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EXTENT OF IMPLEMENTATION OF COST-CUTTING MEASURES OF SORSOGON STATE UNIVERSITY

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Abstract: **The judicious use of any resources has always been a primary concern of every institution in the country and around the world. This study aimed to assess the extent of implementation of cost-effective electrical initiative activities implemented by the University; identified the perceived level of implementation along manpower resources, electrical distribution system, policies and budgetary allocation of teaching personnel, non-teaching personnel and students; revealed the effectiveness of the said activities in the energy consumption of the University since 2014; and suggested other measures to enrich the implementation of cost-effective electrical energy management program of SORSU. It used descriptive-quantitative research design with 432 teaching, non-teaching and student-respondents. Document analysis, researcher-made survey questionnaire, interview and observations were used as data gathering instruments. The University has implemented several cost-cutting measures from July-September 2014 up to present. The perceived level of implementation was moderately implemented. Effectiveness of the cost-cutting measures was found to be effective due to the decrease trend in kilowatt usage during the period of implementation of the cost-cutting measures. Enhancement on the implementation of the cost-cutting measures is recommended.**

Keywords: **Cost effective, electrical energy management program, descriptive.**

1. INTRODUCTION

As a form of resources, electricity and its use is an important issue while students, faculty members and staff constantly rely on a supply of energy to meet their daily needs. Consequently, little though is given to personal habits that lead to over consumption of electricity. Greater awareness by the student body, faculty, and staff could save thousands of worth of electricity every month. However, many electrical needs are relatively inflexible for a variety of reasons. Other than the increase of appliances, the standy power – power consumed when the appliances is not being used but still plugged in – is an increasing source of energy use.

In 2007, the estimated share of standby power used by appliances was 10 percent of total electricity consumption (Brown, 2008). Safety and security issue, such as adequate campus lighting at night, is necessary that energy costs cannot be altered in the short-run. Also, electricity is convenient, if not necessary, for completing many daily tasks. However, from an efficiency standpoint, the school community should strive to eliminate excessive electricity costs (Wiedemer and Cooke, 2001; Virtudazo, 2010).

The Sorsogon State University has an actual average monthly energy consumption of 28, 131.25 Kw-Hr and which is amounting to more than Php 4M. It is necessary to evaluate the electrical system since some buildings were built many years ago. As schools age, they often require more repairs and additional maintenance efforts. The evaluation on its electrical system was to determine the status of implementation of cost-cutting measures of the University which was the primary concern of this study. The result then serves as basis for establishing an Electrical Management Program (EEMP) and in determining the possible areas for improvement in its electrical system.

Various readings and review of related literature and studies on cost-effective electrical energy management were done. The most relevant are discussed.

The two principal ways to lower energy (and electricity) are through energy efficiency practices, "the use of technology that requires less energy to perform the same function," and energy conservation, "any behaviour that results in the use of less energy" (EIA). A major challenge with energy efficiency is the high initial capital investment needed before investors see a return on their asset. On the other hand, energy conservation strategies are becoming more popular because of user controlled heating/cooling systems and appliances and the little to zero monetary investment required (Junnila, 2007).

Scott, et.al., (1996) suggests that the complete set of building plans need to be filed. The administration and the person-in-charge of the maintenance should each have a set of plans to care for such asset. School officials should have a data base, including building plan to work effectively and efficiently.

Organizing maintenance starts with the establishment of a staff or organized unit to attend to maintenance needs and the attainment of maintenance goals and objectives of the institution. To modify and improve the maintenance practices, procedure and programs of their institutions and to obtain the needed funds to support and implement these developmental activities (Dull, 1979).

According to Meersseman and DeHerde, (1997), designs of schools need not be traditional. A primary consideration must be the cooling demand in school buildings, especially in a warm country such as the Philippines where air conditioning has almost become a necessity – an absolute must.

