

Have Power Sector Reforms Increased Access to Electricity Among the Poor in East Africa?

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Abstract

The article focuses on power sector reforms in East Africa and attempts to assess their impact on the poor. Specifically, the article examines the extent to which the amendment of the Electricity Act - a key pillar of power sector reform - has influenced the electrification of the poor. The article is based on the case studies of Kenya and Uganda undertaken under the auspices of the Global Network on Energy for Sustainable Development's "Energy Access" Working Group.

Poverty levels in the East African sub-region are very high, particularly in the rural areas. For instance, in both Kenya and Uganda, virtually the entire (100%)¹ rural population falls under the US\$ 2 per capita per day poverty threshold. Consequently, the rural population has been used as a proxy for the poor in this article.

This article reveals that only 1% of the rural households in Kenya and Uganda has access to electricity – implying that very few of the poor are electrified. The two case studies demonstrate key shortfalls in the provision of electricity to the poor. First and foremost, the amended Electricity Acts do not sufficiently address the issue of the

¹ Stated as 100%, as the few individuals with incomes higher than US\$ 2/day constitute a tiny total that adds up to a fraction of a decimal point (effectively, a rounding error).

electrification of the poor (e.g. proposing new and innovative initiatives that would increase electrification of the poor). Secondly, the utilities, ministries of energy and regulatory agencies make no attempt to track electrification of the poor. Thirdly, the sequence of power sector reform measures appears to have been detrimental to electrification of the poor. In both countries, rural electrification was only addressed at the end of the reform process. Fourthly, reforms also appear to have failed to link rural electrification to the overall strategy of improving the performance of the electricity industry. Lastly, current rural electrification targets are very low and would, within the next decade, leave well over 80% of the rural population with no electrification even if the set targets are realized.

The article concludes that although some of the reforms have had some beneficial impacts on the region's electricity industry, the analysis presented demonstrates that they have not led to significant electrification of the poor. As a result, only a comprehensive transformation of ongoing power sector reforms could lead to greater electrification of the poor. The article ends with some suggestions on how reforms could be amended to ensure greater access to electricity among the poor in East Africa.

1.0 Background

This article examines power sector reforms in eastern Africa and attempts to assess their impact on the poor. Specifically, the article examines the extent to which the amendment of the Electricity Act - a key pillar of power sector reforms - has influenced the electrification of the poor. The article is based on a 2-country study (Kenya and Uganda) carried out as part of a wider global study undertaken under the auspices of the Global Network on Energy for Sustainable Development's "Energy Access" Working Group.

The two countries were chosen for three principal reasons: First, they have roughly comparable socio-economic, demographic and energy characteristics. Secondly, the two countries, closely co-ordinate their national economic policies, a reflection of a high levels of trade between them² as well as common membership of the East African Community and the Common Market for Eastern and Southern Africa (COMESA), the two leading trading blocks in the region. Thirdly, the pace of power sector reform implementation in both countries significantly varies, thus providing a unique opportunity to obtain empirical evidence of contrasting impacts of reforms.

In addition, there is substantial energy data and information from studies undertaken by AFREPREN (African Energy Policy Research Network) in the two countries. Due to their socio-economic similarities, lessons learnt from the two countries are relevant to other eastern African and horn of Africa countries of Tanzania and Ethiopia.

² Kenya is Uganda's leading regional source of imports.

The methodology used in the analyzing the impact of power sector reforms is based on a common methodological approach developed by the “Energy Access” Working Group. The East African study adopted the following key common methodological elements:

In order to identify the extent of impact of reforms on the poor, it was necessary to establish a distinction between the poor and non-poor. Due to the absence of income-differentiated electrification data, one way of differentiating the poor and non-poor was to use the lowest tariff band (for instance 0 – 50 kWh) as a proxy for the poor. The assumption is that the customers within the 0 – 50 kWh tariff band are poor whereas those in other tariff bands above it are non-poor. Unfortunately, this approach could not be used due to the unavailability of time series data in the required format. In addition, this approach would not have captured the overwhelming majority poor who are not electrified.

The authors, therefore, had to use other proxies to distinguish the two groups. Electricity data for rural areas³ was used as a proxy for the poor because income and expenditure levels in rural areas are much lower than in urban areas. It is, therefore, assumed that virtually all the inhabitants of rural areas in Kenya and Uganda are poor. The authors, however, realise that this assumption has limitations as it effectively ignores the urban poor and the fact that not all rural households are poor. In addition, it fails to recognise that the majority of the rural

³ In both Kenya and Uganda, the rural population is defined as those people living in the areas outside administrative boundaries of urban local authorities (i.e. country councils, municipalities and city councils). The sources of data on the rural population is drawn from the Government statistical authorities - Central Bureau of Statistics (Kenya) and Uganda Bureau of Statistics.

population with access to electricity are probably not poor⁴ (Bailis, 2003). In spite of the above limitations, the proxy provides a fairly accurate assessment of the impact of reforms on the poor in the 2 countries.

⁴ Another important limitation of the assumption is that when purchasing power is considered, the urban poor may not be significantly better off than their rural counterparts due to their lower purchasing power.

2.0 An Overview of the Poor in East Africa

In general, rural dwellers in East Africa are worse-off than their urban counterparts. This can be demonstrated by comparing the expenditure and proportion of those living under the respective World Bank defined poverty thresholds of US\$ 1 and US\$ 2 a day per capita.

Data from the 1997 Kenya Welfare Monitoring Survey provides the expenditure for rural and urban areas, divided by quintiles, from the lowest expenditure (Q1) to the highest (Q5) (table 1).

Table 1 Mean Per capita Expenditure In Rural And Urban Areas By Expenditure Quintiles in Kenya (1997)

Expenditure Quintile	Rural			Urban		
	Monthly		Daily	Monthly		Daily
	Kshs	US\$	US\$	Kshs	US\$	US\$
Q1	454.8	7.2	0.2	1,048.4	16.7	0.6
Q2	710.7	11.3	0.4	1,636.9	26.1	0.9
Q3	998.1	15.9	0.5	2,255.1	35.9	1.2
Q4	1,431.2	22.8	0.8	3,541.5	56.5	1.9
Q5	3,568.8	56.9	1.9	9,396.2	149.9	5.0
All	1,716.4	27.4	0.9	4,298.6	68.5	2.3

Source: Republic of Kenya 2000; World Bank 2003a

Table 1 demonstrates that in rural areas, only the population in the upper quintile (20%) live above the poverty line of US\$ 1 a day per capita. Using the US\$ 2 a day per capita threshold, virtually all (100%)⁵ of the rural population lives below US\$ 2 a day. Thus, the overwhelming majority of the rural population can be considered poor. The reverse is true for urban areas. Only the lower two quintiles (40%) live below the poverty line, while the remaining three upper quintiles (60 %) live on more than US\$ 1 a day and are thus non-poor. The upper quintile (20%) is relatively wealthy, living on an average of US\$ 5 a day per capita.

For example, in Kenya, rural households spend much less than their urban counterparts. Estimates from a 1997 Welfare Monitoring Survey conducted in Kenya shows that rural areas in Kenya have a mean monthly household expenditure of approximately US\$ 63.82. The absolute poverty line for rural areas used by the same survey stood at US\$ 94.87⁶. In contrast, for urban areas, the absolute poverty line stood at US\$ 147.80⁷ with a mean monthly household expenditure of approximately US\$ 151.56. This implies a significantly higher prevalence of poverty in rural areas, compared to urban areas where the mean household expenditure is above the absolute poverty line⁸.

⁵ Stated as 100%, as the few individuals with incomes higher than US\$ 2/day constitute a tiny total that adds up to a fraction of a decimal point (effectively, a rounding error).

⁶ This is calculated using Adult equivalent figures and an average household size of 4.8

⁷ This is calculated using Adult equivalent figures and an average household size of 3.5

⁸ Another important limitation of the assumption is that when purchasing power is considered, the urban poor may not be significantly better off than their rural counterparts due to their lower purchasing power. The UN projects that Kenya's urban population will exceed its rural population within 10 years (UNPOP, 2001; UNPOP, 2002). In addition, a recent assessment of National poverty in Kenya finds that in 1999, roughly 2.3 million urban dwellers, 46% of the total, were poor by national standards. This is a full 20% of the country's poor population (CBS, 2003). Essentially, the findings of this article apply to rural populations, which include the majority, but not the entirety of the East African poor as the analysis does not cover an estimated 20% of the population that is urban and poor.

This higher poverty level in the rural areas is also confirmed by a recent UNDP report on Kenya (UNDP 2001), which showed that agriculture accounts for 90% of rural incomes in Kenya, yet contributes only 9% of the total private and public sector earnings in the country. Consequently, the rural population, majority of whom are employed in agriculture, have much lower earnings.

This argument strengthens the point put forward earlier for defining poverty on the basis of rural and urban areas, the approach also adopted in this article.

In Uganda, a similar situation exists and the rural-urban split can be used as a proxy for the poor and non-poor. The majority of Ugandans living in rural areas are poor compared to those living in urban areas. This is demonstrated by using the mean per capita expenditure quintiles and the World Bank poverty threshold of US\$ 1 and 2 per capita per day.

Firstly, data on mean per capita expenditure from the Uganda National Household Survey 1999/2000 demonstrates those rural households are relatively poor compared to their urban counterparts. Table 2 provides the mean per capita expenditure for rural and urban areas, divided by quintiles, from the lowest expenditure (Q1) to the highest (Q5).

