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The Role of Strategic Energy Management on Cost Control in Kenya's Tea Industry- Survey of Tea Factories in Kericho and Bomet Counties

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Abstract:
This study investigated the effect of strategic energy management on cost control in the tea industry in Kenya. Business organizations work on reducing or controlling expenses as a pathway to competitiveness. Tea industry is under threat from a host of challenges including high cost of production, turbulent markets and climate change. New proponents on energy management suggest its adoption, as a strategic approach to minimizing costs and enhancing competitiveness, as successfully implemented in developed countries. The objective of this study was to investigate the effect of strategic energy management in cost control tea industry in Kenya. Using descriptive survey design, the researcher assessed the views of a sample population consisting of 120 people directly tasked in handling energy management operations in the 30 tea factories registered and operating in Kericho and Bomet Counties. Purposive sampling technique was used. Four objectives guided the study. These were assessed as variables. Data was captured using structured questionnaire with a Likert scaling as score. Data was analyzed using statistical package for social sciences (SPSS) V20.0 to generate descriptive and inferential statistics. Tests were done using Pearson's correlation at 95% confidence level and Pearson's product moment correlation (r) derived to show nature and strength of relationship of the variables where coefficient of determination (R^2) used to measure the amount of variation in the dependent variable explained by the independent variable. Statistical results confirmed a strong positive correlation of 0.863, between strategic energy management and cost control. Significance test in the range -0.05 and +0.05 observed that the relationship is significant for all the independent variables, with significance values all lying between -0.05 and +0.05, thus all the variables significantly affected cost. The study concluded that strategic energy management improves operation control leading to continuity in process operations with improved quality, productivity, production cycle, employee morale and reduced plant stoppage and product loss. This positively impact on cost control in tea industry. The study was thus important as it provides more data on strategic energy management in tea industry which is gradually becoming of interest on individual, corporate, governmental and non-governmental organizations and entities, especially on addressing business improvement, global warming and climate change thus benefits tea industry managers, business organizations, researchers and policy makers.

Keywords: *Energy management, cost control, Tea Industry, Kenya*

1. Introduction

Energy is increasingly attracting global attention not only due to the supply and demand and its economics, but also due to the impact of its operations which extend to sustainability and environmental concern. The global manufacturing industries are highly dependent on energy in various forms and from various sources. It constitutes a significant and growing line item in organization's operating expenses. The tea industry utilizes thermal, electrical and manpower energy to accomplish a number of functions in its production or processing units (Manjula, 2009).

While world's energy prices have been steadily rising owing to demand, supply and geopolitics around it, industry managers have been busy working on ways to manage it. The basic understanding was that reduction in energy use is the key to reducing organization's operation costs. This would only be possible where there is an effective energy management system, inefficiencies being noticed and tackled to reduce unnecessary expenditure which erodes profits and performance. Industry managers in developed countries have adopted strategic energy management approach in its systems, as a holistic approach to lowering energy use.

Since independence Kenya has witnessed significant expansion in tea growth, processing and sale. The tea industry in Kenya is now the leading foreign exchange earner, overtaking coffee and tourism which dropped due to market instability, insecurity and global economic downturn among others. The tea sector, though regarded highly due to this economic significance and as an employer of thousands of workers, is significantly threatened by instability in global tea prices owing to forces of demand and supply. Low market

prices have been reported against a backdrop of rising tea production costs, thus threatening its attractiveness and sustainability. The stakeholders are thus challenged to provide decisive solutions to these emerging issues. Energy has been identified as one promising front.

Tea, world's second most popular drink (Markmanellis, 2015), has been contributing to political, economic, and social stability by providing a livelihood for many of Kenya's rural dwellers. It contributes 4% to the Gross Domestic Product (GDP) and over Ksh.117 billion in total earnings annually from around 400million kilos tea production while employing over 5 million Kenyans, over 600,000 being smallholder tea growers. Tea growing is carried out in the large-scale estates or small holder farmers. Tea is manufactured in over 100 factories established in the rural areas thereby contributing significantly to development of rural infrastructure as well as enhancing economic well-being of rural communities. Tea plays an important role towards attainment of Kenya Vision 2030 economic blueprint and thus the competitiveness of Kenya's Tea sector is critical to the country's economy (TBK, 2012).

The tea industries are powered by electricity mainly sourced from Kenya Power and Lightning Company (KPLC) with little supplement from few small hydro power plants established within by the tea industries. They are located in highland areas, characterized by high annual rainfalls and all-season river flows, suitable for hydro power plants. Despite this opportunity, optimal tea production i.0n tea industry has been hampered by lack of reliable, sufficient and cheap energy. This has necessitated installation of backup diesel generators to reduce on effects of un-served energy, despite facing the high costs accompanying its usage and the negative effect on the environment (UNEP).

