Ensuring Continuous Electricity Access Among the Low-income Lifeline Category Consumers

SEAF-K

(Photo courtesy of Kenya Power)

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SUMMARY

Over 640 million Africans have no access to energy yet it is a crucial necessity across social and economic sectors. Kenya prides of an electricity access rate of 76.49 percent (EPRA,2020). However, definition of 'energy accesses' has been an issue of contention among actors in the sector until recently when the World Bank in collaboration with key stakeholders attempted to derive a multi-dimensional framework to do this task. For instance, Penn (2021) affirms that the absence of reliable electricity impedes the ability of informal settlement dwellers to escape poverty and live safe, healthy, productive lives. This in essence depicts the lack of energy in fact as a factor that exacerbates poverty. This study focused on basic access to electricity with attention towards the lifeline consumer category in the Kenyan context. The energy Act,2019 defines the lifeline consumer category as that category that uses less than 50kWh of electricity per month in meeting their power needs. Majority of households in this category are poor. Through application of qualitative research approaches that used desk research method in data collection and review, the study investigated whether if a policy that safeguards the lifeline consumer category was in place to cushion them from the rising electricity tariffs which often leave them either without access to power or illegally tapping the electricity would be of any impact. Three attributes of energy access (affordability, reliability and legality) based on the World Bank's multi-tier framework were used to define the research questions. Through induction, it emerged that having a policy in place that guarantees consumers who use less than 50 units of electricity per month through cross subsidies from middle- and high-income earners can be instrumental in ensuring that illegal connections that congest the network are reduced, and the resulting stability of the network leads to less frequent unscheduled outages.

Key Messages:

- Energy access analysis must be multi-dimensional rather than binary focus on mere household connection
- Energy affordability should consider consumers ability to pay for a minimum level of service (say tier1) distinct from willingness to pay
- Given low household income versus average lifeline expenditure depicted between 2016 and 2019, a threshold policy is needed to assure lifeline electricity access
- Innovative cross-subsidies can go-hand in to addressing lifeline access challenges
- Rational comprehensive policy review approach would be a better option for Tariff adjustment in the lifeline category for affordability purposes
- Illegal substandard connections contribute to frequent fire hazards with some informal urban settlements experiencing an average of two fire incidences annually
- Over 23 percent power losses incurred by Kenya Power were attributable to theft through illegal connections in 2020
- Kenyans experience at least 600 hours of power blackout annually
- The regulator can enhance reliability by imposing financial deterrent whenever outages surpass threshold to allow compensation

INTRODUCTION

The inclusive objective of the National Energy Policy in Kenya is ensuring sustainability, adequacy, affordability, competitiveness and reliability in supply of energy at the minimum cost (Takase et al, 2021). The trend depicted in the cost of energy from 2013 to 2021 shows an increasing trajectory in terms of prices to the margins of 63.2 percent. Lifeline consumer category has not been spared even though this segment seems to be struggling to meet its power needs due to low income. Given that the lifeline consumer category is often characterized by low-income status, it will be prudent to establish whether having a policy in place that protects them from further increment beyond a certain threshold will allow for continuous access to electricity. ESMAP (2014) defines energy access as "the ability to avail energy that is adequate, available when needed, reliable, of good quality, affordable, legal, convenient, healthy & safe, for all required energy services across household, productive and community uses.

ENERGY ACCESS PROBLEM

Part two of the Energy Act, 2019 section seven highlights the responsibility of the government in facilitating the provision of affordable energy services to all persons in Kenya. Whereas there have been various government projects such as last mile connectivity project, modernizing electricity project etc., majority of Kenyans especially in informal settlements and rural areas of the country still lack access to electricity. However, the lack of access does not necessarily mean that this households are not connected to the grid, no, in fact this was the focus of this study focusing on households already connected to the main grid but are not able to sufficiently use the electricity either due to lack of ability to afford or purchase the required units to support basic roles, unreliable supply or are forced to illegally access power due to underlying circumstances. In terms of system and network losses, Kenya Power attributed 23.4 percent power loses incurred in 2020 to theft as a result of illegal connections (KPLC, 2021a). The report further adds that the illegal electricity connections result in overloads causing transformers to damage with possible eventuality of power loss or poor quality and unreliability in terms of supply. Such connections are also mostly done by inexperienced or untrained personnel and therefore do not meet the required standards (KPLC,2021b). It is feared that Kenya Power officers could be collaborating with fraudulent consumers to commit such crime. It is an offence under the Energy Act, 2019 to illegally facilitate or install fake meters or connect to the electric grid and attracts a marched fine of KSh1 million- or one-year's imprisonment or both.