Table 2 Mean per capita expenditure in rural and urban areas by expenditure quintiles

Expenditure Quintile	Rural			Urban		
	Monthly		Daily	Monthly		Daily
	Ushs	US\$	US\$	Ushs	US\$	US\$
Q1	7,718.8	4.7	0.2	17,524.3	10.7	0.4
Q2	12,717.3	7.7	0.3	30,565.5	18.6	0.6
Q3	17,409.9	10.6	0.4	45,654.5	27.8	0.9
Q4	24,052.4	14.6	0.5	70,290.1	42.7	1.4
Q5	50,929.9	31.0	1.0	170,608.3	103.7	3.5
All	24,953.3	15.2	0.5	75,763.4	46.1	1.5

Exchange rate (2000): US\$ 1 = UShs 1644.5

Using 1 month = 30 days

Source: UBOS, 2001; World Bank, 2003a; World Bank, 2003b

As in the Kenyan case, virtually the entire (100%)⁹ rural population lives below both the US\$ 1 a day and US\$ 2 a day per capita thresholds. The overwhelming majority of the rural population can thus be considered poor. The reverse is true for urban areas, where only the lower three quintiles (60%) live below the poverty line, while the remaining two upper quintiles (40%) live on more than US\$ 1 a day and are thus non-poor. The upper quintile (20%) is relatively well-off, living on an average of US\$ 3.5 a day per capita, which is considerably higher than the US\$ 2 a day threshold.

⁹ Stated as 100%, as the few individuals with incomes higher than US\$ 2/day constitute a tiny total that adds up to a fraction of a decimal point (effectively, a rounding error).

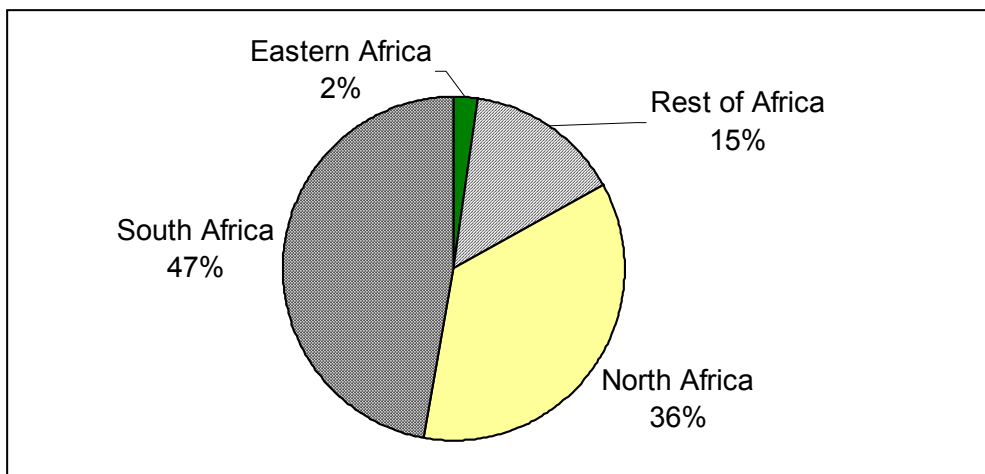
Therefore, in the Ugandan case, the rationale for defining poverty on the basis of rural and urban areas, the approach also adopted in this article, is, to a significant degree, valid.

Before delving into the impact of reforms on the poor, a brief overview of the region's electricity industry is presented in the next section.

3.0 An Overview of the Electricity Industry in the Region

The supply segment of the electricity industry in eastern Africa¹⁰ is relatively small compared to other regions of the African continent. Eastern Africa contributes only 2% of the total installed capacity in Africa. As shown in figure 1, North and South Africa contribute 83% of the total installed capacity, while the rest of the countries account for 15%.

Figure 1 Share of Installed Capacity in Africa (2000).



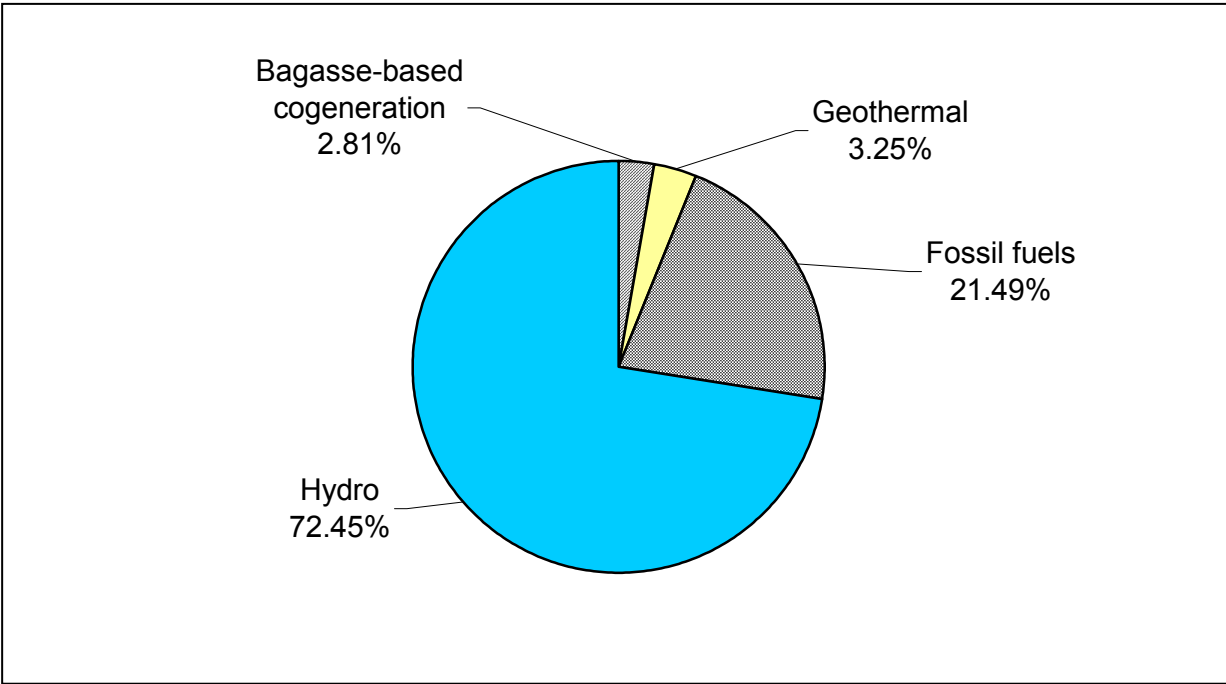
Sources: World Bank, 2003b; IEA, 2002; AFREPREN, 2004

Electricity production in eastern Africa is heavily dependent on hydro, with close to 73% of the production coming from large and small hydro generating units (Figure 2). The balance is shared between thermal generating units, geothermal and bagasse based cogeneration. Co-generation capacity is mainly found in Mauritius.

¹⁰ The term eastern Africa as used in this article refers to Ethiopia, Kenya, Uganda, Mauritius and Tanzania. East Africa, in the context of this article, refers to Kenya and Uganda.

Geothermal energy is in its initial stages of exploitation, with only Kenya and Ethiopia having attempted to use it for electricity generation.

Figure 2 Electricity Production in Eastern Africa (2000)



Sources: Karekezi et al (eds), 2002b; AFREPREN, 2002; AFREPREN, 2004; IEA, 2002

A comparison with other low and middle-income regions of the world shows that the eastern African region has very low levels of electricity consumption per capita (table 3):

Table 3 Electricity Consumption per capita for Selected Developing Regions of the World

Region	Annual Electricity Consumption per capita (kWh) – 2000
Latin America and the Caribbean	1,528
East Asia and the Pacific	760
South Asia	323
Sub-Saharan Africa ¹¹	432
Eastern Africa	60

Sources: World Bank 2003a, AFREPREN 2002, UEB 1999, and UNDP 2002.

Until recently, the electricity industry in eastern Africa was characterized by a monopoly structure, dominated by vertically integrated, state-owned power utilities. This is true for almost all countries, with the exception of Uganda and Kenya, which have recently unbundled their power utilities. This monopoly structure, is thought to be a large contributor to the under performance of the region’s power utilities. With the exception of Mauritius, power sector institutions are mainly characterized by unreliability of power supply, low capacity utilization and availability factor, deficient maintenance, poor procurement of spare parts, and high transmission and distribution losses.

Again, with the exception of Mauritius, all eastern African countries record national electrification levels of 10% or less (table 4). This is very low compared to other

¹¹ The figure for sub-Saharan Africa appears to be high because it includes South Africa which, if excluded, would reduce this figure by half.

developing regions such as Asia and Latin America, where many countries record an electrification level as high as 70% (Shrestha et al, 2003).

Table 4 Electrification Levels in Eastern Africa¹²

Country	National Electrification levels (%) - 2001
Ethiopia	2
Uganda	4
Kenya	6**
Tanzania	10*
Mauritius	100

* 2002 data

** This figure only refers to the proportion of households connected to the electricity grid and may differ significantly from other sources which indicate the proportion of electrified population derived from the total number of grid electricity customers.

Sources: AFREPREN, 2002, Karekezi et al (eds), 2002b; Republic of Kenya, 2002; Okumu, 2003; Kinuthia, 2003

The uniquely high electrification levels in Mauritius can be attributed to its early start and political commitment to rural electrification. In 1961, following a major cyclone that severely damaged the system, the Government obtained a US\$ 7

¹² The data provided in this table might differ from other sources (e.g. MoE, 2002; DHS, 2004) mainly due to the difference in the methodology adopted for the estimation of electrification levels i.e. some sources use the proportion of the population electrified while others use the proportion of electrified households. In addition, some sources use the total number of connections (both household and non-household) while others only use the total number of household connections to estimate electrification levels. In this article, only grid based electricity is counted while in other sources electrification data includes illegal connections as well as electricity from decentralized options such as photovoltaics and gensets.

million loan from the World Bank, which, among other uses, financed an intensive electrification of rural communities throughout the island (Veragoo, 2003). This effort was maintained and 40 years later the entire population has access to electricity. It is only now after achieving 100% electrification coverage that Mauritius is embarking on market oriented power sector reforms.

