CONFERENCE PAPER

ELECTRICITY SECTOR MARKET REFORMS:
Getting It Right in Developing Countries-SADC

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ABSTRACT

Although there have been perennial global calls for market reforms in the electricity sector, most developing countries have been reluctant to undertake radical market reforms. Only partial market reforms have taken place in SADC. The electricity sector market structure in most SADC countries is dominated by vertically integrated de-facto state monopolies. Partial unbundling has been undertaken in some Countries. This is despite the fact that the advocacy for reforms have however centered on unbundling and privatization. The questions that beg answers are why radical market reforms have faced resistance in developing countries especially in Sub-Saharan Africa and in SADC in particular. Why do governments in SADC still hold onto the power sector? The paper explores the economic, social and political factors that are considered in navigating the path of transformation. Further it explores what lessons can be learnt from countries where market reforms have been undertaken. The proposed paper will therefore focus on examining the existing market structures in SADC with specific reference to Zambia, discuss the proposed reforms (unbundling and privatization), and present the experiences of countries where unbundling and privatization has been undertaken. The paper will then present the factors that should be considered by developing countries such as size of the industry, social and economic conditions as well as political considerations in designing power market reforms. The paper concludes that there is no model of power sector reforms that is universal to all countries. Reforms must be based on social, political and economic conditions of each country.

1. Introduction

The market structure in the Southern Africa Development Community (SADC) is dominated by vertically integrated state owned electricity enterprises. In the generation segment, there is an advent of Independent Power Producers (IPPs). Most countries in Sub-Saharan Africa (SSA) have a de facto single buyer model whereby the IPP enters into a Power Purchase Agreement (PPA) with the national utility company over a period of time. The continued dominance of state owned enterprise according to John E. Besant-Jones (2006) is because in many developing countries electricity is considered as a public good that cannot be left to the private sector alone.

Most developing countries continue to grapple with the challenge of underperforming electricity sector, especially in SSA. Therefore, stakeholders have advocated for implementation of power market reforms. The standard model of the reforms has been anchored on liberal economic approach which ultimately entails unbundling of vertically integrated state monopoly electricity enterprises and privatization of these unbundled systems. Very few developing countries have undertaken radical reforms and in the SADC region only partial reforms have been undertaken. The SADC Energy Brief number one (1) of August 2010 acknowledged that SADC had lagged behind in implementing the power sector reforms and urged the members to expedite the reforms. The brief appealed to members to migrate to cost reflective tariffs and reconsider the single buyer model to remove the burden of underwriting power projects to other players.

This paper discusses the power market reforms in developing countries with focus on SSA , SADC and with special reference to Zambia. The paper opens with a discussion on the status of the market power structure which is dominated by vertically integrated state monopolies. It highlights the underperformance of the sector as the basis for reforms and the model of reforms that have been proposed that is anchored on private sector led enterprises. It also discusses experiences from Uganda and Kenya where substantial market reforms have been undertaken. The paper narrows down to discuss the reforms in Zambia and their outcomes. Finally, it discusses the critical factors that must be considered when designing reforms in order to get the reforms right especially in developing countries and terminates with a conclusion, and makes recommendation on the way forward.

2. The status of Electricity Sector Market Structure in SADC

The power systems in developing countries are by far very small as compared to those in the Organisation for Economic Cooperation and Development (OECD)[1].The electricity market structure in SSA and indeed in SADC is dominated by vertically integrated state run utilities with heavy reliance on hydro power generation except for South Africa which is dominated by thermal power. As an economic tradition in Africa, most of the power utilities have enjoyed monopoly power over the electricity industry in their respective countries. Though there is the presence of private power generators, most developing countries have adopted a single buyer model. In the SADC region, the situation is not different. For instance in South Africa, the market is dominated by ESKOM, ZESCO in Zambia, ESCOM in Malawi, Nampower in Namibia, and EDM in Mozambique, just to mention a few.

The population's access to electricity is very low especially in rural areas. Table 1 presents the electricity access rates in selected countries of SADC.

Table 1: Electricity Access Rates in some SADC Countries

COUNTRY	NATIONAL ELECTRICITY ACCESS RATE	URBAN ELECTRICITY ACCESS RATE	RURAL ELECTRICIY ACCESS RATE
Lesotho	19%	65%	3%
Botswana	58%	71%	42%
Malawi	17%	70%	4%
Mozambique	14%	19%	3%
Namibia	40%	70%	18%
South Africa	80%	90%	64%
Zambia	22%	53%	5%
Zimbabwe	44%	80%	24%

Source: SADC Regional Energy Access Strategy Action Plan, March 2010

The electricity access rate is highest in South Africa followed by Botswana. It is lowest in Malawi and Lesotho. South Africa and Botswana also have high electricity access rate in rural areas while Lesotho, Malawi, Mozambique and Zambia have very low access rates in rural areas.