Tea industry success is threatened by host of challenges including instability in global tea prices, high labor and energy costs (TRI & KTDA REPORTS). Low market prices have been reported against a backdrop of rising tea production cost, thus threatening its attractiveness and product competitiveness. The stakeholders have thus been challenged to provide decisive solutions to these emerging issues. Energy, contributing over 12% of its production costs, has been identified as a promising front. Energy is an essential business input constituting a significant and growing cost in tea industry's operating expenses. It is increasingly attracting global attention due to the supply and demand trends and its economics. Further attention is drawn due to the impact of its operations on climate change and the environment. Energy is projected to continue to rise due to many factors, a number of which are beyond the control of most businesses. There are calls for urgent measures to counter rising energy cost for improved competitiveness and profitability (TBK, 2013).

Fall in tea auction prices coupled with rising energy and labor costs threatens competitiveness and sustainability of tea operations in Kenya. On the same note, Energy Regulatory Commission (ERC) did a benchmark study on energy performance in the Kenyan process industries, tea sector included, and reported that inefficiencies are rampant, energy management strategies are weak. It observed that improvements could significantly reduce high production costs thereby improving competitiveness (ERC, 2013).

The industry has not been spared the consequences of uncompetitive energy sector. Tea manufacturing costs have been on the rise, second highest contribution being the energy cost. Kenya Tea Development Agency (KTDA) Ltd estimates cost of production at about Ksh.77.71 per kilo of made tea, with labor and energy at about Ksh.12 each. The industry stakeholders attributed the high cost of energy to lack of competition and low quality of power due to outages and low voltage experienced country-wide (TBK, 2013).

In the last decade, there has been an increased global concern to energy supply, demand, energy management, climate change, and the environment. The rising and volatile energy prices have converged with increasing concern about climate change and growing consumer support for action on energy and environmental issues to drive a surge of corporate environmental commitments. While understanding the potential of the tea sector and the noble cause of this change, United Nations Environment Programme (UNEP) extended its support to the industry by launching the "Greening the Tea Industry in East Africa" (GTIE) project in 2007 to address the energy challenges facing the tea companies by transferring renewable energy technologies and knowledge to the players in the sector. They targeted increase in supply and reliability of electricity to tea factories so as to reduce the industry's energy, production costs and ultimately increase their competitiveness in the world market. Greenhouse gases from tea factories are also reduced through green power generation.

Strategic energy management has been described as an energy-conscious and systematic, key-step approach by an organization's management to proactively organize and systematically co-ordinate procurement, conversion, distribution and use of energy to meet the requirements, while taking into account strategic environmental and economic benefits. Optimizing energy use is essential to improve industrial competitiveness. The strategic goal of business organizations is to gain a competitive advantage by seizing external and internal opportunities so as to improve the profitability of their operations, products, sales and their marketplace position. A successful organization strategy takes into account all of the influences on the organization's operation and integrates various management function into an efficiently working whole. Energy management programs have been set up as a cost saving initiative. A survey by Aberdeen group observed that leading firms have invested and implemented energy management strategies which have enabled them earn a double-digit energy saving improvements with significant impact on their quality, production cost and overall equipment efficiencies. A recent business cost survey found that the real challenges for businesses today is that energy costs pose a significant challenge to businesses that may lack the knowledge and resources to address it systematically (Taylor *et al*, 2012). Many companies, especially small and medium-sized, find it difficult to conceive Energy Management as a management practice with decisive character for strategic planning guidelines (Batista et al, 2013).

Cost is the price paid to acquire, produce, accomplish, or maintain anything (Webster, 2015). Manufacturing operations are assessed in terms of the cost of production. Production cost refers to the sum of the three basic elements in manufacture which include direct cost, direct labor and overheads. Fixed cost remains constant regardless of volume of output, while variable cost varies with volume of output (Stevenson, 2003). Productivity in operations is a measure of the output of goods or services relative to the input which could be labor, material, energy and other resources used to produce it. Productivity is expressed as the ratio of output to the input.

Productivity can be computed based on a single input, such as energy consumption, or on all inputs. Examples of productivity include labor, energy, machine, and capital productivity. Productivity is closely related to competitiveness. Competitiveness is a factor used to determine whether an organization prospers or not. It is a factor of time, quality, product differentiation and flexibility (Stevenson, 1999).

