

# Green Energy Strategies on Sustainable Development Goal Seven on Affordable Clean Energy at Kenya Electricity Generating Company Limited

Samuel Olinjo, Joyce Mugure Nderitu, Honnon Samuel Kosney

*Business Administration, University of Nairobi, Kenya*

**Abstract:** - The strong forces arising from the dynamic environment has made organizations in today's world to re-think on how to do business in order to fully satisfy their stakeholders and remain relevant in the unfolding dispensation. In any given business environment, innovative adoption strategy has to be employed to provide tactical mode that satisfy the customers. The purpose of this study was to establish the effects of green energy strategies and united nations sustainable development goal on affordable clean energy in Kenya; A case study of Kenya Electricity Generating Company Limited (KenGen). The researcher adopted a case study design with a census Population of 10 respondents comprising of the Chief Executive Officer and 9 Executive Directors who forms the executive board committee at KenGen. The findings of the study indicated that green energy strategies are adopted for the provisions of affordable clean green energy for the organization. The Kenya electricity generating company considers green energy strategies to be valuable tools as they help in attaining the strategic goals while ensuring the energy is affordable, reliable and sustainable to the consumers. The study recommends that the organization should increase the investment in training employees on the green energy strategies for it is a good way to enhance the adoption of the green energy strategies and their operationalization. The strategic planning should also be incorporated in these strategies for it will ensure that the strategies are achieved and will allow creativity and innovation to the strategies hence, facilitate the achievement for the affordability of clean green energy.

**Keywords:** Green Energy Strategies, Sustainable Development Goal, Kenya Electricity Generation Company Limited, Affordable Clean Energy

## I. INTRODUCTION

The strong forces arising from the dynamic environment has made organizations in today's world to re-think on how to do business in order to fully satisfy their stakeholders and remain relevant in the unfolding dispensations. These conceptual not only changes present critical challenges but also new opportunities for growth and development (Ojo, 2009). Therefore, organizations are rapidly adopting new strategies to respond to this dynamic environmental pressure in order to remain relevant economically. There is a new paradigm on the organization to emphasize on the environment preservation thus aligning the firms' strategies in order to be sustainable in the business environment. Green energy strategies have been on alert by the power generating

firms globally in order to provide an eco-friendly product to the customers.

In Kenya, the Electricity Generating Company Limited, (KenGen), is the leading power generating company and the main supplier of electric power to KPLC through the national grid. The growth has been due to a high pressure by the industrial and domestic power consumers. The organization has adopted diversification due to the technological change pressure from Non-green energy to Green energy that is more affordable, reliable, sustainable and environmental friendly. Consumer's products are much safer from power surge than with Non green power. These developments coupled with lack of the literature on the effects of green energy strategies on the achievement of affordable and clean energy triggered the need for a study which motivated this research undertaking (Kiara, 2013)

## II. RESEARCH PROBLEM

In any given business environment, innovative adoption strategy has to be employed to provide tactical mode that satisfy the customers. Changing from non-green energy to Green energy is a positively registered change in strategy adoption and implementation, (Coyle *et al*, 2003). Growth may bring new business opportunities and larger market size while credibility leads to a higher value regarded as a motive for organization growth (Njeru, 2013). Different organizations will have different ways of achieving their competitive advantage similarly different strategies have been implemented in the organization in order to achieve competitive advantage in the firm (Mintzberg, 1991; Johnson & Scholes, 1993).

Kenya adopts the SDG on energy strategy through KenGen to enable for affordable, reliable, sustainable and sufficient energy. KenGen, is a leading limited company in generation of electric power in Kenya with about 80 percent of electricity that is used in currently in the country. KenGen is faced by various constraints, including climate change and high operation cost for their plants in isolated areas. Due to this constraints government of Kenya through the ministry of energy intervened and issued an Initial Public Offer (IPO) onto the Nairobi Stock Exchange (NSE) under the session paper no. 4 of 2004 on energy, where it issued 30 percent of

its stake as a strategy of reducing those constraints. As at 30<sup>th</sup> June 2015, the Company had a total installed capacity of 1.337 MW comprising of hydropower, geothermal, thermal Power, Wind and Solar Energies, (Kiara, 2012).