EPRA (2021) notes that between January 2019 to June 2020, the average reliability in terms of the total number of customer interruptions per reporting period against the total number of customers served per reporting period was 1.98, while against international best practices of not more than 1.

For the year ended June 2021, Kenya Power passed the bill of Ksh. 5 billion to consumers representing 19.9 percent allowable costs by the regulator. This continues to increase the cost of affording power by poor households. Before withdrawal of fixed charge in 2018, energy charge (per kWh) was Ksh. 2.5 for the lifeline category consumers within the bracket of first 50kWh and Ksh. 12.75 for 50 to 1 500kWh bracket. When the new tariff structure was availed in July 2018, the domestic lifeline category cost of energy charge (per kWh) increased to 10 Ksh/kWh until 2019 (EPRA, 2021). In November 2021, this cost stood at Ksh. 18.31 per kWh. This trend is alarming for the poor households leaving in slums and rural areas that live hand to mouth. While using the World Bank devised multi-tier energy measurement framework, the study assessed how having a lifeline consumer protection policy may impact energy access by assessing the three attributes of energy access namely electricity reliability, affordability and reliability.

AIM OF THE ISSUE BRIEF

The main goal of this issue paper was to find out whether having a policy in place that safeguard the lifeline consumer category from future electricity inflation guarantees continuous access to modern energy services

Specific objectives of the study included

- To establish whether having electricity lifeline consumer protection policy in place enhances poor household's affordability status to modern energy
- To establish whether having electricity lifeline consumer protection policy in place enhances poor household's ability to have reliable electricity
- To establish whether having electricity lifeline consumer protection policy in place prevents poor households from illegally connecting to the grid

The trend depicted in the cost of energy from 2013 to 2021 shows an increasing trajectory in terms of prices to the margins of 63.2 percent. Given that the lifeline consumer category is often characterized by low-income status, it will be prudent to establish whether having a policy in place that protects them from further increment beyond a certain threshold will allow for continuous access to electricity.

MATERIALS AND METHODS

The study applied qualitative methodology approach that was conducted from a constructivist worldview. Desk review method was used to review and analyze secondary data in the form of publications, journal articles, reports, concept papers, and framework materials that relate to the research topic and the variables concerned. The research used purposive sampling to select specific literature materials that first of all aided in understanding the energy access landscape, poverty-energy nexus and select attributes of energy access as depicted from a World Bank designed multi-tier framework illustrated in figure 1 below. The study critically analyzed the variables of energy access from this framework but only focused on three variables namely affordability, reliability and legality. The decision to narrow on the three was purposive.

Figure 1: The multi-tier framework for measuring energy access Source: World Bank, (2014)

Reliability calculations were arrived at based on Customer Average Interruption Duration Index (CAIDI) data sourced from KPLC and EPRA reports. CAIDI is calculated as total minutes/hours of customer interruption divided by the total number of customers interrupted. Gives the average time required to restore service and includes only customers who actually experienced an interruption.