Increasing costs, demand and scarce availability of resources have made energy conservation a necessity for all energy-consuming sectors. Thus, energy management has become essential and must be part of all organizations. Energy management in any industry is desirable for financial, social and environmental reasons (Kannan & Boie 2003). The financial reasons focus on the profitability and potential growth of the enterprises, whereas the social and environmental reasons focus on the benefits that the enterprises, their workers and the society get from an energy management. A good sound energy management requires optimum utilization of above energy inputs. Energy conservation measures can be specified in three categories with respect to their lead times to implement conservation efforts. These are immediate, Medium term, and long term. Conservation opportunities with respect to location can be divided into three categories (Tuner & Webb 2008) energy conservation outside the facility, energy conservation through the building envelope, energy conservation in the facility. Major energy savings results from those, which require engineering implementation and capital expenditure, obviously, involve in cost analysis and modifications in the plant. Energy management is the judicious and effective use of energy to maximize profits and to enhance competitive positions through organizational measures and optimization of energy efficiency in the process (Kannan & Boie 2003). The energy system consists of an integrated set of technical and economic activities within a complex socioeconomic framework (Ornek *et. al*, 2003). Its dimensions vary from resources, through production, conversion, transportation, utilization technologies and economies to environmental and social aspects. Therefore, energy management modeling may be defined as an investigation of the allocation of energy resources over time by determining the cheapest and most efficient way of meeting final demands with available and potential resources and technologies.

Energy planning is a dynamic process based on estimates and assumptions for future conditions. There are two approaches to energy system modeling, econometric and process-oriented (Ornek *et. al*, 2003). The process-oriented approach is employed for normative (optimization) and descriptive (assessment) purposes and uses mathematical programming techniques. In this approach energy flows are described in terms of physical units. The description is not limited to a particular technology but it covers the entire system for the production and utilization of energy. The mathematical programming techniques in modeling are generally linear, nonlinear, dynamic and integer programming. The dual solution of the problem provides a set of information as to alternative variables (Callagan et. al, 2007) In the econometric approach, flows of economic activity, including energy flow, are described in terms of economic accounts in current and constant prices. The econometric models are usually based on the economic concept of the balancing supply and demand at a market-clearing price. The econometric models may be inefficient to analyze the system over a period of time in which demand and prices fluctuate rapidly and new investment technologies take place. For this reason, the two approaches are combined, usually the result of predictive models are used as input data for the normative models. Simulation is also used extensively in modeling either on its own or as a combination with dynamic or linear programming to achieve detailed information for a few variables over a long-time horizon.

Energy is an essential business input and often constitutes a significant and growing line item of company operating expenses. In a tea factory electricity is used to operate the motors, pumps, fans and lighting; as the fuel wood or fossil fuels is used to operate the boilers and power generators. The cost of energy is projected to continue to rise due to many factors, a number of which are beyond the control of most industries and businesses (Tea Board of Kenya, 2012). Kenya as a nation faces a number of economic, social and environmental challenges. The high cost of energy is one of the biggest bottlenecks to economic activity in the country (KIPPRA, 2005). Kenyan tea face high competition in the market from teas produced in China, India, Sri Lanka and Argentina among others. China has greatly advanced in its energy supply and management programs and having cheap energy through coal and nuclear energy sources thus cost of their production and competitiveness. Energy cost is of significance. The cost of electricity in Kenya is four times that of South Africa and more than three times that of China (KIPPRA, 2005). The government has put in place strategies for reduced energy cost in Kenya; though domestic and industrial energy consumers still face high cost of energy. The high cost challenge is compounded by unreliability of supply and inefficiency. These factors impede the competitiveness of the country's products (including tea) in international markets (UNEP, 2006).

Optimizing energy use is essential in improving industrial competitiveness. The strategic goal of business organizations is to gain a competitive advantage by seizing external and internal opportunities so as to improve the profitability of their operations, products, sales and their marketplace position. A successful organization strategy takes into account all of the influences on the organization's operation and integrates various management functions into an efficiently working whole (KEREA, 2012). A study in Australian industries observed that unnecessary energy expenditure erodes profits and performance. Introduction of strong and robust energy management systems and ways to identify performance improvements was observed to drive significant cost savings, competitive advantages and mitigation against energy price volatility. Without that effective management system, inefficiencies in the business would go unnoticed and opportunities to improve energy use may not have been acted upon (KEREA, 2012). It further observed that businesses with effective ongoing energy management programs can realize many benefits. Implementation of the systems and processes to achieve best practice in energy management builds business value by unlocking savings, reducing exposure to future energy price increases, improving risk management, improving productivity, reducing greenhouse gas emissions, reducing maintenance costs and improving reliability and improving reputational benefits. Companies that have successfully managed their energy were observed to have a best practice approach which allows it to develop a thorough understanding of energy sources, energy use and opportunities for improvement. This includes ways to use energy more efficiently in systems, processes and technologies; how

energy is sourced and procured; and investigating alternative sources of energy, e.g. clean energy, cogeneration or waste heat recovery (Taylor, 2012).

