals in both lecture halls and hostels; lack of policy on energy saving; users did not know the outcomes of wasting electricity; lack of incentive; they said it was the business of university; they feel university has a lot of money and; students should be allowed to bring their own energy saving bulbs and this would save a lot of energy. A majority of respondents gave the high cost of electricity as what would motivate them to change their behaviour to reduce energy consumption. Also, all the respondents had a positive attitude towards electric energy saving.

Some of the respondents suggested the following as measures to save electric energy in the university: Students should be educated on electricity use; measures should be put in place by the university to ensure that there is no wastage of electricity; people should be trained on energy saving measures; users could be made to pay for electricity and would be forced to conserve it; automatic switching off mechanism should be adopted; they should be made aware of the impacts of wasting energy; switches should be placed near beds because many students are lazy to wake up and switch off lights at night; People should be told to switch off unnecessary lights; there should be a comprehensive policy on energy saving in the university; Educate users on the importance of energy saving; Students should be motivated to save electricity; and each hostel should have energy regulators.

3.2.2 Interviews for university staff

Interviews carried out on the university staff, on the other hand, revealed that none of the respondents had undergone any training on energy saving techniques. Concerning the question on whether there was energy wastage in the university, all of them accepted that it was so and gave some examples such as in students' hostels where over 90% of students used it for cooking. Some claimed that in fact there had been a lot of upgrading of supply cables to these hostels but still they overloaded them. In lecture halls, lamps are left on throughout the day and night and to make the matter worse, these lamps are fluorescent not energy saving lamps. Security lights are also on even during the day yet again these security lamps are the flood light types which consume a lot of energy.

According to some of them, the main barriers to adoption of energy saving techniques included: little knowledge of staff on electric energy saving, that is, ignorance on the part of staff; initial cost of energy saving lamps; the large population made it difficult to control the switching off of lamps when not in use; lack of staff training; a do not care attitude of staff; no necessary information such as energy saving posters; management may not be willing to do so. Saving on electricity bill, training on energy saving and rewards for departments that save energy were mentioned as motivation to energy saving. All respondents had positive attitude to energy saving.

According to the university staff, what could be done to save electric energy in university included: Staff training on energy saving techniques; a staff responsible for switching off unnecessary lamps should be in place; posters bearing words such as "switch off lights when not in use" should be displayed on all the necessary areas; machines and other equipment should be switched off when not in use; unnecessary generator tests should be avoided and scheduled testing is adhered to; use alternative sources of energy such as solar for lighting; everybody should be made aware of the importance of energy saving; make use of biomass, solar and wind systems to reduce the cost of electricity; users should be sensitized on importance of energy saving through training; utilization of natural lighting during the day; installation of energy saving bulbs; purchase of low energy consumption equipment and; each department should have its own energy meter to make it clear the consumption of energy per department.

3.2.3 Interviews for university administrators

University administrators when interviewed responded that there were no programmes, policies and regulations in the university that directly addressed the issues of energy saving. One of them said: "there is no energy saving policy because if we had one, lights would not be left on for 24 hours in lecture rooms and even offices since the policy would guide on this." A majority of the respondents were not aware of any type of technology used to improve electric energy saving in the university. At the same time they said that a procurement policy was not in place and if at all it were, then it was being adhered to. For the question on whether university considers energy saving measures in the acquisition of new university buildings or renovation of existing buildings, some of them said windows were made to take advantage of natural light. They also admitted that universities had not implemented any training on energy saving techniques.

According to the respondents, some of the barriers to the adoption of energy saving measures in the university included lack of willingness to do so; It was difficult to control students in what they did in their hostels such as cooking; money for electricity bills came from ex-checker so no one was much concerned about the cost of electricity and; no one was keen about it.

In conclusion, therefore, the results obtained from the questionnaires and interviews conducted among the university students, staff and administrators, revealed that a majority of the respondents accepted that people were living on energy crisis; had not been trained on energy saving techniques; would be motivated to save energy by the high cost of electricity and; had positive attitude towards energy saving measures. a majority of the respondents accepted that there was a lot of wastage of electric energy in universities through lighting, cooking, electric machines and office equipment; had not been trained on electric energy saving measures and were therefore not aware of electric energy saving techniques; agreed that there was no policy on energy saving that could guide the users; and that universities had no procurement policy that takes into account Life Cycle Costing as opposed to only First Costs when purchasing electric energy consuming equipment. It is therefore clear the level of awareness of electricity end-users of energy saving measures is too low and consequently a lot of electric energy is wasted in turn.

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