The aforementioned literature bears relevance to the present study since they are concerned with electrical maintenance, planning and design. It requires the necessity of both the skills and knowledge in the electrical system. This idea is relevant because the present study deals on energy management as principles needed to come up with a proposed appropriate cost-effective energy management program for the University.

Energy conservation primarily relies on behaviour change of an individual; however, individuals must value a behavior before change can occur. Before behavior change can be achieved, generally, attitude change must happen first. Although people do not always act consistently with their beliefs, typically attitudes account for the reason why humans behave the way they do. Thus, to achieve behavior change regarding environmental sustainability, environmental sustainability must be valued. The level at which it is valued will determine how far individuals will go to achieve far-reaching and possibly inconvenient changes (Arbuthnott, 2008).

Placing value through motivators such as monetary savings, education, marketing, incentives, inconvenience, and disincentives will result in behaviour change. Generally, household residents who pay for electricity respond best to monetary benefits through monthly energy savings (Abrahamse, et. al., 2005).

Dennerlain (1987) also mentioned that the description and the forecast of residential electricity consumption are not only important for many areas of economic policy but also for the long-term investment plans of enterprises supplying electrical power. Again as cited by Abrahamse, et. al., (2005), they noted that interventions work most effectively when they address and change the barriers that limit behavioral change. For instance, an educational campaign based on energy conservation would not be very helpful towards students who are already knowledgeable on the subject and perhaps incentives or tailored feedback would work better to reduce energy consumption.

These concepts of interventions have given the researcher some insights on proposing an intervention program for SORSU. The said plan is in the form of cost-effective measures.

Among the studies reviewed, the following were found to be relevant. They presented various methods of energy modeling that have been developed through the years to determine household electricity demand and supply analysis, and decision analysis for electricity demand forecast.

North (2001) revealed in his study that improving the understanding of electricity consumption characteristics within the residential sector and the way in which to control them can reduce the ever-present risk of energy shortages. It can also provide benefits for the residential consumer and the supplying utility by more optimally managing the consumption of electricity.

Kayhan and Tonuk (2013), in the study of Energy Conservation and Policies at Eco-School in Istanbul, revealed that energy conservation and policies can be achieved by introducing the subject into law and regulation. "Energy-efficient schools cost less to operate, which means that more money can be used for books, computer, teacher salaries and other items essential to the educational goals of the schools."

Several electrical energy management opportunities were uncovered both in technical and behavioural aspect; and with the opportunities, the electrical conservation program/measures were formulated. Thereby the study was essential and significant in line with the electrical energy conservation.

North, Kayhan and Tonuk's study were found similar to this present study since both focused on energy conservation and policies of an academic institution. They differed since this present study included other variables like manpower resources, electrical distribution system and budgetary allocation which were not covered in the cited variables.

Halvorsen and Larsen (2001) presented that political signal indicates that the growth in Norwegian residential energy consumption should be reduced, and that it may be necessary to increase energy taxes. Along with this, Ryckman (2008) said that budgetary allocations are integral components to an annual financial plan, or budget of all organizations. They indicate the level of resources an organization is committing to a department or program. Without allocation limits, expenditures can exceed revenues and result in financial shortfalls. Anyone working with budgets should understand how they are used and the limitations they provide.

The study of Ryckman is related to this present study along with their concern of the need for an energy plan that will provide services at the lowest cost. This study is broader in scope since this does not only cover financial plan or budget as components of the proposed energy plan but also the manpower resources, local electrical distribution system and proposed policies.

World Bank (1999) asserted that developing power infrastructure can alleviate poverty by providing the poor with access to a more efficient and cheaper energy. It can mitigate environmental degradation by encouraging a shift from traditional to commercial energy and by increasing the supply of clean fuels. The efficient development of the power sector, open to private participation, is a critical requirement to support Cambodia's goal to generate sustainable economic growth and social development.

Sen (2002) cited that energy electricity is an important need to serve every day the standard of living of people. It is a necessity to serve the process of other fields of the national economy, and the stability of enough and cheap electric supply, which is a catalyst to push ahead development of other national economic fields.