The financial performance of eastern African utilities is unsatisfactory. Development and expansion of the sector has been hampered by the inability to mobilize sufficient investment capital. With the exception of Mauritius, most public utilities have been unable to collect revenues from customers in a timely fashion, which has contributed to poor financial performance.

The need to address this poor performance of utilities has been a key driver for the far-reaching structural, legal and regulatory reforms that are being implemented in the power sector of eastern Africa sub-region. The next chapter discusses the status and trend of power sector reforms in the sub-region.

4.0 Status of Power Sector Reforms

Compared to the other regions of the world, eastern Africa's power sector reforms have been slow. The majority of the countries have corporatised/commercialised their power utilities. With the exception of Ethiopia, the key reform measure implemented by most countries has been to facilitate the entry of independent power producers (IPPs) primarily to meet shortfalls in electricity generation. Limited progress has been realized with respect to unbundling of vertically integrated state utilities and the establishment of independent regulatory agencies.

Table 5 Status of Power Sector Reforms in Eastern African Countries (2003)

Reform Measures	Mauritius	Ethiopia	Tanzania	Kenya	Uganda
Amendment of the Electricity Act		U		U	U
Corporatisation/Commercialisation		U	U	U	U
Establishment of Independent Regulator				U	U
Restructuring (unbundling)				U	U
Independent Power Producers	U		U	U	U
Privatisation of Generation					U*
Privatisation of Distribution					U**

Notes:

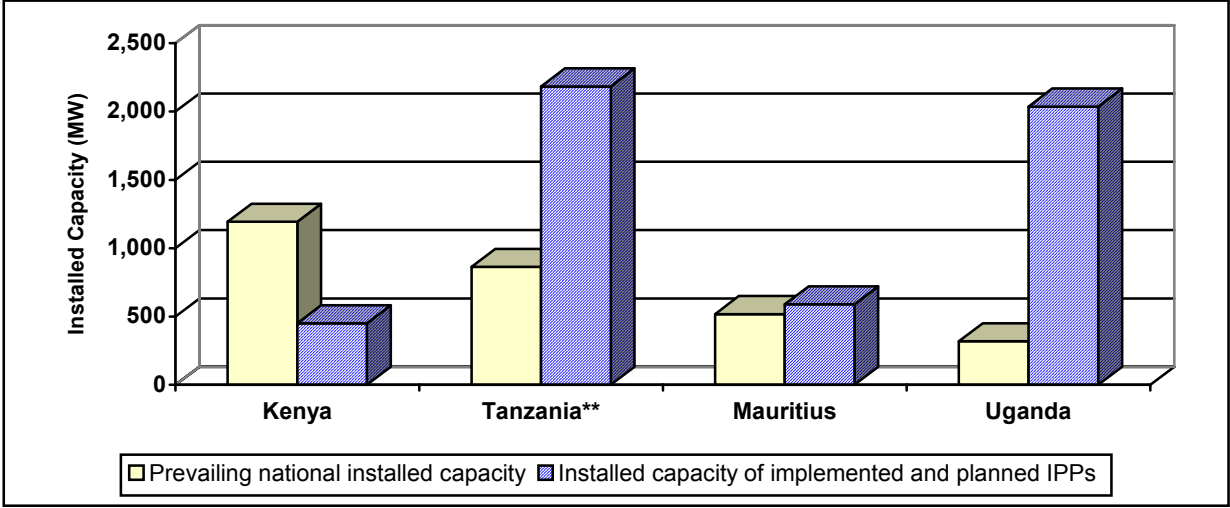
* Concession awarded to Eskom in 2002

** Concession awarded to a consortium of Eskom and CDC-Globeleq in 2004

Source: Compiled by authors

Perhaps the most significant impact of power sector reform in the region is the increased involvement of IPPs. With the exception of Kenya, the capacity of IPPs (both implemented and proposed) in eastern Africa is greater than the prevailing national installed capacity (figure 3).

Figure 3 National Installed Capacity Compared to Installed Capacity of Implemented and Planned IPPs¹³ for Eastern African Countries (2002)*



* There has been no IPP development in Ethiopia to date.

** Year 2001 data

Sources: Adapted from Karekezi et al (eds), 2002b; Okumu, 2003; Kinuthia, 2003; Veragoo, 2003

¹³ In many cases, planned IPPs are often cancelled.

Many of the IPPs came into operation very recently. However, most of the IPPs are predominantly fossil fuel-based, with the exception of Mauritius, where all the IPPs include a renewable energy component (i.e. bagasse-based cogeneration) and Kenya and Uganda which have recently encouraged geothermal-based and hydro-based IPP developments, respectively.

In overall terms, Uganda and Kenya appear to have effected the most far-reaching changes. The two countries have implemented a large number of reform measures with the exception of fully privatising the generation and distribution segments (see table 5 and Appendix 1).

Power sector reforms involving corporatisation/commercialisation of the power utilities have significantly improved the financial performance of the state-owned utilities. The introduction of new management teams has also improved the financial performance of utilities. For example, in Uganda, the former Uganda Electricity Board had for a long time consistently registered huge financial losses. However, a change in management led to a Ushs. 4 billion¹⁴ profit and an increase of 20% in debt collection (Bidasala, 2001) in under two years. Last year, citing the Ugandan success, the Tanzanian Government hired a private company, Netgroup Ltd., to manage TANESCO¹⁵ (the national utility in Tanzania), on a contract management basis.

With regard to reforming the legal and regulatory framework, only two countries - Uganda and Kenya, have established independent regulatory agencies. However,

¹⁴ Exchange rate (2001): US\$ 1 = Ushs. 1,757

¹⁵ TANESCO - Tanzania Electricity Supply Company

in 2001, Tanzania passed an Act of Parliament for the establishment of the Electricity and Water Utilities Regulatory Authority, which is yet to be constituted. Ethiopia established the Electricity Agency in 1997. However, unlike the Ugandan and Kenyan regulatory agencies that could be considered “independent” the Electricity Agency in Ethiopia was designed to work closely with its parent ministry, the then Ministry of Mines and Energy (Teferra, 2002).

A review of the amended Kenyan and Ugandan Electricity Acts reveals that the Kenyan Act addresses the question of “access” only to a limited extent. For example, rural electrification is mentioned in only three “miscellaneous” paragraphs of the Kenya Electricity Act – a clear indication of limited policy interest. The Kenyan Electricity Act amended in 1997 empowers the Minister of Energy to re-establish the Rural Electrification Programme Fund to support electrification in rural areas and other areas considered economically unviable for electrification by public electricity suppliers. Furthermore, the Minister may impose a levy of up to 5% on all electricity consumed in the country, the proceeds of which go into the Rural Electrification Programme Fund.

The major limitation of the Act is that it is explicitly not in favour of subsidies (which would, otherwise, benefit the poor). It stipulates that (Republic of Kenya, 1997:81):

“All rates or tariffs charged by a public electricity supplier for electrical energy supplied ... shall not give any undue preference or be discriminatory”.

Compared to the Kenyan Electricity Act, the Ugandan Electricity Act (amended in 1999) places more emphasis on the question of electricity access in rural areas.

The Electricity Act also empowers the Minister for Energy to undertake the following (Republic of Uganda, 1999):

- a) Prepare and submit a sustainable and coordinated Rural Electrification Strategy and Plan for Uganda to the Cabinet for approval;
- b) Once each year, submit to Parliament, an annual report on the progress and achievement of the Rural Electrification Plan;
- c) From time to time, with the approval of Cabinet, amend the Rural Electrification Strategy and Plan;
- d) Establish the Rural Electrification Fund;
- e) Determine the criteria and the appropriate level of the subsidy; and,
- f) Maintain a national rural electrification database to assist in the monitoring of progress and establishment of the rural electrification targets.

5.0 What Has Been the Impact of Reforms on the Poor's Access to Electricity in Kenya?

This section assesses the impact of the amendment of the Electricity Act¹⁶ on the poor before and after the amendment of the Electricity Act, by analyzing the electrification levels¹⁷ and electrification rates¹⁸. Although the selection of the amendment of the Electricity Act as the principal reform option may not be fully accurate, it is, however, adequate for the purpose of this article. This reform option is selected primarily for three reasons: First and foremost, the Electricity Act sets out the structure and operations of the electricity sector as a whole in both countries. Consequently, the amendment of the Act is one of the primary drivers of power sector reforms and determines the direction reforms take.

Secondly, the issue of electricity access, which is the focus of this article, can be traced back to the Act. The Acts of both Kenya and Uganda provide for, in some cases, modalities to increase access to electricity. For instance, in both Kenya and Uganda, the Electricity Acts provide for the Rural Electrification Fund (REF)¹⁹,

¹⁶ The Kenyan Electricity Act was amended in 1997, while the Ugandan Act was amended in 1999.

¹⁷ Electrification levels refers to the estimated proportion of the households that has physical access to electricity. The most common technique of estimating electrification levels is using the total number of electricity connections (including non-domestic customers). This technique has a major flaw in that it does not differentiate between domestic and non-domestic connections. Consequently, it masks the real problem of access by generating higher domestic electrification levels than there actually exists. It is for this reason that this article only utilizes domestic connections to estimate household electrification levels.