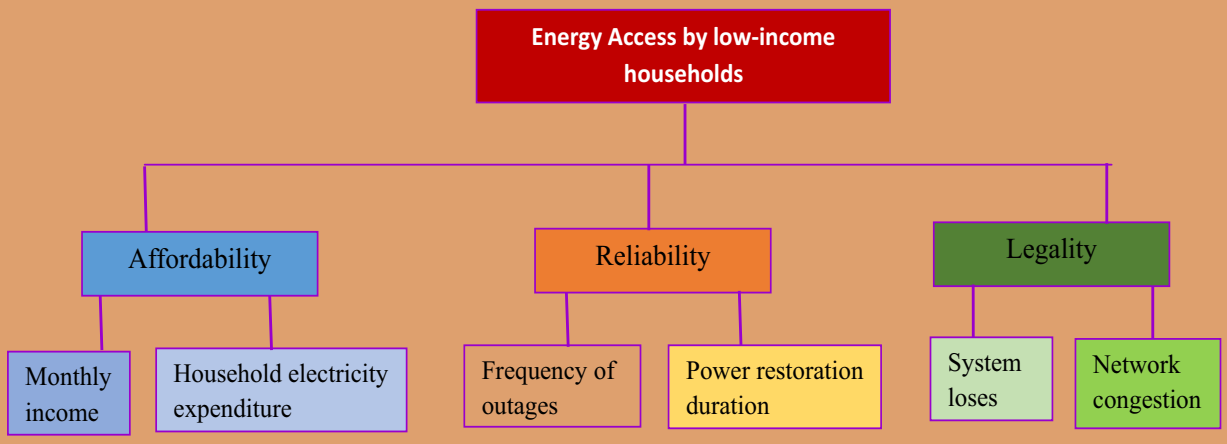

Figure 2: Conceptual framework of the study source: author

SYNOPSIS OF SELECTED ACCESS ATTRIBUTES

Affordability as an attribute of energy access

The large gap between poverty levels and electrification rates in Kenya points at a significant suppressed demand whereby93 percent of the rural population has not got access to electricity, with 50 per cent below the poverty line (Pueyo,2015). Although it was remarkable to withdraw fixed charge costs from the electricity bill in 2018, it is still loaded with charges that include value added tax at 16 per cent of the total bill, fuel energy charge, forex charge and Energy and Petroleum Regulatory Authority charge besides Water Resource Management Authority Levy, Rural Electrification Programme Charge which is five per cent of the cost of the units of power and inflation adjustment (Nyawira, 2021). Affordability gap has been widened by COVID-19 pandemic since many have lost jobs however menial they were. The steep rise in total costs is a disadvantage to already struggling rural and struggling poor rural and informal settlements' population

Reliability as an attribute of energy access in Kenyan context

Pueyo (2015) mentions that rural communities with a connection to the grid suffer frequent and prolonged outages and poor voltage levels. The dire condition of the distribution network in rural areas, with long and undersized feeders, also causes high losses and long response times. In majority of rural areas, electricity hardly lasts four hours in the night and sometimes it's not available during the day. When power failures occur for instance, time taken to address the technical failures is often long.

Legality as an attribute of energy access in Kenya

Majority of grid connections for poor households in rural and informal settlements were facilitated through a subsidy programme. For instance, the last mile connectivity programme had a model through which potential households within transformer maximization distance were only required to provide support documents for premise ownership in and sign agreement to pay Ksh. 15,000 during electricity purchase whereby a 50 percent charge would be deducted from the payments made during purchase towards payment of upfront loan and the rest goes towards units (Amakobe and Randa,2020). However, most households are tempted to connect illegally since they have little money to be spent towards electricity costs but want utilize the resource. offering a further disincentive to connect legally. Mensah and Berch (2021) affirm that these illegal substandard connections contribute to frequent fire hazards with some informal urban settlements experiencing an average of two fire incidences per year which contributes to increased levels of deprivation and impoverishment. Kenya Power attributed the over 23 percent losses incurred to power theft through illegal connections. In the Company's annual report published in 2021, the utility promised to step up revenue protection activities to enhance system efficiency by cracking down on illegal connections through use of data analytics to curb electricity theft by commercial customers, intensifying inspections to address meter bypasses, and by expediting the replacement of faulty meters (KPLC,2021a).

(Photo courtesy of World Bank Group)

FINDINGS

Findings regarding affordability as an attribute of energy access

Affordability as a concept is often confused among utilities as well as policy makers. This is brought about by definitions related to willingness to pay, low cost etc. as closer terms to affordability.

'Utility services may be low-cost, in the sense that a basic, no-frills service is provided cheaply, but this does not mean consumers have enough income to pay for it. Affordability has to do with the ability of certain consumers or consumer groups to pay for a minimum level of service. Ability to pay is also distinct from willingness to pay, which has a clear technical meaning in consumer theory, where it is defined as the amount of income someone is willing to forego to obtain a certain service' (Fankhauser and Tepic,2005).

