Effect of Service Delivery Reforms on Access to Electricity in Rural Kenya

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ABSTRACT

Background: Access to electricity in rural areas is critical for beneficiary households, local communities, and the economy as a whole. Indeed, access to electricity is one of the factors that will determine the realization of Kenya's Vision 2030. In view of this, the Kenyan government has over the years, through regulatory bodies such as the Rural Electrification Authority, the Energy and Petroleum Regulatory Authority, and Kenya Electric Power, implemented various institutional and service delivery reforms to accelerate electricity adoption in rural areas.

Objective: The study investigated the effect of service delivery reforms on access to electricity in rural Kenya.

Methodology: The materials used in this study was part of the larger study that was looking at the effect of regulatory reforms in the electricity subsector on access to electricity in rural Kenya. In this paper, we present data generated from the quantitative component of the study that comprised 384 rural households in Kakamega, Uasin Gishu and Nyandarua counties. Data were collected using a questionnaire and analyzed by both descriptive and regression techniques.

Findings: The study found that service delivery reforms notably; Stima Loans and Umeme Pamoja schemes as alternative ways of financing access to electricity, have no statistically significant association with access to electricity in the study areas. The results further indicate that most households (69.6%) do not have knowledge about these service delivery reforms.

Conclusion: We have highlighted that most rural residents in the surveyed counties do not know of existing alternative ways to finance their access to electricity. Therefore, we suggest an increase in the awareness of rural residents about the existence and availability of these financing schemes to finance accelerate rural electrification in Kenya.

Keywords: Access to electricity, service delivery, reforms, regression, rural electrification.

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INTRODUCTION

Although energy is not a basic human need, it is widely accepted that it is essential for the provision of other major human needs such as food, water, and warmth (Benard, 2012). Energy is therefore extremely important for the sustainability of people's lives. Lack of access to clean and cheap energy such as electricity is considered a fundamental aspect of poverty, especially in developing countries (World Bank, 2023). Therefore, meeting basic needs and reducing poverty cannot be achieved without improving access to clean energy services.

To improve the living standards of the growing world population, access to electricity can and should be significantly increased (UNESCO. 2022). According to the World Bank report on electricity access, 1.06 billion people around the world still lack access to electricity, and approximately 3.06 billion people still rely on solid fuel and kerosene for cooking and heating (World Bank, 2023). The same report estimates that around 92% of the rural population (370 million people) in Sub-Saharan Africa lacked access to electricity; 70% (690) in south Asia; 48% (60 million) in Latin America; 22% (30 million) in North Africa. This is particularly crucial for African countries since research shows that electricity access and consumption cause economic growth implying that the economy depends on energy for survival and vice versa (Stern, Burke & Bruns, 2019). This calls for energy growth paradigm that focuses on expanding access to energy services through innovative models. Using clean energy efficiently and applying cost effective technologies and systems to all sectors of the economy within a capital constrained context remains a major challenge in Africa. This makes the availability of electric energy an absolute pre-requisite for economic and social development in Africa.

Kenya's rural electrification efforts are described in the government's Energy Session Paper No. 4 (2004). This document laid the foundation for the establishment of the Rural Electrification Authority (REA) (now the Rural Electrification and Renewable Energy Corporation, REREC). Its mission was to accelerate the pace of rural electrification in the county and ensure adequate electricity at an affordable price. REA was established in 2007 under section 66 of the Energy Act 2006 to expand electricity supply to rural areas, manage rural electrification funds, mobilize resources for rural electrification, and promote the development use of receivable energy (GOK, 2014).

Increasing connectivity especially in rural areas has been problem to Kenya Power (KP) due to high connectivity costs which vary depending on a household's distance to the transformer. While the allocation of transformers is based on government criteria (availability of funds and fair allocation of resources), decisions regarding connections rest with individual economic agents. Currently, a customer who lives within 600 meters from the transformer pays Kshs. 15,000. However, connection charges for customers located more than 600 meters from the transformer are dependent on material, labor, and transportation costs, making them unaffordable for many potential rural customers.

KP came up with several service delivery plans to make electricity more affordable. As part of these initiatives, KP started a partnership with Equity Bank to provide "Stima" (Electricity) loans for connection fees to potential customers living within 600 meters of transformers. Under this scheme, the customer pays 30% of the cost upfront and the balance has to be paid over 3 years with an annual interest rate of 15%. The second program is for those customers living beyond 600m radius of the transformer (KPLC, 2018). The company offers a cooperative program known as "Umeme Pamoja" (Electricity together). The aim of this program is to enable potential customers who normally would not have the ability to connect as individuals, except at a high cost to finance the transformer charges and low-voltage charges. In the Umeme Pamoja program, the cost of connecting power to those households is divided equally among the affected potential customers, making it generally affordable. The third program administered by KP is revolving fund which is

open to all potential customers. In this program, a customer is required to pay 20% connection charges upfront and clear the balance in two years' time. Administration charge of 2% is charged on the remaining balance of 80%. However, with all these initiatives, it is not yet clear on how affect rural electrification.