In the past four years, tea auction prices have gradually declined leading to reduced marginal profit to the tea producers. The tea industry reported high energy costs as a threat to its competitiveness and sustainability. Production cost which includes energy usage cost increased significantly in the past ten years, to Ksh.77.71 per kilo of made tea from below Ksh. 50; labor and energy at about Ksh.12 each (TBK, 2011). Each kilogram of made tea requires about US$0.12 electricity, a cost that doubled from 2001 to 2010 (Musyoka, 2012). Traditionally energy issues were only tackled based on emergency, investment or on availability of funds. This has however been challenged by the ever-rising cost of energy. Strategic energy management has lately received industry acceptance as a judicious and effective approach to use of energy to minimize costs and enhance competitive positions. As much as this is the case, the effect of strategic energy management on cost control in the tea industry has received little attention as far as academic study is concerned. Tea factories and industry stakeholders have adopted various approaches to manage energy costs. How has strategic energy management impacted on cost control and its suitability, effectiveness and significance to the tea industry?

1.1. General Objective

The overall objective of this study was to assess the effect of strategic energy management on cost control in the tea industry in Kenya.

1.2. Specific Objectives

The study was guided by the following specific objectives: -

i. To assess the effect of strategic energy management action plans on energy costs in tea industry in Kenya.
ii. To investigate the effect of strategic energy management implementation and operation practices on energy cost in tea industry in Kenya.
iii. To assess the effect of energy management monitoring and control on energy costs
iv. To assess effect of strategic energy management performance review on energy costs in tea industry in Kenya.

2. Research Methodology

Survey research design was used for the study. Parahoo (1997) described a research design as a plan on how, when and where data was to be collected and analyzed. According to KIM Training Series (2001), survey research designs describe people's response to questions about phenomenon or situation with the aim of understanding the respondents' perceptions on an issue under study. Further this research design is used to obtain a description of a particular perception about a situation, phenomena or variable and their views are taken to represent those of the whole population. The survey research design was used in order to determine the effect of strategic energy management on cost control in the tea industry; a case of factories located in Kericho and Bomet Counties.

Kericho and Bomet Counties had an ideal mix of tea factory ownership and management structure. It had the largest representation of independent private, multinational and the small-holder KTDA managed tea processing companies in Kenya (TBK 2015) and a unique tea processing facility i.e. the only instant tea processing facility in Africa. This was formed the study area.

Tea Directorate, Kenya had licensed over 35 tea factories with only 30 being fully operational by January 2015. They were registered operating in as plantation/ estate management or the small holder tea growers under KTDA; 12 under KTDA, 18- Independent/ Estate managed and operating at beginning of 2015 (TBK, 2015). Assuming KTDA management structure, each factory at least operated with 2- managers, 3- junior management staff members and 3- general factory workers conversant on energy management structures, energy utilities and its operations thus a reliable sample for the study. A sample size of 240 respondents was targeted, consisting of senior and junior managers and general workers were selected from the 30 factories (Bomet - 10, Kericho-20) under study. This was in line with Kothari (2004) who said a sample size of at least 50% is acceptable for a target population between 50 and 500. Stratified purposive sampling technique was applied, where a sample was drawn from 30 tea factories with target respondents as detailed in Table 1.

	Target Population	**Sample Size**	**Percentage**
Managers	60	30	25
Junior management staffs	90	50	42
Other staff (Graded/Ungraded)	90	40	33
Total	140	120	100

Table 1: Target Population and Sample per Category
Source: Researcher (2015)

Data was collected from both primary and secondary sources; secondary data was from documented sources including textbooks, journals, internet and research papers which provided information on the effects of internal auditing in an organization's performance. Primary data was collected using structured questionnaire to get information from managers, their assistants, senior staffs and among other staff working on energy management in tea factories. The questionnaire sought information on the effect of strategic energy management on cost control in the tea industry in Kenya. It captured demographic characteristics of respondents, their assessment on effect of strategic energy management action plans, effect of strategic energy management implementation, effect of energy management monitoring & control and effect of strategic energy management performance review, on energy costs in tea industry in

Kenya. According to Mugenda (2008), validity refers to the accuracy and meaningfulness of influences which are based on research thus enabling the researcher to verify the accuracy of the instruments used. Validity of instrument was determined by having consultation and by the supervisors of the study and my colleagues who studied and gave their comments. The questionnaire method was preferred for ease of application, reliability and exhaustiveness when collecting data. It was cheaper, saved time, accurate and convenient.