The World Bank, Sen and this present study are all concerned with providing the consumers with cheaper energy yet more efficient supply. However, the first two studies differed from this study in the target area which is on the national, international and commercial settings while this study is on local academic institution

This study aimed to assess the extent of implementation of cost-effective electrical initiative activities implemented by the University; identified the perceived level of implementation along manpower resources, electrical distribution system, policies and budgetary allocation of teaching personnel, non-teaching personnel and students; and revealed the effectiveness of the said activities in the energy consumption of the University since 2014.

2. MATERIALS AND METHOD

This study used descriptive-quantitative research design. It involved 432 respondents, 120 of which were faculty members, 62 were non-teaching personnel and 250 were electrical students. These numbers of samples were identified using Slovin's Formula. To identify samples for teaching and non-teaching personnel, random sampling was used. For student samples, purposive sampling was used because only electrical students were utilized due to their familiarization with the cost-cutting measures implemented by the University.

In identifying the cost-cutting measures implemented by the University, documentary analysis was used. The perceived level of implementation was identified using a researcher-made survey questionnaire which underwent validation. The effectiveness of the said measures was identified using mean difference of electrical consumptions for SY 2010-2012 up to mid of SY 2013-2014 compared to present when the measures were implemented. Out of the results, a cost-effective electrical energy management program for SORSU was proposed.

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3. RESULTS AND DISCUSSION

1. Cost-cutting measures implemented by the University

The University has started the implementation of different cost-cutting measures on July 8, 2014 through SORSU Memorandum No. 27, s. 2014. This memorandum informed and enforced the strict implementation and compliance that air-conditioning units should be switched on starting 9:00 AM only and be switched off by 4:00 PM; and computers should be switched off when not in use; and no downloading is allowed after office hours. This memorandum has been issued to comply with Administrative Order No. 103, s. 2014 which directed the continued Adoption of Austerity Measures in the Government.

On July 11, 2014, additional measures were added through Memorandum Order No. 29, s. 2014. It stated the strict observance and implementation that all lights, fans and computers should be switched off when not in use, unplug water dispenser and computers before leaving the office in the afternoon, perimeter lights should be switched on at 6:00 PM and should be switched off at 5:00 AM, and be sure that the faucets are closed before leaving the office.

SORSU Memorandum No. 30, s. 2014 was issued to state the designation of Mr. Christopher C. Jaramiel as in-charge of energy cost-cutting measures of the University. As such, he is tasked to monitor, coordinate and implement policies and measures to reduce electrical power and water consumptions of the campuses.

With the assignment of Mr. Jaramiel, he started with energy efficiency practices at Sorsogon City campus. The installed and busted fluorescents were replaced with electronic ballast or T5 fluorescents light known to save more than at least 40 percent of electricity and less maintenance compared with the regular one. Damaged electric fans were repaired and/or replaced. The electrical wiring system of the some offices and classrooms were fixed. Air conditioning units and electric fans were regularly checked, cleaned, maintained, replaced and/or repaired.

He also did roaming, checking and reminding everybody to observe the issued memorandum on cost-cutting measures. There were already posted reminders in every room/offices of the proper use of electricity. The administrators were also strict in issuing permits to activities beyond 5:00 PM that would incur energy consumption.

2. Level of implementation along manpower resources, electrical distribution system, policies and budgetary allocation as perceived by the respondents

Table 1 shows the level of implementation along manpower resources, electrical distribution system, policies and budgetary allocation as perceived by the teaching personnel, non-teaching personnel and students.