The remainder of the study is organized as follows. Section 1.2 describes the methodology and Section 1.3 deals with the results of the study. Finally, this study provides conclusions and policy recommendations in Section 1.4.

METHODOLOGY

We sought to evaluate the effects of service delivery reforms: Stima loans, *Umeme Pamoja*, and revolving fund schemes on access to electricity. The study adopted across-sectional research design with quantitative approach. Households in three counties, that is, Kakamega, Uasin Gishu and Nyandarua. Kakamega County is the second largest county after Nairobi in terms of population (KNBS, 2019). It borders counties; Siaya to the West, Vihiga to the South, Bungoma to the North and Nandi to the East. It occupies an area of 3050.3 with an altitude of between 1,240 and 2,000 metres above sea level. The county has a total population of 1,867,579 which comprises of 897,133 females and 970,406 males (Kenya Population, Housing and Census (KNBS, 2019). The county has 433,207 rural households (KNBS, 2019), 177 transformers (KPLC, 2019) and electrification rate of 5.6%. According to Integrated Household Budget Survey (KIHBS) of 2015/2016, the head count poverty in Kakamega county stands at 35.8 percent (672,000), slightly below the national rate of 36.1 percent (KNBS, 2018). Uasin Gishu County has a total area of 3,345.2 km^2 and borders Tranzoia County to the North, Baringo County to the South East, Elgeyo Marakwet County to the East, Kakamega County to the North West, Bungoma to the West and Kericho County to the South. KPHC (2019) indicate that, the county has a total population of 1.163 Million with male to female ratio of 1:1. This county is a highland plateau ranging between 1500m and 2700m above sea level. The head county poverty in Uasin Gishu stands at 41.0 percent or 465, 000 residents are living below poverty line, and occupies position 23 in the county ranking. This county is the main hub of agricultural farming activities of commercial cultivation of maize and wheat on large scale. Other crops cultivated in this county are: beans, potatoes and peas for subsistence and commercial purposes. The county has a total population of 124,207 rural households, 92 transformers and electrification rate of 27.9%. Nyandarua County Nyandarua County borders Laikipia to the North and north east, Murang'a and Nyeri to the east, Nakuru to the west and south west, and Kiambu to the south. According to the National census statistics of 2019, Nyandarua County has a total population of 638, 289 with 51% females and 49% males. According to KNBS (2016), Nyandarua County has a total population of 120,123 rural households. The county with 167 transformers has an electrification rate 10.5%. Kenya Integrated Household Budget Survey of 2015/2016 shows that Nyandarua county has 34.8 percent poverty rate by head count (465,000) (KNBS, 2018). This rate is also slightly below the national poverty rate of 36.1 percent. Nyandarua County is ranked at position 19, indicating that its residents are more resourced that Kakamega and Uasin Gishu.

The study sampled 384 house households through stratified approach with each county forming a stratum. Household heads of 18 years and above were targeted. We applied mathematical formulae suggested by Gall et al. (2007) to compute sample size:

$n = Z^2pq/d^2$

Where; n=is the desired sample size when the target population is greater than 10,000;

Z = the standard normal deviate at the required confidence level;

P = probability of success;

q = (1-p) probability of failure;

d= is the degree of accuracy required (in this case it set at 5 percent)

$n = (1.96)^2*(0.5) *(0.5)/0.05*0.05$

n=0.9604/0.0025=384.16

n = 384.16

Proportionate sample from each county was calculated using the researcher's formula expressed as:

Sample Size = n/N × 384, while the; Percentage of target population = n/N × 100

Where n, is the total number of households per county N, is the total number of households in the threeselected counties. See table 1 for proportionate allocation of sample size.

Table1:

Sample distribution by County

County	Target Population	Sample size	Percentage of total population
Kakamega	301,616	212	55.20
Uasin Gishu	124,207	87	22.80
Nyandarua	120, 123	85	22.00
Total	545,946	384	100.00

Source: Computed from KNBS (2019) statistics

Data was collected through administration of household questionnaires and analyzed using descriptive (frequency & percentages) and inferential techniques (regression) with the aid of Scientific Package for Social Sciences (SPSS) software version 21. The regression equation was estimated at 95% confidence level.

FINDINGS

Of the 384 surveys, 360, or 93%, were completed and returned. Regarding socio-economic characteristics, there were slightly more women (51.9%) than men (48.1%). Regarding marital status, the largest number of respondents (251) (69.7%) was married, followed by unmarried (14.7%). Additionally, 10.6% were widowed, of which only 14 (3.9%) were separated or divorced. Regarding the age of the respondents, the study found that the mean age was 40 years, with a standard deviation of 14 years. The age range ranges from a minimum of 20 years old to a maximum of 90 years old. According to the study, 38.3% of household heads have primary education as their highest educational level, followed by 35% with secondary education. Additionally, 14.4% of respondents had a university degree and 10.3% had no formal education. By occupation, the unemployed accounted for the most at 35%, followed by the self-employed at 31.1%. The statistics also show that 9.2% of respondents are permanently employed, 13.9% earn a living through daily casual work, and the remaining 8.1% earn a living from other economic activities. At the time of the study, the electricity access rate in the three counties was 39.4%.