¹⁸ Electrification rate refers to the number of new domestic connections in a specific year expressed as a percentage of total domestic connections for the previous year.

¹⁹ In Kenya, Rural Electrification dates back to 1967. The Rural Electrification Fund was initiated in 1972 and the Rural Electrification Programme was started in 1973. In Uganda, the Rural Electrification Fund was established in 2001 but its operation is still in its embryonic stage.

whose objective is to finance electrification of rural areas. As mentioned earlier, the Ugandan Electricity Act, in addition, empowers the Minister for Energy to undertake a range of critical tasks aimed at accelerating rural electrification (Republic of Uganda, 1999).

Lastly, since the amendments took place in the late 1990s, there is some useful pre and post reform data that can enable empirical analysis of the impact of the amendment of the Acts on electricity access.

As mentioned earlier, the key weakness of the available time series data sets is that they do not differentiate the poor and non-poor. Consequently, the proxy used for the poor is electricity data for rural areas on the assumption that the majority of urban residents are not poor²⁰. The rationale is that income levels in the rural areas are much lower than in urban areas (virtually the entire (100%) rural population is under the internationally recognised US\$ 2/day poverty datum).

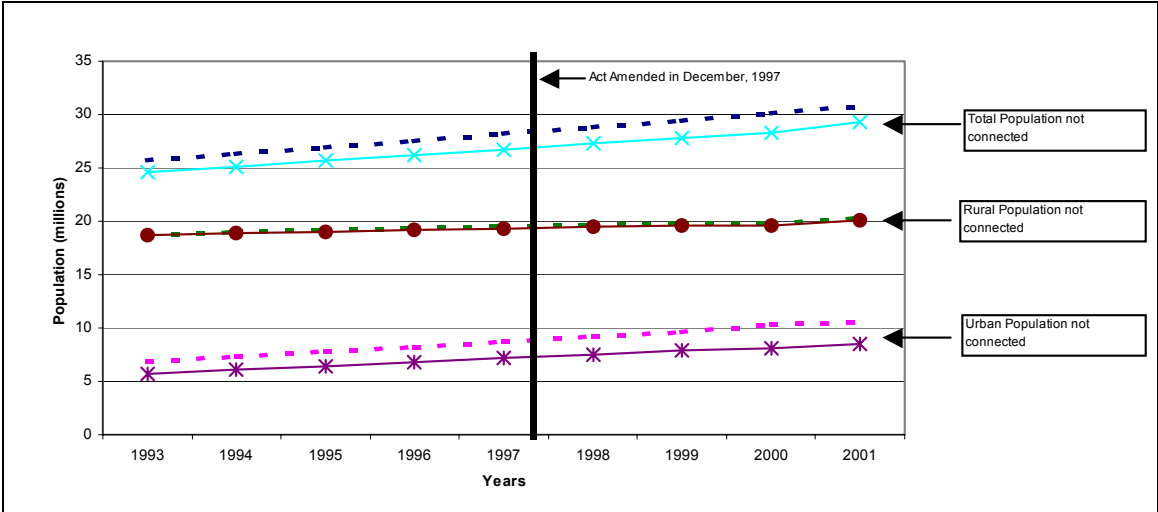
5.1 Electrification Levels

A decade after initiating power sector reforms, one would expect to see a significant decrease in the population not connected to the grid electricity among other improvements in the sector. This is, however, not the case in Kenya. As shown in the following figure, for the last 10 years, no significant changes to electrification levels have been registered. As before, almost the entire population

²⁰ As mentioned earlier, this assumption has a major flaw as it ignores the urban poor accounting for a not-insignificant 20% of the national population of Kenya. In addition, the urban population is expected to surpass the rural population by 2012 (UNPOP, 2001; UNPOP, 2002; CBS, 2003).

had no access to electricity. Effectively, power sector reforms do not appear to have an impact on electrification levels.

Figure 4 Status of Population Without Access to Electricity in Kenya



Sources: Computed by the authors using data from World Bank, 2001; KPLC, 1992; 1997; 2002; Kinuthia, 2003; AFREPREN, 2004

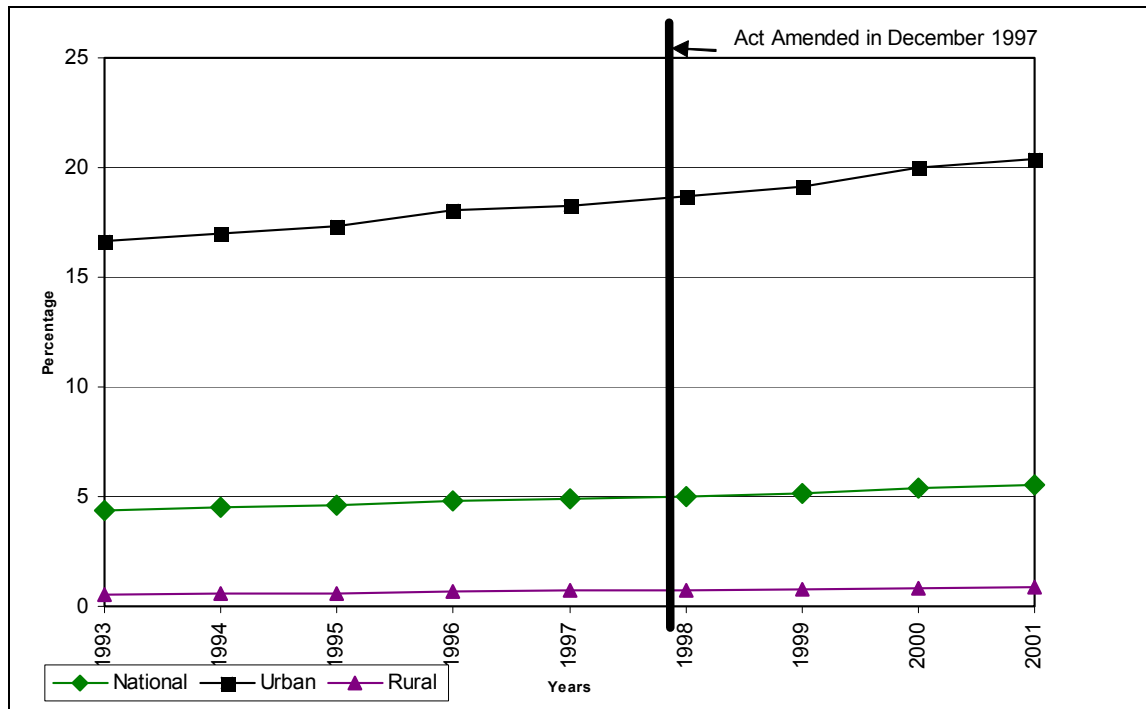
Note: Dotted lines depict the respective total population.

Figure 4 reinforces the view by critics of reforms who insist that power sector reforms have largely focussed on the development of IPPs and improving the financial status of state-owned utilities (mainly to lure the IPPs and other private investors in the sector), at the expense of electrifying the country's poor.

The data presented in figure 4 also demonstrates that the amendment of the Electricity Act in 1997 did not improve access. The population without access to electricity continued to increase.

In percentage terms, pre- and post-reform electrification levels of households (national, urban and rural) have been relatively constant (figure 5). National electrification levels have only risen by 2 % over an 8-year period. This is lower than the average annual national population growth rate of 2.6 % (UN Habitat, 2004) implying that the unelectrified proportion of the population is growing. Similarly, both urban and rural household electrification levels rose by an insignificant proportion during the same period. To date, 30 years after the establishment of the Rural Electrification Fund, less than 1% of the rural households have access to electricity (see figure 5).

Figure 5 Households Electrification Levels in Kenya



Sources: Computed by the authors using data from World Bank (2001), KPLC (1992), (1997), (2001/2002); Kinuthia, 2003

Implications for the poor: The trend in electrification levels of households (national, rural and urban) seem to indicate that the Electricity Act (amended in 1997) has not had a significant impact on electrification levels. Using the data on electrification levels of rural households as a proxy for the poor, it appears that for the foreseeable future, the overwhelming majority of the poor will not have access to grid electricity.

The Electricity Act does not address this problem. The only reference made to electrification is with regard to the Rural Electrification Fund, but the Act does not

provide guidance on how the rural population (who form the bulk of the poor in Kenya) will be electrified.

5.2 Electrification Rates

The electrification rate indicator refers to the number of new domestic connections in a specific year expressed as a percentage of total domestic connections for the previous year. This indicator is used to determine the extent to which the reform option accelerates (or retards) access to electricity among the poor. Figure 6 shows the trend in electrification rates at the national level as well as in rural and urban areas of Kenya:

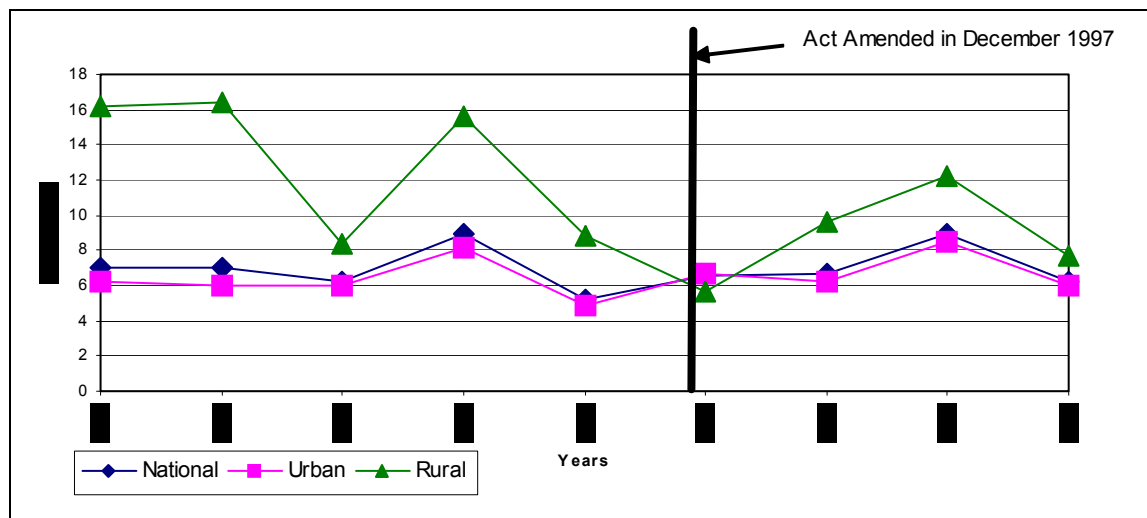
Overall, the household electrification rates (national, rural and urban) have been low (figure 6). An interesting trend is that the national electrification rate and the urban electrification rate have been almost the same (varying between 5 – 7% for most of the years under review). The similarity in the trend between the national and urban household electrification rates could be explained by the fact that most of the new household connections are in urban areas, with very few in the rural areas as shown in the table 6.