The structure of the electricity sector in most African Countries has traces imbedded in their political and economic history. When most African Countries attained their political independence from their colonial masters, they still remained economically dependent on the west. The challenge that lingered on the minds of the new native leaders was

[1] OECD is an organization of developed countries committed to promoting trade, economic growth and democracy. Most members are high income economies with very high Human Development Index

how they could also attain economic independence, having attained political independence. The newly independent countries therefore embarked on rapid development programmes. They undertook an import substitution industrialization programme to achieve self-reliance and break the economic dependency on the west. Therefore the electricity sector was designed in such a manner as to support the industrialization program.

Girod and Percebois (1998) in what they referred to as the sectoral model, was adopted and became dominant in Africa. It was characterized by the following:

- By law or de facto, establishment of state monopoly enterprise in charge of electricity supply services;
- Vertically integrated three segments of generation, transmission and distribution within the company; and
- Creation of state monopoly supervised and regulated by the Ministry. Central Governments were in charge of setting tariffs and appointing the Directors of the enterprises.

The model described above has persisted in the majority of African Countries and it can be observed in SADC as well. Bhagavan (1999) through Turkson and Wohlgemuth (2001) also observed that "Publicly owned companies dominate the electricity utility industry in the region". Bhagavan further stated that the majority of SSA have vertically integrated state owned monopolies with no autonomy from the government to operate commercially.

Girod and Percebois (ibid) further observed that "the scheme was in fact recommended by a large majority of the theoreticians in development (Singer et al), despite their divergences concerning the sequence of steps to be taken and political implications. The key to development was for all industrialization, which supposed putting in place as quickly as possible the basic infrastructure (energy and communications networks). This was the conceptual framework retained by international institutions set up from 1944 onwards".

Paul L. Joskow (2006) has also noted that the electricity sector globally has evolved with primarily vertically integrated monopolies that were either state owned or privately owned with price regulations and barriers to entry into the market thereby perpetuating natural monopolies.

The vertically integrated state monopolies were designed in tandem with the macro-economic and political context that existed at the time and in relation to development needs. The model succeeded in establishing the basic infrastructure that was required

to support industrialization. In the SADC region, the successful construction of large hydro dams (Kariba, Kafue and Cobora Bassa) on the major rivers bears the testimony.

The economic crisis that was experienced in Africa in the 1980s began to cast doubt on the suitability of the development model that many independent African countries adopted. Admittedly some factors leading to the economic recessions in Africa were external such as the 1973 oil crisis perpetuated by the Organisation for Petroleum Exporting countries (OPEC) and rise in interest rates on the international financial markets. The economic down-turn triggered the reforms in Africa as a response to the crisis. The energy sector was not spared from the reforms.

3. The Case for Market Reforms

Power sector market reforms refer to the restructuring of the power industry in order to enhance its performance. It involves among many things, the change in the legislations governing the industry, change in the ownership of the sector enterprises, change in institutional arrangements and general organization and conduct of the industry.

The power market reforms have been driven by a myriad of factors ranging from technical, financial, economic and social.

Technical performance

The technical performance of the utilities was unsatisfactory. Poor maintenance works, unavailability of spare parts, variety of equipment caused its own maintenance challenges. The lack of maintenance consequently led to premature aging of the infrastructure. (Girod Percebois, ibid)

Financial performance

The financial performance of most electricity state enterprises in Africa was unsatisfactory. The utilities were unable to mobilise sufficient financial capital for the sector's development and expansion, hence the advocacy for reforms. The power sector was faced with huge financial challenges. Financial deficits and lack of capacity to expand the existing power infrastructure; Most Utilities had huge stock of debt. Non-payment from customers especially government institutions partly perpetuated the financial problems.

Elsewhere in Africa for instance Plane (1999) reported that "the near bankruptcy of the public electricity utility in Cote d'Ivoire in 1988-99 left the government with no option but to accept reform in the form of management contract to private company in 1990".

Economic performance

At a macroeconomic level, the economic crisis that most African countries experienced during the 1980s inevitably attracted criticism in the manner the economies were organized. There was unwavering advocacy for reforms. The call for reforms was also extended in the electricity sector.

At sector level, there were inherent inefficiencies in the existing system. Excessive use of factors of production, especially labour, accumulation of credit, and inappropriate below cost reflective tariffs were prevalent. Calls to migrate from commandist economies to private sector market driven economy began to echo from everywhere.

Reduction of Fiscal Stress on Government

Related to above reason, the reforms were also stimulated by the need to ease the fiscal stress pressed on government through its involvement in electricity supply. It was argued that the reforms would free financial resources from the power sector to other public needs. This strengthened the case for privatization.

Private sector participation

The failure by state run electricity monopolies to meet the rising demand for electricity necessitated the national governments to engage the IPPs into capacity expansion in order to increase electricity access to the majority of the population.