Table 1: Level of implementation along manpower resources, electrical distribution system, policies and budgetary allocation as perceived by the respondents

	Indicators				
	MR	EDS	P	BA	OWM
Teaching Staff					
WM	1.64	1.84	1.89	1.64	1.75
Des.	NI	MI	MI	NI	MI
WM	2.2	1.63	1.58	1.79	1.80
Non-Teaching Staff					
Description	MI	NI	NI	MI	MI
WM	1.7	2.09	2.05	1.97	1.95
Students					
Description	MI	MI	MI	MI	MI
Ave. WM	1.84	1.85	1.84	1.80	1.83
Description	MI	MI	MI	MI	MI

Legend:

MR – Manpower Resources *EDS – Electrical Distribution System*

P – Policies *BA – Budgetary Allocation*

OWM – Overall weighted mean *Desc – Description*

NI – Not Implemented *MI – Moderately Implemented*

Based from the above data, the teaching personnel perceived that the manpower resources and budgetary allocation were not implemented while the electrical distribution system and policies were both moderately implemented. Non–teaching personnel perceived the opposite. Students then perceived that all four, the manpower resources, electrical distribution system, policies and budgetary allocation were moderately implemented. The overall weighted means of 1.75, 1.8 and 1.95, showed that the three groups of respondents perceived that all four indicators were moderately implemented.

The data further showed that there is a weak implementation of cost-cutting measures of the University with the four mentioned indicators. This may be brought about by the fact that the University has no specific program to manage cost-effective electrical energy system. Only in-charge was designated who is at the same time taking a teaching load. The full implementation would never be realized due to low reinforcement of the memorandum and no specific and focused personnel to look after the overall implementation.

Dull (1979) emphasized that aside from determining grouping, arranging and assigning maintenance and responsibilities, administrators are also expected to modify and improve the maintenance practices, procedures and programs of institutions and to obtain the needed funds to support and implement these development activities.

2. Effectiveness of cost-cutting measures implemented by the University

Based from the table, there is a usual increase in the kilowatt hour used from January 2011 to June 2014. The table also shows a large decrease in the number of kilowatt hour used in July – September 2014 and in October – November 2014, a mean difference of 10500 and 9100 respectively means a decrease in the number of kilowatt hour used. A mean difference of 5716.67 and 4675 means that there is 5716.67 kilowatt hour decrease in the number of kilowatt hour used on the first quarter of 2015, and 4675 kilowatt hour decrease in the second quarter of the same year.

Table 2: Effectiveness of Cost-Cutting Measures Implemented by the University

Time/ Duration	Mean Difference			
	2012	2013	2014	2015
January – March	-6883.33	2333.33	933.33	5716.67
April –	-3266.67	-1750.00	-3383.33	4675.00
June	-3966.67	-583.33	10500.00	-6685.00
July- September	-2916.67	-1633.33	9100.00	-

Based from the table, there is a usual increase in the kilowatt hour used from January 2011 to June 2014. The table also shows a large decrease in the number of kilowatt hour used in July – September 2014 and in October – November 2014, a mean difference of 10500 and 9100 respectively means a decrease in the number of kilowatt hour used. A mean difference of 5716.67 and 4675 means that there is 5716.67 kilowatt hour decrease in the number of kilowatt hour used on the first quarter of 2015, and 4675 kilowatt hour decrease in the second quarter of the same year.

The cost-effective program actually started in August 2014, and based from the above data, starting July – September 2014, a large decrease in kilowatt hour used were noted. There was an increase of 6685 kilowatt in the number of kilowatt hour used in July – September 2015. This increase is actually brought about by construction done in some of the University's buildings. The use of welding machines and other highly electrically powered equipment during the months of July, August and September 2015 in the construction also affected the increase in the number of kilowatts used.

This trend in decrease of consumption may be influenced by the cost-cutting measures implemented during July – September 2014. The decrease is very apparent compared to the past quarters when no measures where implemented.

4. CONCLUSION AND RECOMMENDATION

The University has implemented several cost-cutting measures from July-September 2014 up to present. The perceived level of implementation was moderately implemented. Effectiveness of the cost-cutting measures was found to be effective due to the decrease trend in kilowatt usage during the period of implementation of the cost-cutting measures. Proposed SORSU Electrical Energy Management Program was taken as output of this present study to strengthen/enhance the cost-cutting initiatives of the University. Enhancement on the implementation of the cost-cutting measures is highly recommended.

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