- Although it was remarkable to withdraw fixed charge costs from the electricity bill in 2018, it is still loaded with charges that include value added tax at 16 per cent of the total bill, fuel energy charge, forex charge and Energy and Petroleum Regulatory Authority charge besides Water Resource Management Authority Levy, REP Charge which is five per cent of the cost of the units of power and Inflation Adjustment (Nyawira, 2021).

- Going by studies conducted by KNHS (2016), Nationally, households investment income on average received stood at Ksh 1,265, per month, whereas average for families that have rental and pension income was Ksh 12,284 and Ksh 2,106, respectively every month. Segregating this to reveal urban and rural figures depicted Ksh 19,976 for rental income in urban and Ksh 6,088. So what proportion is left for energy expenditure?

- Time-of-day rates would immediately benefit smaller households and those with older household heads. However, alteration of lifestyle changes, in the form of appliance use patterns, would be required among the low-income population if they are to benefit from time-of-day rates but this requires broader approach beyond specific utilities (Bloker, 1985). Pressure to increase tariffs can be abated through optimizing the power generation mix and reducing costs further.

- Speed of tariff adjustments affects affordability (Fankhauser and Tepic,2005).

In fact, Fankhauser and Tepic affirm that delaying tariff reform by a few years does not translate into desired changes in affordability constraints, hence may not be an effective way to mitigate the social impact of utility reform, in this case to the low-income families.

(Photo courtesy of Rural Electrification Authority)

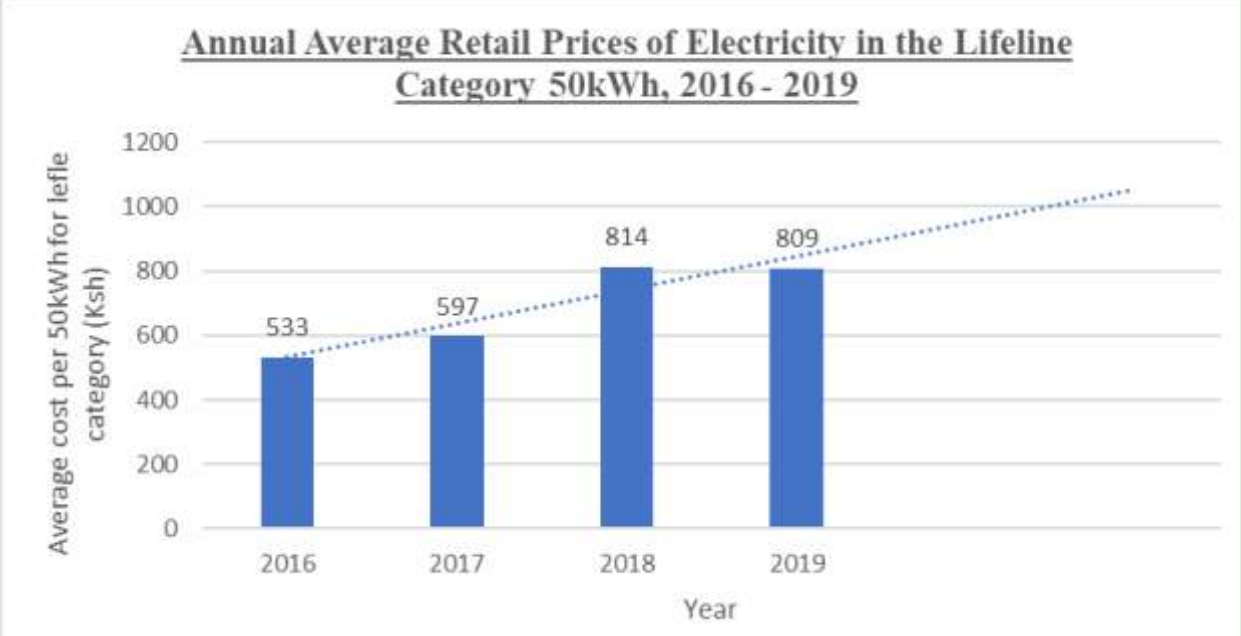

Figure 3: Monthly average cost of electricity for lifeline category between 2016-2019 Data adopted from KPLC, (2021a)

Findings regarding reliability as an attribute of energy access in Kenyan context

- Rural communities with a connection to the grid suffer frequent and prolonged outages and poor voltage levels. The dire condition of the distribution network in rural areas, with long and undersized feeders, also causes high losses and long response times (Pueyo, 2015).