Table 6 New Household Connections

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Urban	11,729	12,179	12,697	18,480	11,827	16,997	17,155	24,640	19,054
Rural	2,775	3,283	1,942	3,951	2,564	1,784	3,238	4,477	3,156

Source: Kinuthia, 2003; KPLC, 1997; KPLC2001/ 2002; AFREPREN, 2004

Figure 6 Households Electrification Rates in Kenya



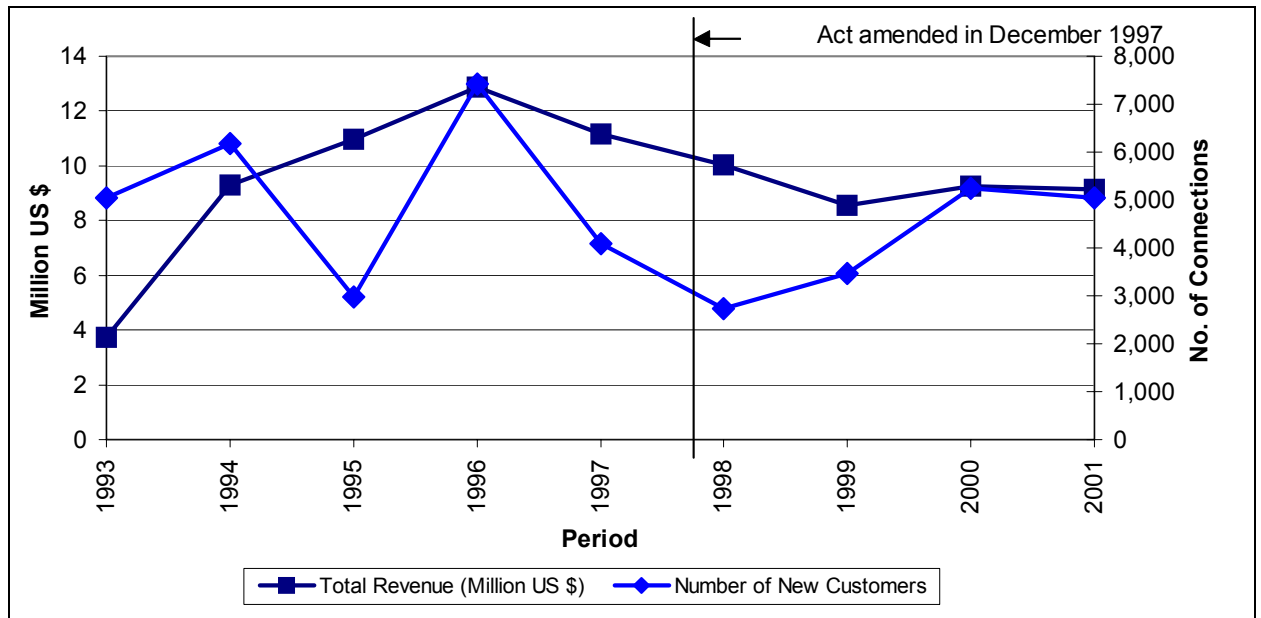
Sources: Computed by the authors using data from KPLC (1992), (1997), (2001/2002); Kinuthia, 2003

As shown in figure 6, during the 4 years preceding the amendment of the Act, rural electrification rates dropped dramatically from a high of 16% to a low of about 9% in

1997. Four years after the amendment of the Act, the rural household electrification rates further dropped to 8%.

As shown in figure 7, the revenue of REP grew steadily from about US\$ 3.72 million in 1993, to over US\$ 9.13 million in 2001. However, the number of new customers annually has been fluctuating, and on average the annual increase in customers has been fairly constant. Interestingly, the number of new connections in 1993 when revenue was about US\$ 3.72 million was the same as in 2001 when the REF received about US\$ 9.13 million, nearly 2.5-fold increase in revenue. In other words, in 1993, the cost per connection was about US\$ 738, while in 2001, it rose to US\$ 1,809. This shows that in spite of a substantial increase in funding, there was no significant increase in the number of customers added to the program each year.

Figure 7 Rural Electrification Fund Revenue²¹ and Number of New Rural Customers²²



Sources: KPLC (1997), (2001/2002), Republic of Kenya 2003; AFREPREN, 2004

An assessment of the management of the REF could, in part, provide useful insight into the cause of the insignificant increase in rural connections. The agreement between the Government of Kenya and KPLC - the official rural electrification implementation agent - is that KPLC obtains funding from the REF to finance the capital investment associated with grid extension in the rural areas. In addition, the REF also finances any resultant operating losses incurred by KPLC. However, over the past decade, the proportion of the REF financing KPLC's operating losses

²¹ REF revenue is adjusted to account for inflation and exchange rates fluctuations. Prior to 1997 the REF sourced its revenue from KPLC's revenue. From 1997 onwards a 5% levy on every consumer's electricity bill was imposed to finance the REF, as stipulated by the Electricity Act.

²² Refers to customers of all categories including households, farms, industries, institutions and others.

has grown dramatically from about 12% in 1993 to about 54% by 2002 thus hindering capital investments into new connections.

Implications for the poor: The sharp decline in rural electrification rates prior and after the amendment of the Electricity Act has important implications for the poor: First, it indicates the declining interest on the part of Government to increasing electricity access among the poor. Secondly, the assessment of the REF management illustrates its growing ineffectiveness which has led to minimal or no increase in electrification of the poor. Since the Act sets no explicit targets for rural electrification, it is not surprising that the advent of the Act has not led to higher electrification rates.

5.3 Preliminary Conclusions

There are several important observations that emerge from the Kenyan case study: First and foremost, data on the electrification of the poor in Kenya is inadequate. As a result, the authors had to use a proxy for the poor. This limitation, implies that the findings presented in this article are not conclusive, but indicative .

It appears that rural electrification was relegated to the bottom of the priority list of reforms. This is confirmed by the fact that the establishment of a rural electrification agency has come at the tail end of the reform process. In fact, the creation of this agency appears to be an afterthought given that it is not provided for in the Electricity Act.

Secondly, the *de facto* distribution monopoly enjoyed by the Kenya Power and Lighting Company (KPLC) limits the increase in rural electrification. The fact that KPLC holds distribution licenses covering most of Kenya, if not the whole of it, implies that no other entity can establish a rural mini-grid or decentralized system without express permission from KPLC. Given that KPLC was only recently salvaged from near bankruptcy by the Government (Mogusu, 2004), it is likely to take a while for the utility to upgrade its overloaded distribution system before embarking on the improvement of its rural electrification programme.

A short-term response to the above problem is to make additional amendments to the Act to reflect a more substantial commitment to electrification of the poor. The Electricity Regulatory Board has prepared a set of regulations in an attempt to minimise KPLC's monopoly. However, the approval of these regulations as well as the amendment of the Act may take a while to be effected. This is because Kenya is in the midst of a massive constitutional amendment process, which is still ongoing. Therefore, for the next 2 - 3 years, legislators are unlikely to be keen to take on small amendments to existing Acts.

Lastly, the rate of rural electrification declined during the reform period. The electrification rate has been outpaced by the population growth rate. The amended Electricity Act – essentially the pillar of all power sector reforms, does not provide any new or improved mechanism for increasing electricity access to the majority of the poor.

The idea of establishing of an autonomous rural electrification agency was mooted by a Ministry of Energy taskforce in the year 2003 – somewhat as an afterthought to the reform process. The proposed rural electrification agency is, however, faced with a number of limitations: firstly, the involvement of Ministry officials could stifle the requisite autonomy of the agency; secondly, the proposed representation of the key stakeholders in the rural electrification agency may not be adequate as the poor appear not to be represented; lastly, it is unclear whether the Rural Electrification Fund will be “ring-fenced”²³ to ensure the agency does not mismanage the fund as KPLC reportedly did.

Close examination of the issues discussed above shows that, the future of electrification of the poor in Kenya is bleak. This is exacerbated by the fact that, in spite of the Government’s directive that KPLC ensures 100,000 new connections every year, these will largely cover urban areas and most likely target non-poor households.

²³ The term “ring-fencing” refers to ensuring that funds are strictly accounted for and protected from any undue misallocation.