Structural Adjustment Program (SAP)

Following the collapse of most African economies in the 1980s, most developing countries approached the International Monetary Fund (IMF) and the World Bank for support. As a condition to accessing the financial help, the developing countries were required to implement SAP. Turkson and Wohlgemuth (ibid) also observed that with the implementation of SAP in SSA, the restructuring of the electricity sector was subject of the debate on the changing role of the government. One of the key characteristic of SAP was privatization of state owned enterprises and liberalization of the economy. Njeri Wamukoya (2003) observed that for most Less Developed Countries (LDC), the reforms were imposed on them by Bretton Woods institutions which were the traditional sources of financial capital required to boost investment in the sector. The World Bank (1993) also acknowledged that reforms have been a condition tied to lending since 1993. "Mismanagement, poor operational performance and distorted tariffs structures resulting in poor economic inefficiency and low returns on investment" were cited as the reasons to demand reforms. It has been observed that other financial institutions such as the African Development Bank (AfDB) and the Asian Development Bank (ADB) also adopted similar conditions.

Herd Behavior

Adoption of reforms became fashionable among economists and politicians. The behavior was also influenced by political economy elements with national governments wanting to demonstrate decisiveness by adopting reform models that have yielded good results elsewhere especially in the western countries. There were wide-spread reforms in the electricity sector in Europe hence influential institutions such as the World Bank and the IMF adopted the same European models for the developing countries.

Forms of Market Structure

Hunt and Shuttleworth (1997) suggested four models for undertaking the electricity market reforms that vary in the degree of monopoly and competition as follows:

- Model 1: Monopoly at all levels in the supply chain. There is no competition in the generation of electricity. A single company monopolises the generation, transmission and distribution of electricity to end-users.
- Model 2: Purchasing Agency. This is a single buyer model. The purchasing agency chooses from a number of generators. This creates competition in generation. Access to transmission infrastructure for generators to sale directly to end-users is not allowed.
- Model 3: Wholesale competition. This is gives sovereignty to distribution companies (Discos) to buy directly from generators and have access to use of transmission network to evacuate power to final end-users.
- Model 4: Retail competition. This gives freedom to customers to choose their preferred suppliers. There is open access to transmission and distribution infrastructure. The model allows for competition at retail level.

The above models are further illustrated in table 2.

Table 2: Structural options

Characteristic	Model 1 Monopoly	Model 2 Purchasing Agency	Model 3 Wholesale Competition	Model 4 Retail Competition
Definition	Monopoly at all levels	Competition in generation-single buyer	Competition in generation and choice of Discos	Competition in generation and choice for final consumers
Competing generators	NO	YES	YES	YES
Choice for retailers?	NO	NO	YES	YES
Choice for final customers	NO	NO	NO	YES

Sources: Hunt & Shuttleworth, (1996).

Standard Model and Sequence of Electricity Sector Market Reforms

The overall aim of the reforms in the electricity sector has been to create new sectoral institutions that generate lasting benefits to the masses and ensures that an apt portion of the benefits cascade down to the consumers through tariffs and quality service that mirror the efficient economic costs of supplying electricity. It was envisaged that the benefits would be delivered through the introduction of competition in the market, encourage technological innovations by providing motivation to the network operators to provide quality service and allocate the risks of technology choice, operational errors to suppliers and not consumers. The standard model and steps for realizing what is described above according to Joskow (ibid) and Kessides (ibid) is as follows:

- Corporatisation and Commercialisation to free utilities from the ambit of the Ministry and Government by transforming them into legal entities in order to enable the entities operate on commercial terms. Commercialisation occurs when the government surrenders the micromanagement and gives the enterprise autonomy to pursue profit. From the World Bank's perspective, Commercialisation according to Besant-Jones (ibid) requires to oblige the utility to operate based on commercial principles such as meeting tax obligations, market based interest rates, market rate of return on equity and capital, and possess the autonomy to make own business decisions. Corporatisation is a legal transformation from direct government control to legal corporation (Hunt and Shuttleworth, ibid).

- Enactment of requisite legislation to provide a legal environment that facilitates restructuring of the sector to allow private sector participation and creation of an independent regulator**.**

- Vertical Separation (unbundling) of potentially competitive generation and retailing business operations from the monopoly vertically integrated segments of generation, transmission and distribution in order to facilitate competition and entry into the sector.

- Related to the above, horizontal restructuring (unbundling) to create competition especially in generation to mitigate failures of market dominance and lower wholesale tariffs.

- Creation of an independent energy regulator to promote efficiency, fair competition and guide investments in the sector. Besant-Jones (ibid) stated that

"in the wholesale market, the focus of regulation is to prevent anti-competitive abuses of the market power and to ensure appropriate investment in new supply. In the retail market, the focus of the regulation should be on balancing the interest of suppliers with interest of their captive customers" (pg.11)

- Privatisation of state owned enterprise to instill financial discipline, incentivise cost efficiency and insulate the entities from destructive political interference. Privatisation should be undertaken in such a way that it yields dispersed ownership in order to ensure competition. In developing countries, privatisation is envisaged to bring in financial resources and technical as well as, managerial expertise that would correct the existing managerial deficiencies in state owned utilities.

- Facilitate entry of IPPs in the generation segment. This could be done even in the absence of radical reforms.