- Kenyan households and businesses experience at least 600 hours of power blackout. In South Africa, this occurs on average 120 hours or five days in a year (IEA,2014)

- In majority of rural areas, electricity hardly lasts four hours in the night and sometimes it's not available during the day. When power failures occur for instance, time taken to address the technical failures is often long (Konjima, 2016). He emphasizes that information systems are fundamental to attending to customer complaints, accelerating service restoration after outages, regularly measuring system reliability, and providing better commercial service.

- The regulator can protect household and business by imposing financial deterrent whenever outages surpass threshold whereby this would allow affected customers to be compensated (World bank, 2016).

- Availability of better fiscal, energy and monetary policy in South Africa has considerably improved power availability in the country, a case for emulation in Kenya (Bekker et al., 2008).

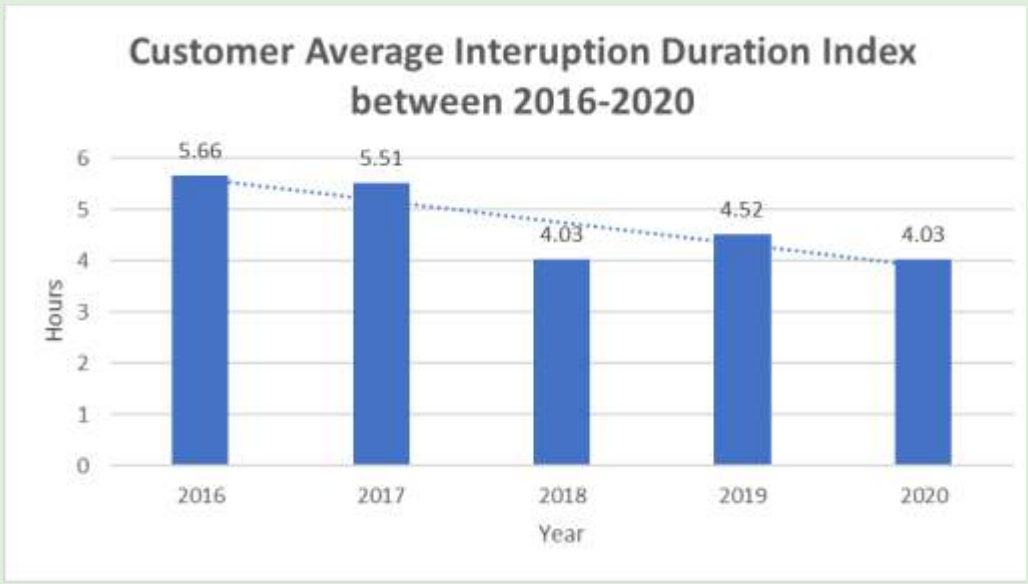

Figure 4: Number of hours a customer is interrupted in Kenya before electricity is restored between 2016-2020 Data adopted from KPLC, (2021a)

Findings regarding legality as an attribute of energy access in Kenya

- Most households are tempted to connect illegally since they have little money to be spent towards electricity costs but want to utilize the resource, offering a further disincentive to connect legally.

- Mensah and Berch (2021) affirm that these illegal substandard connections contribute to frequent fire hazards with some informal urban settlements experiencing an average of two fire incidences per year which contributes to increased levels of deprivation and impoverishment.

- Over 23 percent losses recorded by in the power sector in 2020 were attributed to power theft through illegal connections. In the Company's annual report published in 2021, the utility promised to step up revenue protection activities to enhance system efficiency by cracking down on illegal connections through use of data analytics to curb electricity theft by commercial customers, intensifying inspections to address meter bypasses, and by expediting the replacement of faulty meters (KPLC,2021b).