6.0 What Has Been the Impact of Reforms on the Poor's Access to Electricity in Uganda?

As in the Kenyan case study, the above question is answered by assessing the impact of the amendment of the Electricity Act on the poor before and after the amendment of the Electricity Act, using the following indicators:

- Electrification levels
- Electrification rates

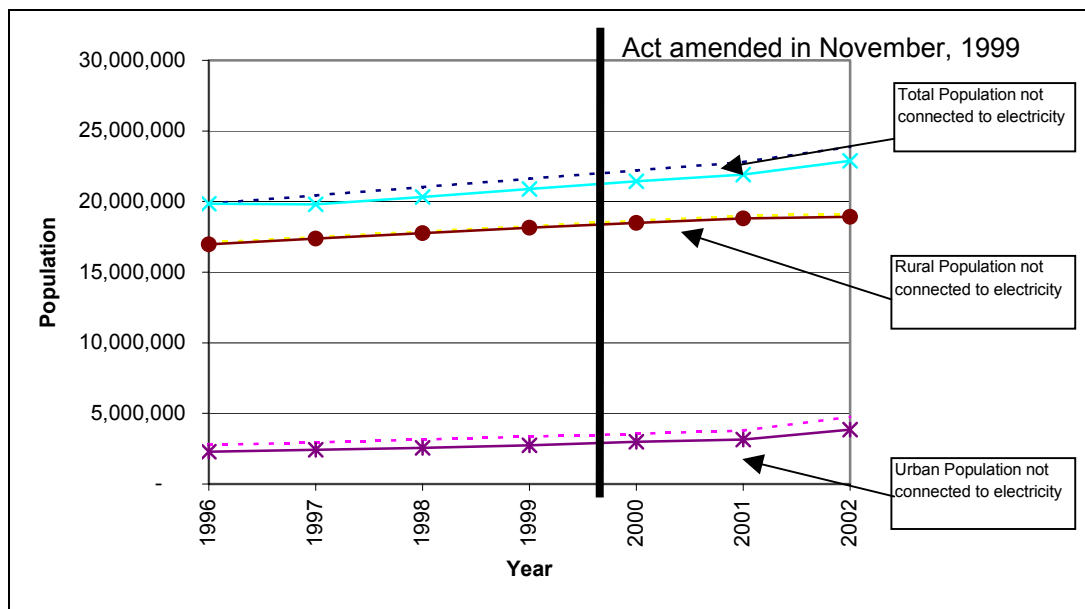
Access to the relevant data for Uganda proved to be difficult. For instance, rural and urban data sets – our proxy for the poor and non-poor, respectively, are not readily available. The Uganda Electricity Distribution Company Limited (UEDCL) (and its predecessor, Uganda Electricity Board (UEB) does not categorise its data into urban and rural customers. With guidance from an expert from the UEDCL, the authors reassessed the entire UEDCL customer list and treated the capital city of Kampala and all major municipal centers as urban areas, and all other areas rural.

Although this approach, may to some extent not be absolutely accurate, it does not significantly affect the analysis because Uganda is the least electrified East African country with only 4% of the total population electrified, and about 99% of the rural population without access to electricity.

6.1 Electrification Levels

The following Figure 8, below presents the number of people not connected to electricity in Uganda.

Figure 8 Number of People Not Connected to Electricity in Uganda



Note: The dotted lines refer to the respective population levels.

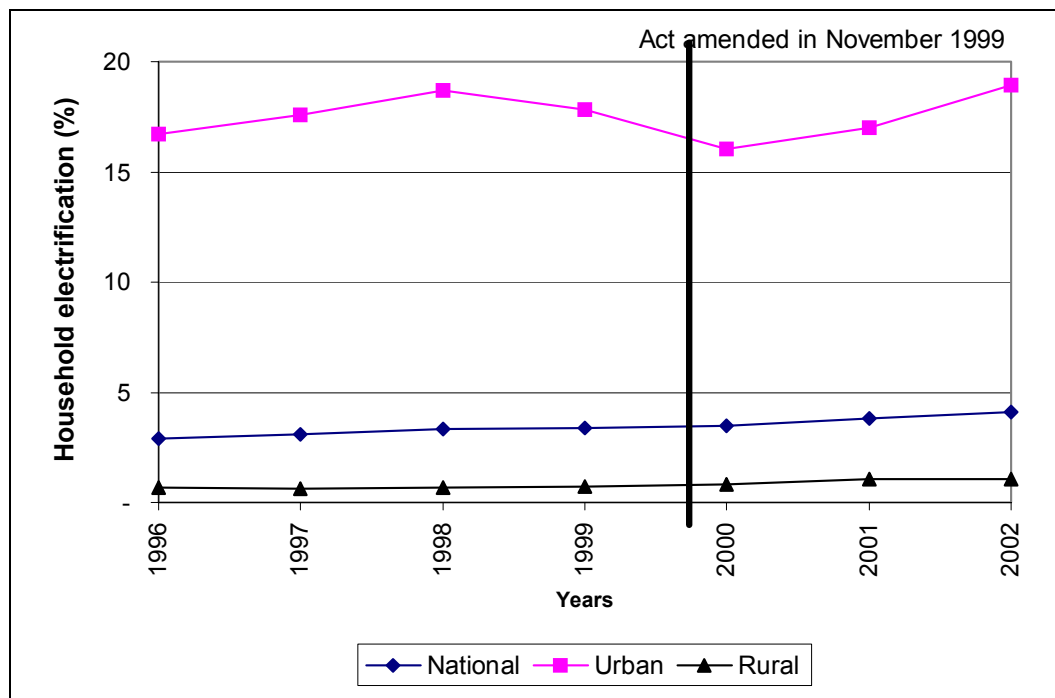
Source: Okumu, 2003; Kyokutamba 2003b; Engurait, 2001, AFREPREN, 2003

Figure 8 shows that virtually all rural households have no access to electricity. A comparison between 1996 and 2001 indicates a slight drop in the number of the unelectrified population for the national and urban indicators. However, closer

examination reveals that the change at the national level is primarily due to the increase in urban electricity access.

National household electrification levels in percentage terms, present a deceptively positive picture that shows an upward trend. However, the largest share of electrification is in the urban centres (figure 9).

Figure 9 Household Electrification Levels in Uganda



Source: Okumu, 2003; Kyokutamba, 2003b; Engurait, 2001, AFREPREN, 2003

Available data shows that a few years before implementation of the Electricity Act, there appears to have been a marginal increase in electrification levels at the national level. In 1999, national household electrification levels were about 3% and

appear to have risen marginally to about 4% in 2002. This may, however, be due to the formalisation of illegal connections following "Operation Sigma" in 2001/2002²⁴, thus there may have been no real new connections. In effect, the utility recorded "new" connections whereas in reality the number of physical connections remained unchanged.

Similarly, disaggregated data on rural and urban household electrification levels shows a marginal increase. For instance, urban electrification levels appear to have risen to about 19% in 1998, then dropped down to 16% in 2000, followed by an increase to slightly under 20% in 2002. In the case of rural electrification, the levels have been hovering around 0.8%, with no major increases.

Implications for the poor: The stagnant electrification levels for the poor imply that they have been left out as far as access to electricity is concerned.

The Government of Uganda is, however, in the process of implementing the Energy for Rural Transformation Project whose objective is to increase rural electrification levels to about 10% by the year 2012 (Okumu, 2003). This target is too low given that at the end of the next 10 years, the vast majority of the poor (90%) will still have no access to electricity. Data from other African countries (South Africa, Zimbabwe and Ghana) shows that for the same period of time (or even shorter), it is possible to achieve much higher increases in electrification levels. For example, South Africa recorded an 18 percentage-points increment in 7 years; Zimbabwe's rural electrification increased by 19 percentage-points in 8 years, and Ghana's rural

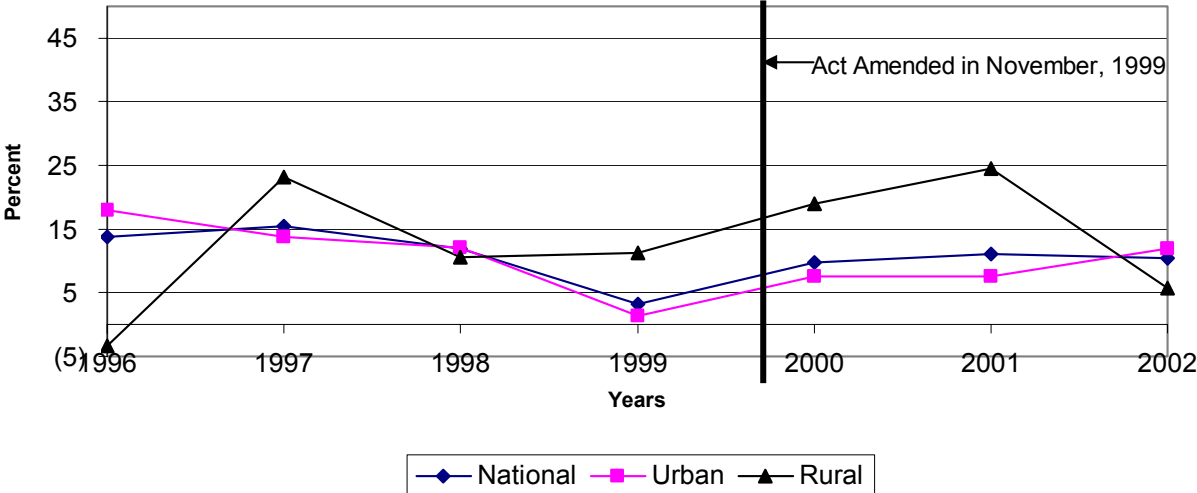
²⁴ This was an exercise by the utility aimed at formalizing illegal connections as well as stopping fraudulent acts such as bypassing and/or tampering of electricity meters.

electrification went up by 30 percentage-points in 10 years (NER, 2003; Gboney, 2001; Kayo, 2002; Dube, 2002).