- Horizontal integration of transmission network operations that encompass spatial expanse natural markets and creation of an independent systems operator to guide economic operation of the system, determine the dispatch order and guide investments in power generation and transmission.

- Unbundling of tariffs to separate end-user tariffs from transmission and distribution charges.

- Creation of transition mechanisms that facilitates the transformation from the old to new system and create the markets and trading mechanisms for voluntary energy and ancillary services.

The anchor of electricity market reforms is market liberalization, competition and privatization. The restructuring of the electricity supply chain is to facilitate competition. It involves the breaking up of the vertically integrated power utility into several generation and distribution companies to introduce competition. Privatisation frees the utilities from political interference and abuse, and instils financial discipline. The role of the government is to change to focusing on policy formation and execution. It is argued that this role is better performed when the government ceases to be a major investor and controller of the entities in the sector.

4. Theoretical Perspective of Vertical Integration and Privatisation

The theoretical framework for the design of reforms is based on liberal economic approach that favors the private sector led economy and competition. This is dealt with through the discussion on the theoretical advantages and disadvantages that are associated with vertical integration and privatization.

Vertical Integration

According to the Economist Magazine edition of March, 2009, "vertical integration is the merging together of two businesses that are at different stages of production."[2] It is a business arrangement whereby the different stages in the supply chain are owned by the same firm. For the power sector, vertical integration is a business model where all the three business segments of generation, transmission and distribution are owned by the same company. There are pros and cons associated with vertical integration.

<u>Advantages</u>

- The transmission and distribution system is the supporting facility of the power industry. It is easier to avert cascading failures of grid elements and generation units when the supply chain is combined and owned by a single entity.

- *Coordination of investments in a composite system.* Vertical integration facilitates the coordination of highly distinctive and interdependent investments in generation, transmission and distribution. Any new investment in any segment affects the economic value of all other facilities on the system, and the company that owns most such facilities is likely to comprehend their interactions and invest optimally in them.

- *Risk management*. A vertically integrated Utility enjoys less risk than one that operates under long-term lease with generators. The coordinated operation of a large system is likely to lower the chances of power outages. Greater certainty enables the company to have access to low cost capital, which is very important in such capital-intensive industry.

- *Economies of scope*. This catch-all benefit (this is a subset of economies of scale) refers to advantages from close coordination, such as the above-stated advantages of centralized investment and operations. In vertically integrated utility the costs are lowered because of centralised management.

[2] http://www.economist.com/node/13396061

- The *end-user tariffs are relatively lower* with vertical integration because profit margins at each stage in the supply chain are eliminated because the whole chain is owned by a single entity unlike in the unbundled structure, where all the stages in the downstream would require a profit margin and the resultant cost would be passed on to the end-user which will result in higher tariffs. (Nelie Kroes, 2007)

- *It enables integrated resource planning*. Integrated resource planning is an important tool in the hands of one utility, usually state-owned, mandated to manage and develop all industry-related activities: generation, transmission and distribution. Within a vertically unbundled power sector, various established autonomous entities will tend to carry out resource planning largely independently unless appropriate institutional and coordination mechanisms are put in place to ensure that integrated resource planning is to be used effectively.

<u>Disadvantages</u>

- *Vertically integrated power state utilities reduce competition* thereby denying the consumers the benefits that comes with a competitive industry;

- *Vertical integration is characterized by inefficiencies* that results in poor quality of service; and

- *It is difficult to expose sections in the power systems that are inefficient*. Separation makes it easier for Management to discover segments that are inefficient and in turn initiate solutions.

Privatisation

Privatisation is the migration from the government to privately owned corporation. The state owned companies are sold to the private investors. In theory privatization has its own advantages and disadvantages.

<u>Advantages</u>

- *It enhances efficiency*. It is argued that privately owned enterprises are driven by profit motive and as such they are cost efficient in comparison to state owned companies.

- *Privatisation frees previously state owned enterprises from political interference*. It has been argued that governments in SSA are poor business managers because their decision making is dominated by political motives. For instance, a privately owned company can easily shed-off labour when need arises. A state owned company will be reluctant to do so.

- *Privately owned firms are insulated from politics and are more likely to invest in long term projects.* State run enterprises mostly focus on short term objectives. Politicians mainly focus on what can be achieved in their tenure of office. They are unlikely to invest in long term projects. They therefore focus on projects that yield results in the short term. This arguement is however contestable as there is evidence of long term projects that have been implemented thought out SSA.

- *Maximisation of shareholder's return***.** Privately owned enterprises have to act in the interest of shareholders. They are, therefore, more likely to be efficient. Inefficient firms may be subjected to takeover. However, for state owned firms, such pressure is non-existent.

- *Privatistion enhances competition***.** Privatisation of state owned companies is accompanied by liberalization and removal of barriers to entry into the industry in order to increase competition. It is widely held that competition breeds efficiency. Competition however is achieved depending on the nature of the market.