To ensure reliability was achieved, the research tools were pretested. The methodology and questionnaires developed were scrutinized by colleagues and assisting lecturers before use. Fifteen staffs from Arroket Tea Factory were chosen when testing reliability and this resulted in development of few systematically structured questions for study. The method chosen was reliable since standard questions in control of the research were put in the simplest way possible, enabling the respondent comfortable in answer the questions as true as possible. The method was consistent, as questions adopted had leading choices to guide responder, thus enabled objectivity in the response. The researcher sought permission from the relevant authorities, including NACOSTI. The researcher visited the factories, notified management teams of research intentions and got their approval before proceeding in data collection. Then the researcher administered the questionnaires to the persons as identified in research plan.

Data collected was registered, edited, coded, tabulated and analysed according to the outline set at the time of developing the research plan. Frequency distribution tables, pie-charts and bar graphs were used in data tabulation and presentation. Data analysis was done using descriptive statistics with the help of Statistic Package for Social Sciences (SPSS). To understand the nature of relationship between dependent and independent variables- cost control and strategic energy management- an analysis of correlation was undertaken.

A statistical correlation was measured using coefficient of correlation (r), where the result indicates strength and nature of relationship. A multiple regression model was chosen and fitted to illustrate the relationship between variables of strategic energy management and the influence on cost control. The effect of strategic energy management on cost control in tea industry was conceptualized and modelled as in equation (1):

$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$ ..... (1)

Where:

Y = Cost control

α = Constant or the intercept point of the regression line and the y-axis.

$\beta_1, \beta_2, \beta_3$ and β_4 represent the corresponding beta values for the variables X_1, X_2, X_3 & X_4; analogous to regression coefficients or the corresponding slope

- → X_1 = Effect of strategic energy management action plans
- → X_2 = Effect of strategic energy management implementation and operation
- → X_3 = Effect of strategic energy management monitoring and control
- → X_4 = Effect of strategic energy management performance review
- → ε = error or the correction factor.

3. Results and Discussions

Over 130 questionnaires were prepared and distributed in tea factories located in Kericho and Bomet Counties, but only 120 were received as dully filled and returned. The data response received represents 92.3% of questionnaires dispatched. The data response was coded, analyzed and reported below. These respondents were senior management at 16%, junior management 42%, and graded staff 42%. The majority of the respondents were from the junior management. An assessment of their work experience shows a fair distribution with 85% having worked for at least five years as seen in figure 4.2. Only 15% had worked for less than three years.

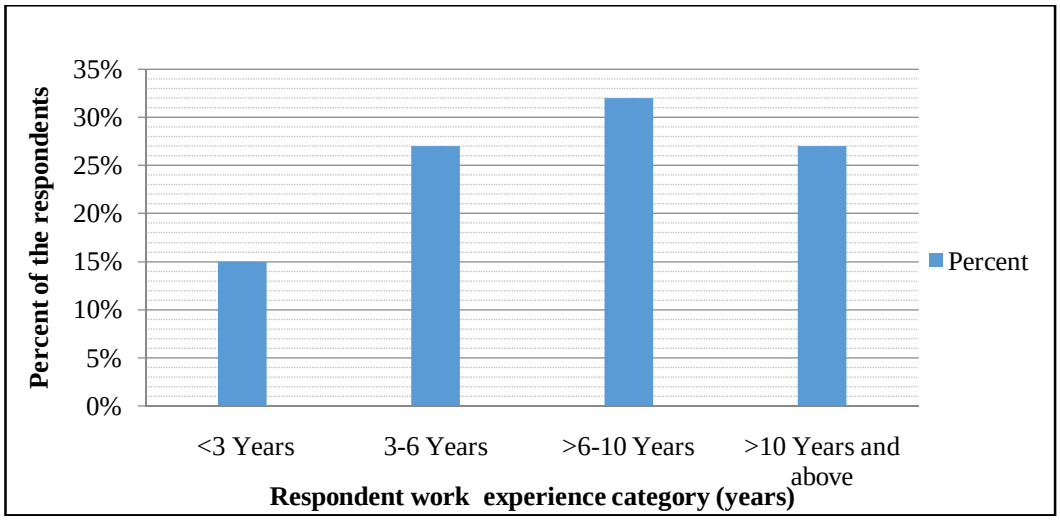

Figure 1: Respondents' work experience in tea industry
Source: Researcher (2015)

All the respondents were educated, having primary level education and above, with 44% achieving tertiary level and 17% being University graduates. On age, 42% of the respondents were in age brackets 20-30, 39% in 31-40, 11% in 41- 50, and only 8% being over 50years.