- Demand caused by illegal connections leads to grid stretch and the network's likelihood to suffer the brunt of the demand increases occurrence of outages (Kelly and Grouse, 2011).

- Kenya Power Company loses about 80 percent of expected revenue due to illegal connections in Mathare, Mukuru and Kibera (KPLC, 2021b).

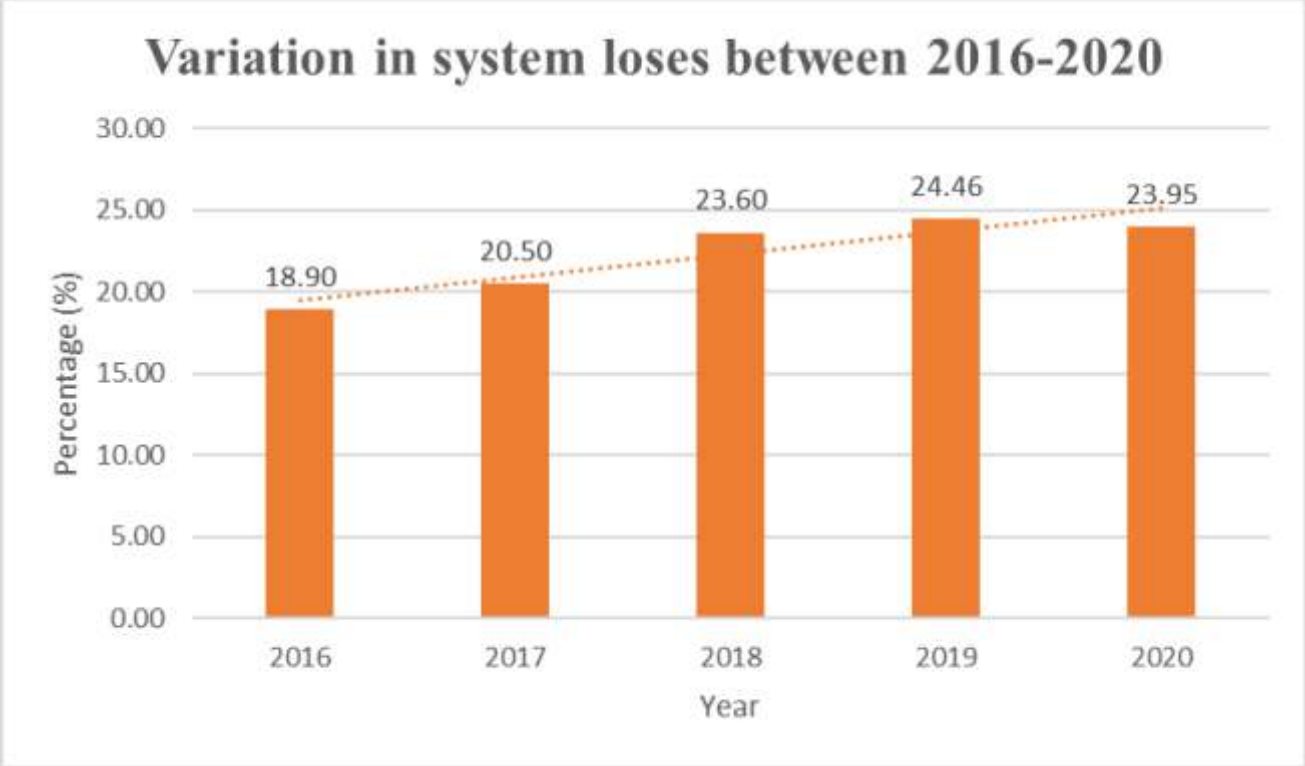

Figure 5: System loses between 2016-2020 Data adopted from KPLC, (2021a)

DISCUSSION

The findings above established that most households in the country have low income in the averages below Ksh.1500 thus spending five percent of total income as per internationally agreed rates on energy would mean setting aside only Ksh.75 which essentially can barely purchase 5 units given the current charge of Ksh. 24 per unit. A focus of the trend revealed in the study of how electricity prices have been increasing demonstrates the lost value in terms of enabling poor houses to continuously afford electricity hence the need for a lifeline protection policy. Figure 3 illustrates the plight by lower income earners who as per the monthly income presented above were not able to pay the average amounts depicted in 2016 as Ksh.533 and Ksh. 809 in 2019. Further responding to the research question "Does having electricity lifeline consumer protection policy in place enhance poor household's ability to afford modern energy services?", Moeketsi et al, (2020) confirms that policy protective pathway can positively impact lower income households in that Lesotho in 2016 was struggling with a similar problem and decided to alter its tariff whereby the first 30 kWh/month consumers were set at a lifeline tariff and any excess was charged at a standard rate that was directed towards cross-subsidizing the lifeline tariff.