- *Privatisation raises revenue for the state***.** The sale of state owned enterprises raises revenues for the government which can be spent on other public needs.

<u>Disadvantages</u>

- *Creation of natural private monopolies.* Natural monopoly occurs when there are significant fixed costs as the case may be in the electricity supply industry. This hinders entry into the industry and limits competition. Therefore, privatization may create private monopolies. It is often argued that a state monopoly is always better than a private monopoly.

- *May adversely affect public interest.* Public service industries such as education, health care and public transport are a primary objective of the government and not the private sector. Therefore, such services are better left under the control of government. Electricity is often viewed as public good that cannot be left to the private sector alone.

- *Loss on potential dividends***.** Privatisation of state owned enterprises makes the government to lose out revenues in dividends declared by profitable state enterprises.

- *Regulatory costs.* Privatisation creates private monopolies such as power distribution companies and water utility companies. This requires an independent regulator to prevent consumer exploitation.

- *Privatsiation leads to fragmentation of the industry.* Fragmented industries are associated with unclear responsibilities. No one is willing to take responsibility in the industry. The industry may also lose out on the economies of scale depending on the market structure of the industry.

- *Short-termism* is also associated with privatization as firms pursue short-term goals that maximize profits and shareholders' earnings.

5. Experiences of Market Reforms in Sub-Saharan Africa

In a bid to improve the performance of the power sector, developing countries in SSA embarked on reforms. Presented here are some experiences from Kennya and Uganda, where substantial market reforms have been undertaken. The two countries have been chosen because they have similar socio-economic, demographic and power industry characteristics to those in the SADC region. Additionally, the two countries share membership to the Common Market for East and Southern Africa (COMESA) and with most of the SADC countries.

KENYA

The Government of Kenya embarked on electricity sector reforms in order to "ensure affordable, sustainable and reliable supply to meet national and country development needs" (Kenya Energy Policy: 2012). The reforms started with the enactment of the Electric Power Act in order to create an enabling environment for unbundling of the national electricity utility company and facilitation of the entry of the private sector. Transmission and distribution of electricity were unbundled from generation. Kenya Electricity Generation Company (KenGen) was created to be responsible for power generation, Kenya Electricity Transmission Company Limited (KETRACO) in charge of Transmission and Kenya Power and Lighting Company (KPLC) was responsible for distribution. The Government of Kenya returned majority share ownership of KenGen and KPLC and wholly owns KETRACO.

Realizing the need to increase the electricity access rate in rural areas, the Rural Electrification Agency (REA) was also created. The Government also created the Energy Regulation Authority (ERA) which was later transformed into the Energy Regulatory Commission (ERC) to regulate the sector.

The outcomes of the power market reforms have been mixed. Proponents of the reforms argued that unbundling will enhance efficiency resulting in lower tariffs and improvement in the quality of service. A consumer watchdog organisation, observed that electricity tariffs in Kenya remain high. In a survey conducted by CUTS International (2015) 70 % of the respondents complained that the electricity tariffs were high in Kenya and 76 % of the respondents complained about the frequent black outs.

Power generation has increased though the empirical study undertaken by Kathingo (2014) revealed that the increase in the per capita power generation was insignificant. There is a significant increase in the participation of the private sector with the IPP accounting for 26 % of power generation (MoE 2012). Rural electricity access rate also improved to over 20 % thereby increasing the national access rate.

Kapika and Eberhard (ibid) also made the observation that the reforms in Kenya have made many achievements especially in green energy sources. However, power reliability is still a challenge with an estimated 53 days of outages per year. This is attributed to limited transmission and distribution infrastructure to transmit power from generators to end-users. The limited capacity is a consequence of underinvestment into the network exacerbated by narrow focus on service extension to rural areas.

UGANDA

Uganda is one of the few developing countries that have undertaken substantial market power reforms. The reforms involved the unbundling of the vertically integrated government utility, the Uganda Electricity Board (UEB) into separate entities for electricity generation, transmission and distribution. These are; The Uganda Electricity Generation Company Limited; The Uganda Electricity Transmission Company Limited; and the Uganda Electricity Distribution company Limited. The distribution company is currently operated and managed by UMEME on concessional terms for a period of 20 years. The Government legislated for the creation of a regulator and the Rural Electrification Agency (REA) and liberalized the market.

Just as the case is in Kenya, electricity tariffs have risen significantly (arguably the highest in the region) contrary to the argument that the reforms would result into lower tariffs because of efficiency gains. System losses continue to be high though there is an

insignificant reduction in the losses. Electricity generation grew significantly and the access rate also increased. The access rate in rural areas remains significantly low (Mawejje 2012).