Various studies have been conducted in this area globally and locally. Globally, Woh, and Lee (2004), studied the causal association between consumption of energy and the growth of the economic activities as measured by either income or employment. There is a positive relationship between energy consumption and income, economic growth and policies and concluded that the consumption of energy has a link with the growth in the economic activities. Baumer *et al* (2010), studied on the effect of capacity utilization on renewable green energy efficiency that varies across different sectors. Santosh (2009) carried out experimental studies in Indian manufacturing industries that established a positive correlation between the size of the firm and efficiency of the renewable energy.

Locally, Kiara (2013) did a research study on the infrastructure development determinants on the renewable energy sector: a case study of Kenya Electricity Generating Company Limited (KenGen), the study findings established that KenGen's organizational culture supports implementation of renewable energy development projects, which has contributed in the enhancement of the green energy in the company. Omamo (2012) carried out a research study on the factors affecting adoption of green technology by firms in Kenya and concluded that technological and environmental factors among other factors negatively influences the number of firms wishing to adopt green technology. Gitone (2014) did a research study investigating the determinants of adoption of renewable energy in Kenya and established that household size plays a role in facilitating the adoption of the green energy in Kenya. Despite these attempts by research to investigate on the green energy aspect in Kenya, none of the studies known to the researcher has been done investigating the effects of the green energy strategies on the achievement of the clean energy in Kenya. This has created the need for a further study by addressing the following research question: what are the impacts of green energy strategies on the achievement of the affordable and clean energy in Kenya?

### III. RESEARCH OBJECTIVE

To establish the effects of green energy strategies and the sustainable development goal on affordable clean energy in Kenya, A case study of Kenya Electricity Generating Company Limited (KenGen).

### IV. THEORETICAL REVIEW

#### *Open Systems Approach Theory*

Open Systems approach theory was developed by Burnes (2000), the theory suggests that organizations operate in open systems where there is an interaction between internal and external environment. Most often, organizations transact with

the environment by obtaining their inputs from the environment, processing them to goods and/or services and getting their output to the environment (Bastedo, 2004). This indicates that organizations cannot exist without the external environment which explains organizational environmental dependence. The environment has a great impact on the performance of organizations and its impact and influence needs to be constantly assessed for sustainability.

The firm must be very keen on the way their operations affects the environment in order to have a good reputation from the community and the general public, hence, the implementation of the new technologies, new regulation frameworks and use of facilities that do not affect the environment since they will have an impact on the customers' perceptions concerning the environment. Failure to which, may results to loss of reputation which may not make the firm sustainable in the environment (Bastedo, 2004).

Green energy firms operate in open systems where they transact with an environment. Thus, the effect on the environments establishes their sustainability and affordability of the clean energy that explains the relevance of the theories in this study.

#### *Empirical Review*

Implementation of green energy strategies through the SDG is geared towards the provision of affordable, reliable and sustainable clean energy to consumers through great reduction of carbon emission to the environment. This is not only a smooth ground in terms of the financial initiatives and research development but rather need to ensure that customers have an access to information on the environment performance of the products and that they are in position to pay the environmental differentiation costs (Orsato, 2006). There is high emphasize for the firms to be recognized to have adopted the green energy strategies, however, the green strategies are viewed differently by different customers and firms (Saha & Damton, 2005). A sustainable development goal of the green energy strategies is in pursuant of the green marketing belief that ensures the consumption of the energy in the economy is kept at par and does not interfere with the standards of living of future generations.

In order for a firm to provide essential services and products at an affordable price, there is high need to adopt strategies that align on the objectives of the organization while keeping the operations costs at the lowest level possible while emphasizing on the good record of ecological performance. According to Kotler (2008) there is high demand of green products and therefore, high demand for the producers to concentrate on the environmental factors during production.

Peattie and Charter (2003) argued that in order for a product to gain a loyalty in the mind of the consumers they should significantly incorporate the environmental issues so as to be sustainable. However, Ambec and Lanoie (2008) suggest that

there is no empirical evidence on the consumer purchasing behaviour due to the greenness position of the firm.

Waddell (2000) established in order for the organization to be sustainable, there is an emphasize of the organization to enhance the reputation and create a good image to the customers through the development of the eco-friendly products that observe environmental production and enhanced processes that adheres to the environment and that through these, the customers will be willing to purchase the products at the prevailing prices. According to Peattie and Charter, (2003) the firms' structure needs to integrate with green marketing policies so as to enhance its sustainability development and overall performance. The organization needs to enhance customer awareness through provision of information on how environmental values are built into the organizational values, products and services competitiveness.