To understand the effect of strategic energy management on cost control in tea industry, the researcher developed 26 questions pertaining to energy management commitment and action planning, implementation, monitoring and control, and performance review. The researcher formulated structured questions on strategic energy management approach and used it to examine factory staff response to statements on the effects of strategic energy management on tea industry operations and influence on costs.

From the data collected, analyzed, 8% of the respondents agreed as 91% strongly agreed that strategic energy management enhanced establishment and implementation of energy management policy in the factories. Only 1% was neutral.

On effect on compliance to legal and regulatory requirements, a total of 116 respondents (97%) of the respondents agreed or strongly agreed that strategic energy management documentation and policy framework improved compliance to legal and regulatory requirements in tea factories.

An average was determined for each of the independent variables, from the findings as observed from each of the questions per the for sub-topics or the four independent variables under study, and the result tabulated as seen in Table: 2.

Variable	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
x1	0%	0%	1%	44%	55%	100%
x2	0%	0%	1%	46%	53%	100%
x3	2%	3%	5%	40%	50%	100%
x4	2%	3%	6%	42%	47%	100%

Table 2: Descriptive table: Averages of data for variables X_1, X_2, X3 and X_4.
Source: Researcher (2015)

Where X_1, X_2, X3 and X_4 represent independent variables: strategic energy management action plan, strategic energy management implementation and operation, strategic energy management monitoring and control, and strategic energy management performance review.

Regression analysis was conducted using SPSS statistical tools and the results were as shown in Table 3. Statistical correlation was measured using coefficient of correlation (r) and the result a strong positive relationship with r = 0.933. R squared was 0.871, as shown in Table 3.

Indicator	Coefficient
R	0.933
R square	0.871
Adjusted R square (R^2)	0.867
Standard error of the estimation	0.178

Table 3: Model Summary
Source: Research Data, (2015)

Regression analysis was conducted to empirically determine whether strategic energy management influence cost control for tea industry in Kenya. The coefficient of determination R^2 and correlation of coefficient (r) shows the degree of association between the independent variables and resultant cost control. The result of linear regression indicates R^2 = 0.871 and R= 0.933 as shown in table 4.2. The results clearly show that there is a very strong positive relationship of 86.3% between strategic energy management performance (effects of energy management performance plan, energy management implementation and operation, energy management monitoring and review -independent variables) on cost control (dependent variable). The magnitude of effect is 86.3% (R^2 change) - meaning that if the effects of strategic energy management performance factors are improved to 100%, its influence on cost control would be 86.3%. Table 3.

Variable	Un-standardized coefficients		t	Significance.
	Beta (β)	Standard. Error		
Constant	0.605	0.212		
Strategic Energy management action plan (X_1)	0.037	0.018	2.109	0.037
Strategic Energy management implementation (X_2)	0.681	0.055	12.364	0.000
Strategic Energy management monitoring and control (X_3)	0.054	0.023	2.361	0.02
Strategic Energy management performance review (X_4)	0.15	0.043	3.462	0.001

Table 4: Regression coefficients
Source: Research Data, (2015)

The result shows there is a strong positive relationship of 86.3% between strategic energy management performance on control and production (dependent variable or the outcome) and independent variable (i.e. effects of strategic management performance review, energy management implementation and operation, and effects of energy management monitoring and control).
The regression was conducted at 95% confidence level, or significance in the range -0.05 and +0.05 and observed that the relationship is significant for all the independent variables, with significance values at: $X_1 = 0.000$, $X_2 = 0.001$, $X_3 = 0.002$ and $X_4 = 0.008$. They all lie between range -0.05 and +0.05.
From the above results, on inserting values for the model in equation (1) we have model equation is as shown in equation (2):

$$Y = 0.605 + 0.037\beta_1 + 0.681\beta_2 + 0.054\beta_3 + 0.15\beta_4 \quad \text{..... (2)}$$