6.2 Electrification Rates

The household electrification rates provided in figure 10 enable us to better understand the reason for the low electrification levels shown in figure 9.

Figure 10 Households Electrification Rates in Uganda



Source: Okumu, 2003; Kyokutamba, 2003b; Engurait, 2001

The national and urban household electrification rates prior to the amendment of the Electricity Act were generally on a downward trend. However, during the post-

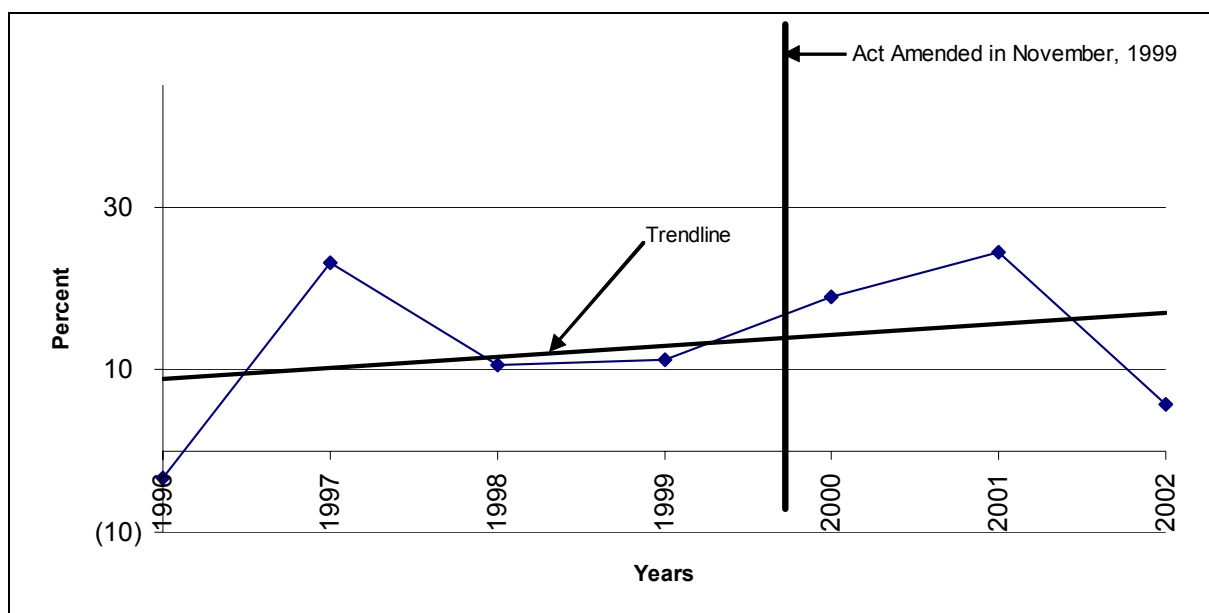
reform period under consideration, an increase in electrification rates was registered. Nevertheless, the 2002 post-reform rates are considerably low compared, for instance, to the 1997 rates.

Rural household electrification rates recorded significant slumps in 1997 and 2002 due to operations initiated by the utility targeting illegal connections ("Operation Thunder" in 1996/1997 and "Operation Sigma" in 2001/2002). Both operations resulted in massive disconnections. In addition, tariffs were increased in 2001 leading to further disconnections for non-payment, especially in rural areas.

It is worth noting that for both rural and urban areas, the rates of electrification went up at some point after the amendment of the Act in 1999. In rural areas, the electrification rates appear to be very positive (see figure 11). However, this trend is distorted due to the very high fluctuations caused by massive disconnections and reconnections²⁵. In addition, the modest positive trend in rural electrification is unlikely to result in significant increase in overall electrification levels of the poor due to rapid population growth (see table 11).

²⁵ The data available does not differentiate between reconnections and new connections. Reconnections are considered new connections (new customers).

Figure 11 Trend Analysis of the Rural Households Electrification Rates in Uganda



Source: Okumu, 2003; Kyokutamba, 2003b; Engurait, 2001

At the prevailing rural electrification rates, even the Government's very modest target of 10% by 2012 will not be realized. Projections computed by the authors (see table 7) based on the historical annual average electrification rate of 16% (1996 – 2002) show that by the year 2012, the Government's 10% target for rural electrification levels would not be met.

Table 7 Projected Targets for Rural Electrification Levels for 2012

	Current Status	Authors' Projections	Government Target
	2002	2012	2012
No. of Rural Households	4,008,695	5,387,351 ^a	5,387,351 ^a
No. of Rural Household Connections	43,098	190,124 ^b	538,735
% Rural Household Connections	1.1	3.5	10

Sources: Okumu, 2003; AFREPREN/FWD, 2002.

Notes:

^a – Projected at 3% growth rate per annum

^b – Projected at a historical annual average of 16% rural electrification rate for the period 1996-2002

For the Government target of 10% to be achieved, the total number of households electrified needs to be increased by 348,611 (nearly 35,000 annually).

6.3 Preliminary Conclusions:

The Uganda case study demonstrates the low priority given to rural electrification. The utility does not even keep track of data on rural electrification, which confirms

the lack of interest in the electrification of the poor. Conclusive findings are, therefore, difficult to develop without this kind of data. There is need to track and develop an income-differentiated database on electricity access, both in rural and urban areas. The database would be useful for the newly formed Rural Electrification Board to monitor its performance in meeting the Government's 10% electrification target by 2012.

Although power sector reforms in Uganda are at an advanced stage, the reforms appear to have been undertaken primarily to prepare the utility for privatisation with limited attention given to increasing the poor's access to electricity. Implementation of rural electrification programmes as provided for in the Electricity Act began after privatisation of the utility was almost finalised. However, the regulatory and policy instruments that are in place seem to provide incentives for rapid rural electrification – certainly the rhetoric is encouraging.

The Electricity Act appears to place some emphasis on rural electrification. However, it only provides for a rural electrification agency resembling the conventional rural electrification programmes which have been unsuccessful elsewhere, such as in Kenya and Zambia. For example, the Rural Electrification Board (REB) is headed by the Permanent Secretary in the Ministry of Energy and Mineral Development (MEMD). This not only limits the autonomy of the Board but could also stifle its performance given that the person heading the institution provides inputs on a part-time basis. This has been considered to be a key contributor to the failure of Kenya's Rural Electrification Programme which was also headed by a Permanent Secretary from the Ministry of Energy (Ministry of Energy, 2003).

The Electricity Act also appears not to provide for “ring-fencing” of the funds allocated for rural electrification. As witnessed in the Kenyan case, inadequate protection of the Rural Electrification Fund hobbles attempts to reach the poor. Another important aspect not adequately addressed by the Act is that it does not explicitly provide for the representation of the poor on the Rural Electrification Board.

7.0 Key findings and recommendations

7.1 Findings

In general, the findings of this article appear to indicate that the vast majority of the poor in East Africa still has no access to electricity. In both countries, reports from the utilities; Ministries of Energy and the regulatory agencies make no attempt to track electrification of the poor. In Uganda, this is exacerbated by the fact that the distribution utility does not categorise customers into rural and urban categories. It is, therefore, difficult to comprehensively assess the impact of reforms on the poor without access to adequate data.²²

Close examination of the amended Electricity Acts of Kenya and Uganda indicates that none of the Acts propose new and innovative initiatives that would ensure increased electrification of the poor. For example, the Kenyan Electricity Act does not provide for a rural electrification agency, while the Ugandan one does not protect the autonomy of the Rural Electrification Board. In addition, both Acts are silent on “ring-fencing” of electrification funds for the poor and on the representation of the poor on the board of the rural electrification agency.

The sequence of power sector reform measures in Kenya and Uganda appears to have been detrimental to electrification of the poor, particularly in rural areas. In both countries, initiatives aimed at increasing rural electrification were started at the end of the reform process. Other developing countries such as Thailand, Bangladesh and Philippines, initiated reforms after establishing an independent

²² This article overcame this constraint by a judicious use of proxies and careful reassessment of utility customer list.

rural electrification agency that ensured rapid rural electrification before the advent of market-oriented sector reforms (Shrestha, et al, 2003).

Reforms also appear to have failed to link rural electrification to the overall strategy of improving the power sector performance. For example, the issue of lucrative licenses and concessions is not closely linked to the ability of the licensee/concessionaire to increase electricity access among the poor. In addition, the newly unbundled (and privatised) distribution utilities do not appear to have rural electrification targets that are linked to future tariff adjustments.

The practice of linking improved access to licensing has been successfully implemented in the mobile telecommunication sector in Kenya. Operators are licensed based on, among other prerequisites, a demonstration of their ability to significantly increase the number of mobile telephone connections and geographical coverage. The license awarded to successful operators includes a target number of new connections and geographical coverage over a specified period. Subsequent renewal of the operator's license largely depends on the extent to which the operator met the initial target (CCK, 2003).

Uganda's rural electrification target for the year 2012 is a paltry 10%. This is a very low target and unlikely to make a significant difference. Data from other African countries shows that for the same period of time (or even shorter), it is possible to achieve much higher electrification levels.

Table 8 shows increments in national electrification levels for selected African countries within a decade or less. With the exception of Zimbabwe, the key driver

for high national electrification levels was rigorous and well managed rural electrification programmes. In some countries, the increase in rural electrification levels was higher than of national level. For example, in South Africa, rural electrification levels rose from 21% to 50% in seven years (1995 – 2002) indicating an increase of 29 percentage-points compared to an increase of 18 percentage-points at the national level (NER, 2002).