According to Ginsberg and Bloom (2004), the consumer buying decisions are influenced by the prices and products characteristics instead of environmental issues and largely leads consumers believe that green products are of poor quality thus, reluctant to purchase the green products. He recognized that eco-labelling has become effective way of ensuring that customers are informed about the ecological issue on the products compared to other products. Consumers are more aware of the eco-friendly items and are more eager to pay for eco-friendly products (Base et al, 2003).

From the aforementioned studies, it is evident that studies have been done on the related study topic but on a different context and variables than the ones on this study to the best knowledge of the researcher, that is, green energy strategies and sustainable development goals on affordable clean energy. The applications of those studies are therefore limited in their relevance to the current study thereby creating a research gap. From the review of the global and local previous studies, it was evident that the green energy strategy greatly affects the sustainability and affordability of the energy provision, despite the numerous studies on the study topic on the green energy strategies and its affordability, for the studies focused on different variables that affects the green energy strategies, thus it is evident that no studies have been carried out to the best knowledge of the researcher on the green energy strategies and sustainability on the affordability of the energy at KenGen. Therefore, need of this study to fill the gap that exists on the relationship between eco-friendly energy strategies and sustainable development goals on the affordability of clean energy.

## V. METHODOLOGY

An explorative research design was preferred to conduct an in-depth study on the effects of green energy strategies and sustainable development goal on affordable clean energy. A case study was preferably suitable for the research for it allowed the researcher to have a comprehensive study on Kenya Electricity Generating Company, (KenGen). According

to Burns & Burns (2008), Population is the entire collection of interest by the researcher in terms of people, events or items. The population was drawn from 10 respondents who comprise of the chief executive officer and 9 Executive Directors who are members of the executive board committee as they were deemed knowledgeable on the green energy strategies and sustainable development goals on clean energy at KenGen.

The study used both secondary and primary data in form of interview guide to collect data from the respondents. Data analysis is the process of data coding, entry and common methods of data analysis (Mugenda & Mugenda, 2003). It was expected that most of the data was qualitative and was collected from a single organization, and thus was analyzed using the content analysis technique. Therefore, the data was collected, edited, coded and analyzed for completeness and consistency using the content analysis. The content analysis allowed understanding the data from the respondents. The data was then presented in line with the literature review and the use of tables where applicable.

## VI. FINDINGS AND CONCLUSION

Most of the respondents (50%) had worked between 6 and 10 years, followed closely by the respondents who had been in the organization for more than 11 years (30%). The least among the respondents had served in the organization for less than 5 years, which represented 20% of the respondents. However, most of the respondents had worked for over five years. This indicated that they were knowledgeable since they had gained relevant information of how green energy strategies affected sustainable development goals on energy at KenGen.

From the findings, all of the respondents attributed to the overall vision and mission statements to recognize the need to use green energy for sustainable development. On whether there were green energy strategic policies and regulations, vast majority of the respondents agreed. Respondents indicated that indeed an organization had established clearly defined policies and regulations that guided green energy strategies.

When respondents were asked to indicate an individual responsible for the formulation and implementation of the strategic plan in the organization, most of the respondents said formulation of strategic plan was not done by an individual but by the collective top management team and the board. The study established that once the strategic goals had been formulated, they are passed down to all levels of management for implementation. The study found out that adequate resources are provided during the implementation phase.

In view of the type(s) of green energy strategies that were in place at the organization, most of the respondents indicated Solar Energy, Geothermal, Hydro-Power and Wind Energy Strategies.

When the respondents were asked on the levels of the green energy generation levels, the response were indicated in Table 1

Table 1: Current & Expected Green Energy Generation Levels

Green Energy Strategies by 2017	Current Generation	Percentage	5 year Expected Generation
Hydro-Power	820MW	50.25	160MW
Geothermal	530MW	32.48	795 MW
Wind	26MW	1.59	475MW
Solar	-	0	45MW
Others	256MW	15.69	600MW
<b>TOTAL</b>	<b>1632MW</b>	<b>100</b>	<b>2175MW</b>

Source: Researcher (2017)

The above findings indicate that hydro-power produces the highest Mega Watts by now at 50.25 but will be overtaken in near future by geothermal which commands production of 32.48. Wind power is low by now but too will pick in near future from the already wells under construction. Solar power is cheap in terms of production and is not yet produced by now though one of the 45 MW solar site is ready for construction. Others, thermal has declined to 256 MW and is expected to be phased out as 600 MW of coal is being studied for construction.