The first objective was on the effect of strategic energy management action plans on energy costs in tea industry in Kenya. The questions raised, Q1 to Q7, were modeled to assess effect of strategic energy management on the systems established. It tested whether energy management reinforced the management framework for the success in operations management and cost control. It looked at effect on policy framework, effectiveness in energy management set up and commitment by the top management in the organization. The response confirmed highlight in literature review on strategy based on Charles and Gareth (Charles & Gareth, 2008) where strategy involves analysis of internal and external environment leading to development of strategy framework with goals and objectives set for easy, efficient and effective plans. The respondents were in agreement that establishment and implementation of energy management policy in the factories were improved with strategic energy management system action plans. There was increased compliance to legal and regulatory requirements in addition to having a clear and well set continual improvement structure. Energy management policies were developed and its communication enhanced. There was increased commitment by top management, even through appointment of energy managers, and increased allocation of resources to energy management programs. This also agrees with Koch (Koch, 2000) proposition that strategy improves integration of plans for better organizational performance.
The second objective was to examine the effect of strategic energy management implementation on energy cost in tea industry in Kenya. The researcher drew nine questions to each of the respondents on effect of strategic energy management implementation on a number of variables influencing cost and they were positive, where they showed support to observation that strategic energy management system improved communication, awareness, training and resource allocation leading to better factory performance. They agreed it improved operation control leading to reduced product losses, reduced downtime, reduced energy waste and improvement in product quality. The respondents agreed that strategic energy management programs improved energy supply thus improved product quality. This agrees with literature review note that quality is improved when correctable and random variations in a system are eliminated (Stevenson, 1999); that inconsistency in energy supply and variability in quality of energy supply would result in frequent plant stoppages which results in product loss or variation in product quality; that delay in tea manufacture as result of energy interruption severely affect product quality and subsequently lower the marketability or price which it can fetch in the market (Muthamani & Kumar, 2004); that subsequently, the profit margin is lower than if or when consistency in production is maintained where energy supply is steady, as a result of good energy management strategy, leading to superior quality product with a potential to fetch high market prices.
The third objective was on the effect of energy management monitoring and control on energy cost in tea industry. Table 4.1-2 illustrate that the respondents were positive on its effect. The respondents strongly agreed by 53% per figure 4.18 that there was improved convenience in data presentation for timely decision making, while in figure 4.19, strongly agreed 48%, agreed by 40% and only 5% disagreed, thereby confirms that conduct of audits and compliance of energy management system with reporting was enhanced with establishment of strategic energy management system monitoring and control. Where records are available the organization would have a good historical data thus ease of trace of the trend and performance of the factories in energy. As reviewed in literature, part of tea industry poor performance and high operation costs is as a result of complexity in variables and challenges including management agency challenges, regulatory concerns, low productivity concern, high fuel cost, inadequate energy supply and environmental concerns (Kagira et. al 2012). These are efficiently and effectively addressed by strategic energy management implementation, monitoring and control, thus reduced energy and subsequent production costs. Porter (1990) wrote that competitive strategy is about being different, deliberately choosing to perform activities differently than rivals to deliver a unique mix of value. This is possible when there is a self checking system with internal continual improvement program. The figure 4.20 shows 43% of the respondents strongly agree with 53% agreeing that strategic energy management enhances continual improvement on energy policy, objectives and targets and allocation of resource for better performance of energy management system. This results in a sustainable way of continual upgrade and maintenance of energy management with impact on tackling energy costs and improving organization competitiveness.

4. Conclusions and Recommendations

The response confirmed highlight in literature review on strategy based on Charles and Gareth (Charles & Gareth, 2008) where strategy involves analysis of internal and external environment leading to development of strategy framework with goals and objectives set for easy, efficient and effective plans. The respondents were in agreement that establishment and implementation of energy management policy in the factories were improved with strategic energy management system action plans. They also agreed that strategic energy management programs improved energy supply thus improved product quality per the literature review note that quality is improved when correctable and random variations in a system are eliminated (Stevenson, 1999); that inconsistency in energy supply and variability in quality of energy supply would result in frequent plant stoppages which results in product loss or variation in product quality; that delay in tea manufacture as result of energy interruption severely affect product quality and

subsequently lower the marketability or price which it can fetch in the market (Muthamani & Kumar, 2004); that as a result of good energy management strategy superior quality product was achieved with a potential to fetch high market prices. To add to these, they also agreed that tea industry poor performance and high operation costs challenges resulting from of complexity in variables and challenge including regulatory concerns, low productivity concern, high fuel cost, inadequate energy supply or environmental concerns (Kagira et. al 2012) were efficiently and effectively addressed by strategic energy management implementation, monitoring and control, thus reduced energy and subsequent production costs. This is reinforced by the respondent agreement that strategic energy management enhanced continual improvement on energy policy, objectives and targets and allocation of resource for better performance of energy management system. This results in a sustainable way of continual upgrade and maintenance of energy management with impact on tackling energy costs and improving organization competitiveness.