(Photo courtesy of Presentation for the World Bank)

Frequent tariff adjustment implies volatile operational environment for the lifeline consumer category which can be prevented by having a policy to protect them whenever inflation occurs. Lifeline rates would assist low-income households in general, with the greatest benefits going to poor households. In answering the research question, "Does having electricity lifeline consumer protection policy in place enhance poor household's access to reliable electricity?", we become certain that congestions in the network especially in informal settlements impact reliability of power among household in the locality. In fact, the unreliability that results tend to cause severe harm to customers outside the lifeline category who are already willing to pay extra for cross-subsidy provided the network is stable as depicted in figure 4.

Although in figure 4 illustrates a decreasing trend in the number of hours taken before power is restored, the rate of outages depicted by the International Energy Agency of 600 hours per year on average is something to worry about especially in strategizing towards minimal blackouts. Findings regarding legality of connections, as investigated under the third research question presents intensity of the whole energy access paradox, especially when Kenya Power affirms that it lost approximately 80 percent of expected revenue due to illegal connections in the informal settlements of Mathare, Mukuru and Kibera (KPLC, 2021b) as well as increasing high system loses presented in figure 5 above.

Majority of grid connections for poor households in rural and informal settlements were facilitated through subsidy programmes. For instance, the last mile connectivity programme had a model through which potential households within transformer maximization distance were only required to provide support documents for premise ownership in and sign agreement to pay Ksh. 15,000 during electricity purchase whereby a 50 percent charge would be deducted from the payments made during purchase towards payment of upfront loan and the rest goes towards units (Amakobe and Randa,2020). To this effect, Konjima and Tremble (2016) confirm that when a household or several households find it difficult to sustain utility payments, they present the risk of pooling together, line under one customer and appear as a single connected customer. What they forget is that they appear as a single high-income consumer which works which has negative effect rather than gains to the households which end up paying more charge per unit. Thus, if cross-subsidy of the lifeline category is enhanced and a lifeline protection policy is adopted against future sharp rise in electricity costs, accessibility issues accruing due to illegal connections would reduce and even be a thing of the past.

(Photo courtesy of Africa Development Bank)

CONCLUSION AND RECOMMENDATIONS

Given that this study was engineered from a constructivist policy inquiry, the opportunity presented in part two of the Energy Act.2019 that requires the cabinet secretary to facilitate review of the energy policy after every five years renders its significance. As pointed out from the introduction section of this study regarding the aim of the energy policy, 2018 important gaps can be inferred from this research specifically tailored on lifeline consumer category. The study deduced that low-income earners can benefit from integration of a protection policy against future sharp tariff adjustments that are likely to curtail their access to electricity. In this regard therefore, following recommendations can be adopted to inform deliberate policy review:

- Connection charges should be set based on the basis of affordability rather than cost in broader sense, with options for payments in installments.
- Provide in the policy a set of incentives where reliability and quality of supply targets are met and sanctions in events of default.
- Establish a national electrification fund to finance the difference between the cost of connections and connection charges based on affordability especially for informal and rural low-income households.
- Ensuring that connection costs are realistic.
- Provide for mechanisms in the policy for refunds where persons require connections out of agreed prioritization and therefore pay more than affordability-based charges and the electric supply lines are used to supply other persons.
- Provide for modalities to enforce standards and regulations that curtail illegal connections and use smart meters to avoid loop holes.
- Provide for opportunities to avert issues of insufficient demand of power especially in low income and inaccessible regions.
- Consider rational comprehensive approach to tariff adjustment for all categories but seek to maintain stability in the pricing of lifeline category.

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