Further it has been observed that the power system in Uganda is still small and there questions on why such a small system was unbundled. There has been a lot of positive outcome especially in financial performance of electricity enterprises, labour productivity, transparency and professionalism. However, "the quality and reliability of power supply remain unsatisfactory, while technical and commercial losses remain high" (Kapika and Eberhard, ibid;120)

Other Empirical Studies

The UNECA and UNEP (2007) observed that the reforms in SSA were ill designed without focusing on the long term sustainability of the industry. In other literature, (see Borenstain et al.2000, Woo et al. 2003. Ishii and Yan. 2004 and Joskow. 1997) major reasons have been cited for the failure of market reforms. Firstly, electricity generation, transmission and distribution are not competitive in nature. Further market restructuring may result in higher tariffs due to excess capacity and growth in the demand. The third factor is the regulatory uncertainty. Most regulators in SSA lack the independence to act professionally. The fourth factor is that the reforms may be influenced by rent seeking behavior by the interest groups which could be at variance with efficiency objectives

Further, it is important to note that the expected outcomes do not depend on the reforms in the power sector alone. For instance, attracting private sector investment depends on many other factors such as political stability, local skills, market guarantee, guaranteed property rights, tax laws, etc. Therefore reforms in the power market sector must be accompanied by reforms in the economy in general to provide an enabling environment.

Zhang, et al (2008) undertook an econometric assessment of the impact of privatization, competition and regulation. Here is a caption of their findings:

"Reviewing our findings in more detail and in relation to the research hypotheses, we did not find that privatisation leads to improved labour productivity or to higher capital utilisation or to more generating capacity and higher output except where it is coupled with the existence of an independent regulator. But regulation on its own, also seemed to have little effect on the performance variables. In other words, when competition is weak, performance improvements from private participation seem to be dependent upon having an effective regulatory regime in place to stimulate management to

improve performance. In contrast, independent regulation without privatisation, in effect regulation of state-owned enterprises, seems to be ineffective".

The Energy Sector Management Assistance Program (ESMAP) undertook a study whose three major objectives were:

- To develop a classification of prevailing power sector market structures;
- Devise an analytical framework for evaluating the suitability of unbundling given the different economic conditions in developing countries; and
- To make suggestions for operational guidance, on alternative structures based on the applicable criteria.

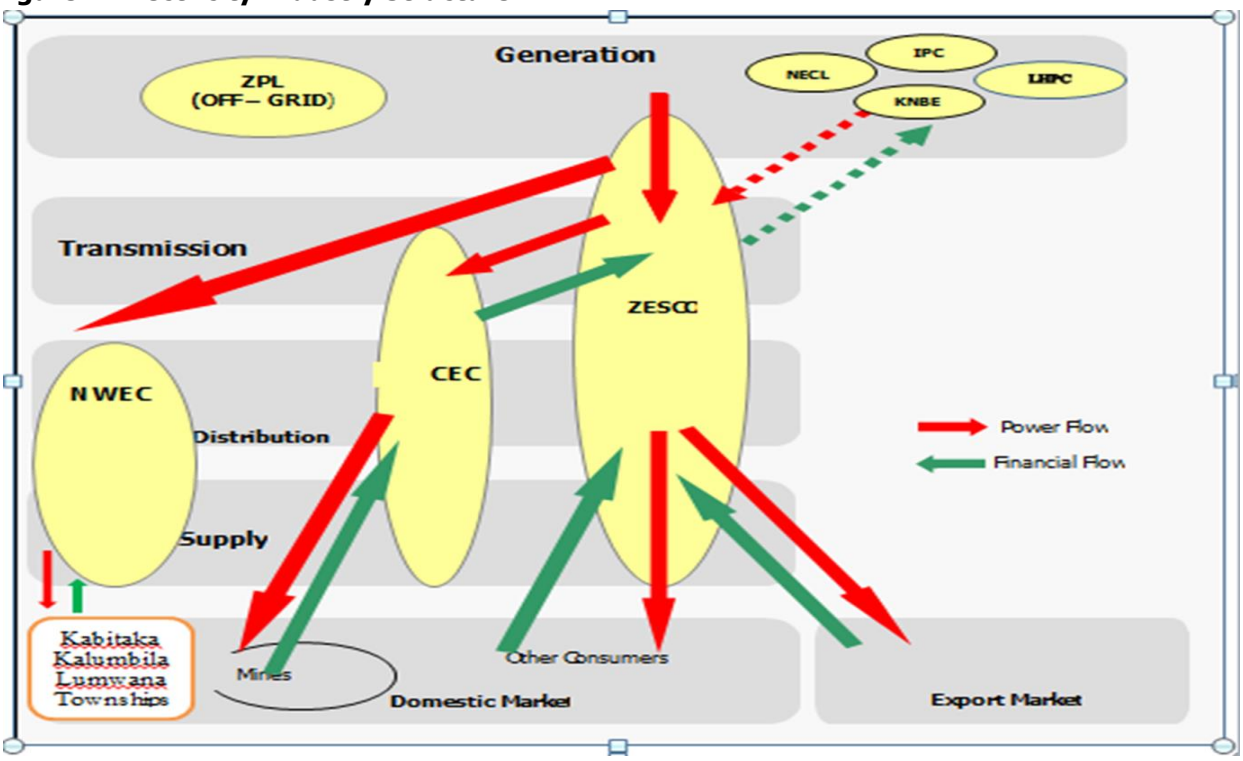
Among the conclusions of the study was that unbundling makes positive achievements with reference to several performance indicators when applied as an entry point when implementing extensive reforms such as introduction of an independent regulator, ending dominance in generation and distribution by attracting additional public and private investment. They also concluded that there is "credible empirical basis for selecting a threshold power system size and per capita income level below which unbundling of the power supply is not expected to be worthwhile" (ibid; pg. vii)