#### *Solar Green Energy*

In respect to solar strategy, it was clear that formal strategic planning and policies guide are underway for operations of the green energy strategies at KenGen. Respondents indicated that regular evaluation of the environment helped the organization appraise the issues it needs to consider when deciding on green energy strategies. Respondents said that sustainable goals through the energy conservation policy are communicated to the employees, and that they inform other aspects of operations such as the organizational culture, the tactical and operational plans and activities. Therefore, the Kenya Electricity Generating Company has no choice but to communicate the details of the energy strategies to all employees through policies in order to be incorporated in all activities and tasks to enable the sustainability towards the development goals.

#### *Geothermal Green Energy*

In regard to Geothermal Strategy, respondents said that the environmental policy was highly considered in the generation of the electric power. According to (Orsato, 2006) the consideration of the environmental regulation in the geothermal strategy enables the development of the sustainability of the energy sector and they implementation that do not disturb the habitat. Respondents said that KenGen considers geothermal strategy to be a valuable strategy that helps it attain its strategic goals.

#### *Hydro-Power Green Energy*

In view of the Hydro-Power Strategy, respondents said that the hydro-power energy policy on environmental conservation was highly considered in the organization. Respondents said that the hydropower strategy, which is commonly used in the organization, was one of the most reliable strategy implemented in the organization since it had developed technology that provided efficient information for evaluation of the environmental impact in the society. Respondents further indicated that the hydro-power strategy provided an avenue for energy efficiency, conservation, exploring and development of the resources in the organization as stipulated by (Kant, Masiga & Veenstra, 2014).

#### *Wind Green Energy*

On Wind Energy Strategy, interviewees indicated that regular evaluation of the environment helped the organization appraise the issues it needs to consider when deciding on green energy strategies. Respondents also agreed that green energy strategies on sustainable development goals do not remain static, and they do change in tandem with the developments in the environment, thus need to review their environmental energy policies. Indeed, according to the resource-based theory, for a sustained performance by an organization, there is need to exploit resources that are non-substitutable, rare, imperfectly imitable and valuable (Hart, 1995). Respondents said that sustainable goals through the solar energy conservation policy were communicated to the employees, and that they informed other aspects of operations such as the organizational culture, the tactical and operational plans and activities. Therefore, the Kenya Electricity Generating Company had no choice but to communicate the details of the energy strategies to all employees through policies in order to be incorporated in all activities and tasks to enable the sustainability towards the development goals.

When asked to indicate the period, which an organization had been engaging in green energy strategy, respondents said that following the energy sectoral reforms in 1996, the management of KPC was formally separated from Kenya Power and renamed KenGen in January 1997. Green strategies therefore have green all along from this period to current period. Respondents said that when combined, all the four green strategies have a combined installed capacity of 1,632MW to the national grid.

On the drivers of the green energy and challenges facing them, most of the respondents said qualified and dedicated staff, a large customer base, and Government policy on last mile connectivity coverage, and increase in manufacturing companies across the country. The study noted that these drivers generally grew the level of revenue of the company while at the same time enabling the company to maximize the wealth of its shareholders. The study however noted challenges that green energy adoption and majority of the respondents said inadequate capital for expansion of these projects, rapid changes in technology that require massive

investments, long periods of site exploration and negative cash flows in the start years during launching and commercialization of projects.

On the stability of the power generated through these strategies, respondents said these strategies yielded stable power that boosted revenue of the company. The power was stable as it relied on green constant sources. On effectiveness of these strategies on environmental impacts, the study established that green energy strategy played significant role in environmental health. The study established that the green energy strategies did not result into environmental pollution, which would lead to health concerns to the community.

The study sought to investigate how the green energy strategies were funded and how massive they were. Majority of the respondents said involved funding is in billions largely done through big financial firms like World Bank (WB), International Monetary Fund (IMF), US Trade & Development Agency (USTDA) and African Development Bank (ADB), International partnership, the government grand, and shareholders. Respondents indicated that the government plays an important role in funding the operations of green energy strategies. Respondents noted that from the time of inception up to until 2006 when the company was listed at NSE, and the Government of Kenya sold 30% of its stake in the company through a very successful Initial Public Offer (IPO), acquisition to capital was enhanced. The company occasionally issue rights issues that enhances implementation of these green energy strategies.