Table 8 Successful National Electrification Initiatives in Selected African Countries

Country	Pre-Initiative National Electrification Levels (%)	Post-Initiative National Electrification Levels (%)	Percentage-points Increment	No. of Years
South Africa	50 (1995)	68 (2002)	18	7
Zimbabwe	20 (1991)	39 (1999)	19	8
Ghana	15 (1991)	45 (2001)	30	10
Uganda (Rural) – planned	1 (2002)	10 (2012)	9	10

Sources: NER, 2003; Gboney, 2001; Kayo, 2002; Eremu, 2003; Kayizzi, 2003; Dube, 2002; Okumu, 2003

In a nutshell, although some of the reforms have had a positive outcome such as improved financial performance in the Ugandan utility and an improvement (albeit for a limited period) in the general technical performance of the electricity industry in Kenya, the analysis presented in this article demonstrates that reforms have not led to significant electrification of the poor. Based on current trends, electrification for the poor is unlikely to take place in the foreseeable future. In addition, the

current institutional and legal framework does not provide any special incentives for the electrification of the poor. As a result, only a comprehensive transformation of ongoing power sector reforms could lead to greater electrification of the poor in East Africa.

7.2 Recommendations

Firstly, there is an urgent need to establish reliable databases on the electrification of the poor. This is absolutely essential for monitoring rural electrification programmes. The utilities, Ministries of Energy and the regulatory agencies should develop databases that track the electrification of both urban and rural households (categorized by income) and include the data in their annual reports.

Secondly, the newly established Rural Electrification Board in Uganda as well as the proposed Rural Electrification Authority in Kenya should avoid the pitfalls of previous electrification initiatives that largely became an avenue for revenue collection for utilities with no clear link to expanded electrification of the poor. To avoid this shortfall, the autonomy of the bodies responsible for rural electrification – an important stipulation not provided for by the Electricity Acts, should be strengthened.

The Acts should also provide for the appointment of the governing boards of rural electrification agencies by Parliament which would strengthen their independence. To further enhance the autonomy, the Electricity Acts should be amended to ensure that the funds for financing electrification of the poor are “ring-fenced”. The board of the rural electrification agency should include representatives of the poor to ensure that the concerns of low-income communities are addressed.

The performance of the electrification agencies should be evaluated by the number of new connections, particularly in rural areas and among the urban poor.

Significantly higher rural electrification targets than the ones currently set should be established. The targets should include explicit and ambitious goals for the electrification of the poor.

Thirdly, it is recommended that other countries in the sub-region whose reforms are not at an advanced stage (e.g. Ethiopia and Tanzania) ensure that they establish structures and mechanisms for increased rural electrification before embarking on large-scale privatisation reforms. Evidence from other developing countries indicates that high rural electrification levels have been achieved when rural electrification initiatives precede major market oriented reforms such as privatisation.

Lastly, reforms should adopt innovative approaches to promote wider electrification. One approach could be to link electrification targets to the purchase of attractive distribution rights. For example, the purchase of attractive city distribution rights can be linked to the mandatory electrification of low-income urban settlements as well as selected low-income rural settlements. This will ensure that private investors are simply not cherry-picking the most profitable portions of the electricity industry and leaving the unprofitable portion (e.g. rural electrification) to the state.

Another approach of ensuring that reforms support the electrification of the poor would be to ascertain that a significant proportion of the proceeds from license fees, concession fees and sale of utility assets directly contribute to the rural electrification fund.

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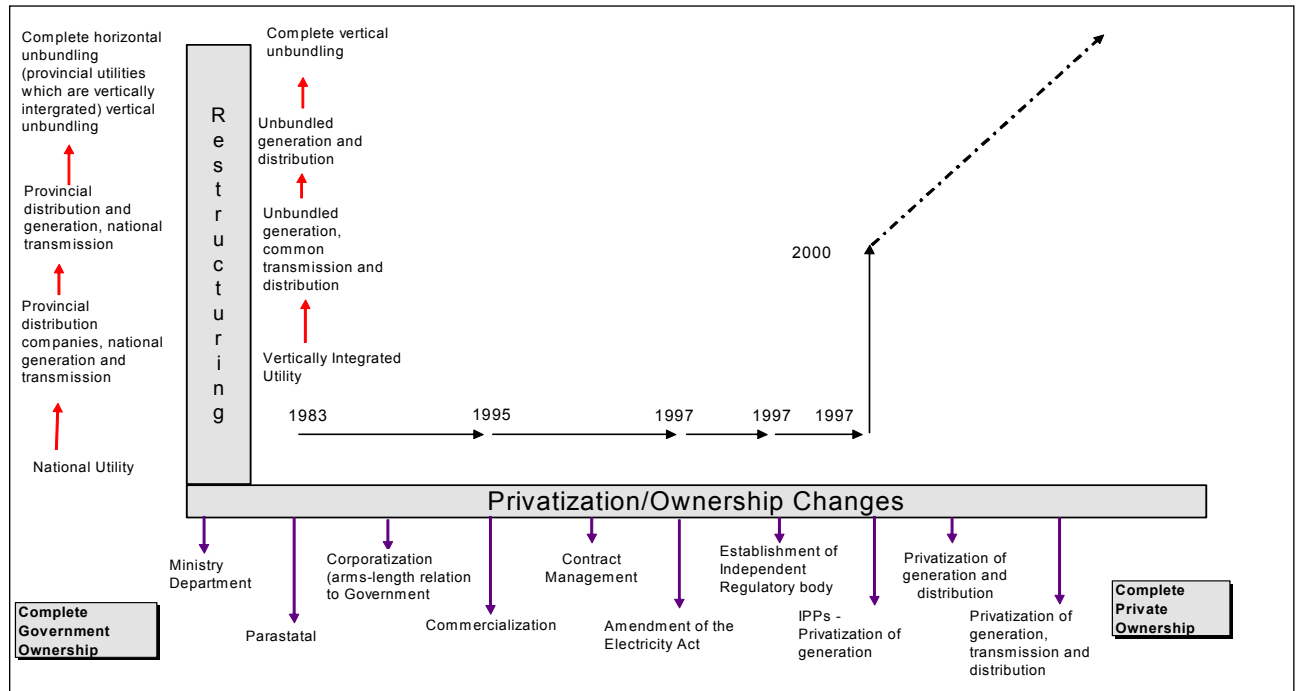
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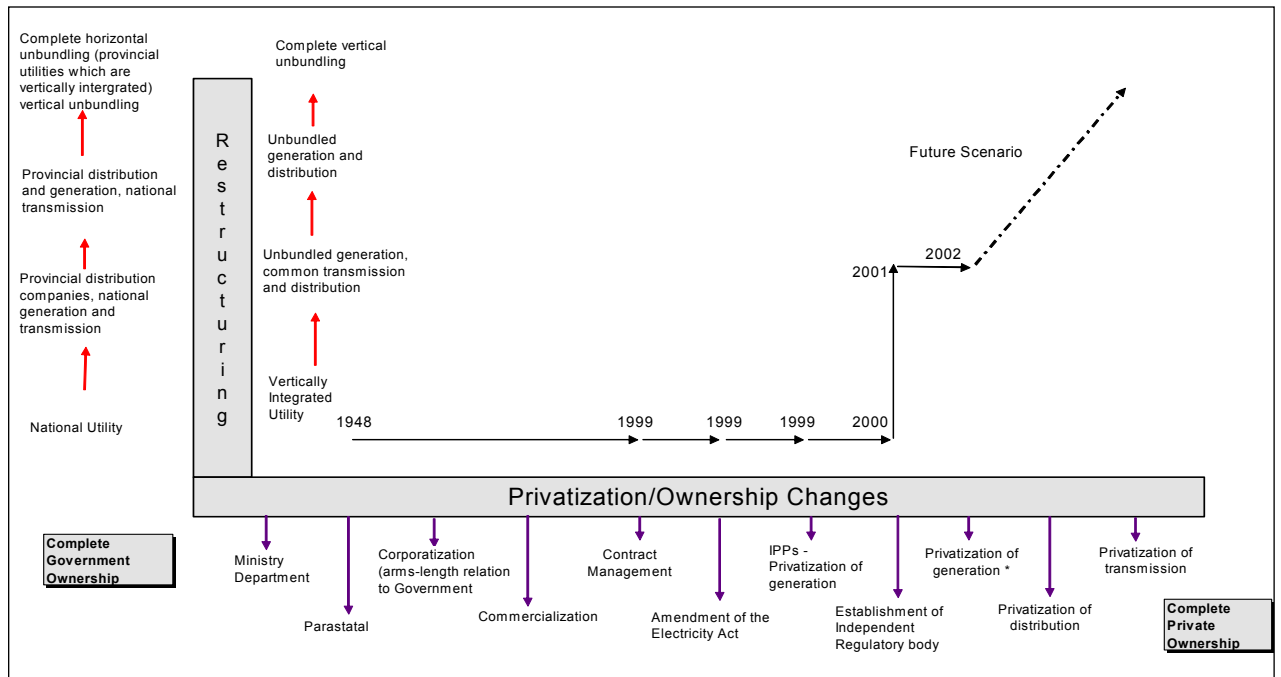
Appendix 1 - Evolution of Power Sector Reforms in Kenya and Uganda

Figure A1 Reforms in Kenya's Power Sector



Source: Karekezi and Mutiso, 2000; Nyoike, 2002c

Figure A2 Reforms in Uganda's Power Sector



* Concession awarded to Eskom Enterprises of South Africa

Source: Compiled by authors