6. Market Reforms in SADC-Zambia's Case

Status of Power Sector in Zambia

Zambia has total installed generation capacity of about 2,300MW. The national electricity access rate is estimated at 22% and only about 5% in rural areas. The power sector in Zambia is dominated by ZESCO which is a vertically integrated state utility accounting for over 90% of Zambia's generation capacity. The utility generates, transmits and distributes electricity throughout the country. The other player is CEC which purchases bulk power from ZESCO and supplies to the mines on the Copperbelt based on the long term power supply agreement. Another player is Lusemfwa Hydropower Company (LHPC) an IPP, which operates 56MW hydro power plants. LHPC sells its power to ZESCO. Ndola Energy is another new IPP that operates a 50MW Heavy Fuel Oil plant and sales power to ZESCO. North Western Energy Corporation (NWEC) is a private distribution company that buys power from ZESCO and supplies to the residential customers of Lumwana mine and surrounding areas in Solwezi. Figure 1 depicts the electricity industry structure in Zambia.

Figure 1: Electricity Industry Structure



Since 1991, the Government of the Republic of Zambia (GRZ) had pursued SAP which included policies such as liberalization and creation of a market economy, turning away from the command-type of economic management. More than 200 state-owned enterprises (including major components of the copper mines) were privatised, pricing of most commodities was liberalized, regulatory bodies for public utilities were established and procedures for establishing business enterprises were simplified.

Power Sector Reforms

In 1994, GRZ propagated the National Energy Policy (NEP). The objective of the NEP with respect to electricity was to increase access to electricity and developing generation from the most cost effective sites for the domestic as well as export market. The NEP set a number of policy measures including:

- Restructuring of the electricity industry;
- Improving accessibility to electricity;
- Promoting electrification of productive areas and social institutions; and
- Developing hydro power generating potential.

To achieve these objectives, the Government's main strategy was to open up the power industry to the private sector, thus abolishing the statutory monopoly of the state-owned public utility, ZESCO.

Government, therefore, initiated the restructuring of the electricity market through legislative reforms that allowed other players in the market. The Zambia Electricity Supply Act of 1970 which founded ZESCO as a state monopoly was repealed and was replaced with the Electricity Act of 1995 to facilitate the participation of the private sector in the electricity industry. In the same year, a law was passed to provide for the creation of the Energy Regulation Board (ERB) to regulate the energy industry. In 1997, the Power Division of the mining conglomerate, ZCCM was privatised to establish CEC as the first privately owned utility in the liberalised electricity market.

By the end of the 1990's ZESCO's performance was poor with low generation capacity, distribution losses were high, rate of return on assets was described as unsatisfactory, inability to settle debts, collection rates were low, overstaffing, financial position was weak to finance new investments and low electricity access rates (Kapika and Eberhard, 2013). The poor performance continued despite the Performance Contract signed between ZESCO Management and Government in 1996. The Government was pressurised by the Brentwood institutions[3] to privatise ZESCO in order to avert the fiscal stress it continued to place on the national budget.

In view of these developments Government commissioned a study between 2000 and 2003 to look at the possible options of privatising ZESCO. The key recommendations of that study were that ZESCO should be unbundled into generation, transmission, distribution and rural electrification business units and privatised.

Parallel to the developments above, the ERB had in 1999, commissioned a separate study to look at options of restructuring the power sector. The report on that study was presented to Government in 2002. The key recommendation of that study was that the Zambian power sector be restructured along the lines of a 'semi-competitive' model which meant unbundling of ZESCO into generation, transmission and distribution to allow for vertical separation among the three divisions. Furthermore, in addition to other recommendations, the study made a provision for an Independent System Operator (ISO) horizontal separation of the distribution into several distribution companies based on regional geographical boundaries.

[3] Brentwoon institutions refer to the World Bank Group and the International Monetary Fund (IMF)

By the Mid-2000's, privatisation had become politically unpopular and intense negotiations between the International Monetary Fund (IMF) / World Bank and Government had commenced, the Government decided to pursue a path of commercialisation in the hope that it would still achieve the same objectives as privatisation.

It is noted that the Government's current position on the structure of the energy industry is that ZESCO operates on the lines of commercialisation as a vertically integrated entity. Under the current market structure, therefore, ZESCO continues to be vertically integrated spanning the generation, transmission and distribution segments of the Power Industry. New entrants in the industry include the Ndola Energy Company (NEC) Ltd, an HFO based IPP with installed capacity 50 MW. Kariba North Bank Extension (KNBE) Power Ltd a 100% ZESCO owned subsidiary, Itezhi Tezhi Power Company (ITPC) a joint venture between TATA India and ZESCO Ltd, EMCO Ltd an IPP company developing a coal fired power plant and Maamba Power Ltd company Ltd an IPP company developing another coal fired power plant.