Respondents were requested to indicate how the company communicated out the green energy strategies. Most of the respondents said majorly through the vision and mission statements of the company, publication of financial statements on dailies on a regular basis detailing overall performance, through corporate social responsibilities and the future in terms of green energy projects to be implemented. Respondents also cited the use of televisions in creating awareness among users.

The study sought to investigate the frequency which the company trains and develops its staff on green energy strategies. From the findings, the study established that the company had put in place regular training programs to its staff on how effective to implement the green energy strategies. The training was mostly centered on changes in technology besides encouragement of creativity and innovativeness to enhance performance aiming at continuity in operations besides succession.

#### *Affordability of the Clean Energy*

The study sought to assess one who did billing estimates to the grid and the position he/she owned in the organization. From the responses, most of the respondents said that competent and qualified experts are hired by the company do billing estimates. The respondent sought to establish if there are price changes due to the implementation of the green

energy strategies and that the current price of 1.21/kwh to the grid is considered relatively fair to consumers. Indeed the energy currently produce by the organization meets the SDG threshold of reliable, affordable and sustainable to the customers

The study sought further to determine whether Green Energy had solved the problem of power inadequacy. Respondents said that in engaging on green energy by the firm there has been less power black outs and surge experienced due to constant producing components and that they supplement each other in case of environmental interference. The green energy through the policies and their implementation leads to lowering the cost of the renewable energy, which makes it prudent in making the green energy affordable to various stakeholders (REA, 2017).

## VII. DISCUSSION

The environmental policy was highly considered in the generation of the electric power and as according to (Orsato, 2006) the consideration of the environmental regulation in the energy strategies enables the development of the sustainability of the energy sector and they implementation that do not disturb the habitat.

The hydro-power strategy, which is commonly used in the organization, was one of the most reliable strategies implemented in the organization since it had developed technology that provided efficient information for evaluation of the environmental impact in the society. Respondents further indicated that the hydro-power strategy provided an avenue for energy efficiency, conservation, exploring and development of the resources in the organization as stipulated by (Kant, Masiga & Veenstra, 2014).

On Wind Energy Strategy, regular evaluation of the environment helped the organization apprise the issues it needs to consider when deciding on green energy strategies. The green energy strategies on sustainable development goals do not remain static, and they do change in tandem with the environmental developments thus, need to review their environmental policies on energy strategies. Indeed, according to the resource-based theory, for a sustained performance by an organization, there is need to exploit resources that are non-substitutable, rare, imperfectly imitable and valuable (Hart, 1995).

Sustainable goals through the solar energy conservation policy were communicated to the employees and that they informed other aspects of operations such as the organizational culture, the tactical and operational plans. Hence, KenGen had no choice but to communicate the details of the energy strategies to all employees through policies in order to be incorporated in all activities and tasks to enable the sustainability towards the development of the goals.

## VIII. CONCLUSION

Green energy strategies have a significant impact on the affordability of the green energy. The organization has moderately exploited the resources being offered by the external environment. There is high need to incorporate the strategies that will effectively enhance the provision of the green energy sufficiently in order to achieve the objective of making the energy affordable to all and to remain sustainable. There more emphasize to develop the strategies and regularly evaluate the environment in order to achieve the sustainability development goals and implementation of the appropriate green energy strategies in the environment.

In order to make the green energy affordable, there is an emphasize to sensitive on the rules and regulations concerning the green energy strategies, and develop the policies and standards that will enhance full adoption of the green energy strategies in the organization and this will ensure all the employees and management are focused on the sustainable development goals of green energy development and affordability. With a clear policies on the strategies it is will ensure that the strategies are operational and effectively put in place to ensure the affordability of the green energy is achieved.

### Recommendations

The organization should increase the investment in training employees on the green energy strategies for it is a good way to enhance the adoption of the green energy strategies and operationalization of these strategies. In an era of more concern in the environment and increase demand on the green energy, it is essential for the organization to put all the stakeholders into consideration in their implementation of the green energy strategies. Socio-economic consideration is paramount for does not remain constant and that adapting to these strategies will enable the organization to meet their objectives, mission and vision in the organization and society in general. The strategic planning should also be incorporated in these strategies for it will ensure that the strategies are achieved and also will allow the innovation and creativity in the strategies hence facilitating the achievement of the affordability of clean green energy.

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