From correlation and regression analysis, the result clearly shows there is a strong positive relationship of 86.3% between strategic energy management performance and cost control; cost control being dependent variable or the outcome, and independent variable being effects of strategic management action plan (X_1), strategic energy management implementation and operation (X_2), strategic energy management monitoring and control (X_3) and strategic energy management performance review(X_4). The coefficient of determination R^2 and correlation of coefficient (r) shows the degree of association between the independent variables and resultant cost control. The coefficient (r) shows the degree of association between the independent variables and cost control. The result of linear regression indicates $R^2 = 0.871$ and $R= 0.933$ as shown in table 4.2. This is an indication that there is a strong relationship between independent variable (strategic energy management) and the dependent variable (cost control). And from the model summary in table 4.2 adjusted R^2 was 0.867 this indicates that strategic energy management was 86.7% of variation with cost control in the tea industry in Kenya. The results show that strategic energy management contributes significantly to the model since the p-value for the constant and gradient are less than 0.05. The fitted model equation is as shown, equation (2) above.

It can thus be deduced that strategic energy management program creates a way for improvement and effective management of energy in all units and facilities in the organization. As a general observation and deduction with the literature review in mind it can be seen that an organization may have opportunities for improving energy management operations but lack the initiative due to lack of plan or structure on how to approach it. Strategic energy management therefore assists it develop a clear plan by developing an energy policy, assessing and analyzing energy usage/ consumption areas and systems, setting objectives, goals and targets, implementing action plans, monitoring, measuring and controlling usage and performing routine review based on goals, targets and objectives to enable it have a continual improvement strategy in energy. The barriers to improvement in energy management which could result from limited finances, lack of employee or management commitment, preference to status quo, lack of communication or poor understanding of energy system are thus systematically and effectively routed out by establishment of strategic energy management.

From these findings, the researcher reaffirms what Kaufmann and Marcia (Kaufmann et.al. 2009) wrote that energy management has a positive impact in cost control. Through strategic energy management tea industry can easily set up programs for monitoring, controlling and improving its energy management to enable it improve its financial performance. Energy consumption is reduced with improved monitoring of energy management system, thereby cost of operation is controlled, and the product quality, factory productivity and operation control improves leading to better factory performance. In tea industry, strategic energy management thus improves operation control leading to continuity in process thereby resulting in improvement in quality and manufacture cycle time. Factory productivity is consequently improved with employee morale getting better due to reduced plant stoppages. It can be deduced that factory competitiveness improved with improves energy management system. The customer satisfaction is expected to improve as product quality improves and production lead time is reduced due to continuous operation. The time, price and quality factors assure improvement in factory competitiveness. Factory operation costs are reduced thus improved profit margins and consequently increase earning to the shareholder and tea farmers. Strategic energy management is effective tool in cost control for the tea industries in Kenya.

The study confirms Haese (Haese 2015) observation that strategic energy management has immediate effects on improving company's financial performance, provided the cost of managing energy are below the savings. The observation by Kerea (Kerea, 2012) that effective energy management reduces exposure of organizations to price increases, improves risk management, improves productivity as well as reducing maintenance costs is also confirmed. In overall organizations achieve a lower cost of operation enabling them to make savings and thus easily attain break-even point. The study agrees with Barua (Barua et al, 2012) that organizations with cross-functional energy management approach achieve significant cost savings and even reduce on its environmental costs. As Manjula (Manjula, 2009) observed, strategic energy management leads to effective outcomes when kept under business improvement part. The study also agrees with Kaufmann and Marcia (Kaufmann & Marcia, 2009) that strategic energy management is the means of managing cost through real time management of information for profitable business. The tea industry therefore has an opportunity to in developing, implementing and effectively running strategic energy management systems and operations in order to reduce on its cost of operation; thereby effectively reducing on production costs as well as improving quality, productivity, energy efficiency and effectiveness for improved competitiveness and customer satisfaction.

The researcher concludes that strategic energy management improves operation control leading to continuity in process thereby resulting in improvement in quality and manufacture cycle time. Factory productivity is consequently improved with employee morale getting better due to reduced plant stoppages. It can thus be deduced that factory competitiveness improved with improves energy management system. The customer satisfaction is expected to improve as product quality improves and production lead time is reduced due to continuous operation. The time, price and quality factors assure improvement in factory competitiveness. Factory operation costs are reduced thus improved profit margins and consequently increase earning to the shareholder and tea farmers. Tea factories can thus adopt strategic energy management as effective tool and approach in cost control in Kenya.

The study was focused on qualitative assessment of the effect of strategic energy management on cost control in tea industry in Kenya. There is need for a quantitative evaluation to be undertaken on the same study area. The researcher thus recommends a quantitative survey to be undertaken in the same area for a conclusive finding as to how much strategic energy management impacts on cost control in tea industry in Kenya.

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