Financing of the electricity access using loans accounted for 24. 4% while other sources of financing accounted for 1.7%. In terms of the county connectivity, Table 2 indicate that Uasin Gishu county has the

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highest percentage of rural population with access to electricity (65.82%) followed by Nyandarua at 49.3%%, and finally, Kakamega has the lowest at 25.84%.

Table 2:

County wise Access to Electricity

County		Household connected to the nation grid (electricity)		Total
		No	Yes	
	Kakamega	155 (74.16%)	54 (25.84%)	209
	Uasin Gishu	27(34.18%)	52 (65.82%)	79
	Nyandarua	36(50.70%)	35(49.3%)	71
Total		218 (60.56%)	142 (39.44%)	360

Source: Authors (2020)

We asked households to indicate alternative initiatives they are aware of to promote access to electricity. Table 3 shows the results, with most households (69.6%) not being aware of any alternative cooperative models of financing access to electricity, 21.52% of households being aware of Stima loans, and 5.4% of households being aware of Umeme Pamoja. Additionally, 2.8% of respondents were aware of both Stima Loans and Umeme Pamoja, and 2 (0.6%) were aware of other programs.

Table 3:

Knowledge of Cooperative Schemes

Model	Frequency	Percentage
Umeme Pamoja	17	5.4
Stima Loans	68	21.5
others	2	0.6
all	9	2.8
none	220	69.6
Total	316	100.0

Source: Author (2020)

The study also investigated whether surveyed households participated in any of these initiatives. Most households (92.3%) had not participate, and only 20 households (7.7%) did. These results indicate that the participation in these financing schemes was very low. According to the survey results, of the 20 households that reported participation in the program, 5 households were involved in Umeme Pamoja and 15 households were involved in Stima loans.

Logistic Regression between service delivery reforms and access to electricity

To investigate how service delivery reforms influence rural electrification in Kenya, this study conducted multinomial logistic regression. This was determined by the categorical nature of the independent variable ‘service delivery reform’, in which households were asked to indicate which initiatives they had participated in. Summary of the results are shown in Table 4

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Table 4:

Parameter Estimates

Access to electricity[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
	Intercept	.000	1.000	.000	1	1.000			
	Umeme Pamoja	.405	1.354	.090	1	.765	1.500	.106	21.312
	Stima Loans	1.540	1.185	1.689	1	.194	.214	.021	2.187
	Others	.439	1.014	.188	1	.665	1.552	.213	11.324
Chi-Square		12.109							
Df		3							
Sig.		0.007							

a. The reference category is: yes.

Source: Author (2020)

Despite the positive effect of these coefficients, the p-values are greater than, 0.05. This imply that the results are not statistically significant. Nevertheless, the odd ratios indicate that Umeme Pamoja has a higher probability (1.5) of enhancing electricity access in the rural Kenya than Stima loans which has a lower probability (0.214). These results could be attributed to poor uptake of these service delivery reforms as demonstrated by a few households who indicated having knowledge of utilized these services.

These findings imply that even though these schemes were initiated with an intention of enhancing electrification particularly in the rural areas, there is a challenge in terms of their implementation. It appears that majority of the rural people have not been sensitized on these schemes and this could have led to no significant effect on access to electricity in rural Kenya. These findings are in agreement with (Yadoo et al., 2010), who attributed the success of the Bangladesh cooperative model, to the participation in decision making of rural population through elected representatives to the PBS(cooperative) governing body. The PBS is able to attract lower retail tariffs, higher subsidies, training of members in cooperative management and investment in distribution infrastructure. Trimble (2018) noted that structural and policy reforms within the energy sector are aimed at electrifying particularly the rural areas but, they are often hindered by socio-cultural factors such as poor information flow and general ignorance among the population. However, having a reform is one thing but, implementing it is another thing. Evidence show that various factors could impede proper implementation of policy reforms and hence, not achieving the purpose for which such policies were put into place (Nsikak, 2018). Economic and social factors such as capabilities, behavioral, cultural characteristics and preference are among the key factors.

CONCLUSION

Various conclusions are drawn from findings of the study. Firstly, there is low electrification in rural areas and secondly, there is unequal access to electricity in different parts of the country. Thirdly, households in the rural areas have limited understanding of the service delivery reforms (Stima loans, Umeme pamoja and other revolving funds) in the Kenya's electricity sub-sector. Furthermore, it can be concluded that even

though reforms in the service delivery methods are statistically not significant, they are positive which means they have potential in enhance rural electrification if appropriate reforms are undertaken and openly shared with the rural population. Therefore, the government should take a deliberate effort to educate the rural population on the service delivery reforms in the electricity sub-sector. Sensitizing people on alternative electricity funding methods such as Umeme pamoja, Stima loans and other revolving funds could help to increase electrification in rural areas. This study recommends that the government should focus more attention on Umeme pamoja as it represents the highest potential for rural electrification.

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FOOTNOTES

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