The under listed were the reasons cited for rescinding the earlier decision to privatise ZESCO:

- The size of the electricity system in Zambia was too small to be unbundled.

- The existence of the Bulk Supply Agreement (BSA) between ZESCO and CEC for a longer period, which committed over 50 % of power from ZESCO to one customer.

- The Government believed that cost reflective tariffs would take some time to be attained in Zambia, given that the majority of Zambians lived in abject poverty. Poverty levels are still high and cost reflectivity has not yet been attained;

- Going by the lessons learned from other former state owned companies that were privatized, a lot of workers were retrenched. It was feared that the privatization of ZESCO would result in more job losses at a time when poverty was rife.

- Energy is the engine of growth, development and poverty reduction and as such privatization of ZESCO would compromise the national development agenda; and

- ZESCO was viewed as a vehicle for rural electrification thus; privatisation of the Utility would have affected the program of rural electrification, as it would have meant contracting other entities with similar competences as ZESCO to undertake rural electrification. Government created the REA to accelerate rural electrification programme and in order to allow ZESCO to operate commercially. It is however

worth to note that REA transfers the infrastructure created to ZESCO for operation and maintenance.

Since that time, Government shelved the idea of restructuring the power sector along the lines described in the foregoing paragraphs and pushed ahead with commercialisation. In broad terms, the objective of commercialisation was twofold; reforms in the legislation managing the sector and commercial operations of ZESCO.

- Legal reforms required making amendments to the ZESCO's Articles of Association and the composition of the Board in order to insulate the company from political interference and improve its commercial operations; and

- Secondly, it also meant amendments to the Energy Regulation Act to grant more independence to the regulator and provide a platform for ZESCO to partner with private investors. Commercial reforms required ZESCO to develop a business plan, reduce the debtor days and achieve financial independence to reduce fiscal stress on the national treasury (IMF and IDA 2005)

In 2003, the Government also legislated for the creation of REA as a vehicle for acceleration of the electrification of rural areas.

Performance of the Sector after Reforms

This section discusses the performance of the electricity sector after the reforms were implemented by highlighting some achievements and challenges that the industry is currently faced with.

ZESCO's Performance

ZESCO has improved its performance from the time commercialization was adopted. The table below shows the performance of the utility during the pre and post commercialization period. Post-reform performance has been analysed based on data obtained from ZESCO between 2011 and 2014.

Table 3: ZESCO's Performance using some selected indicators

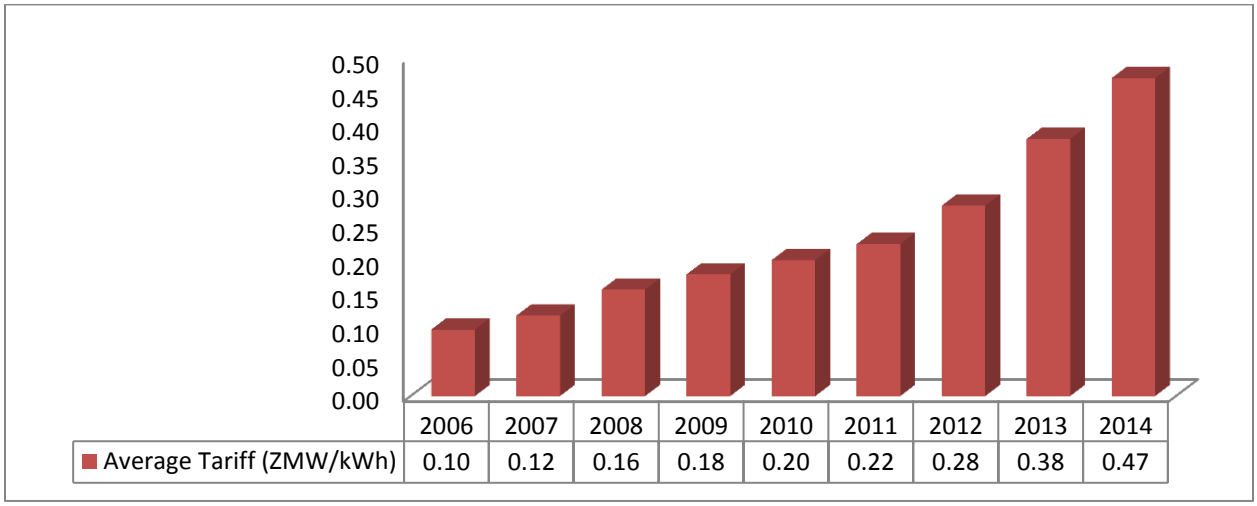
Performance Indicator	Before Reforms (Pre-1998)	Post-reforms (post-1998)
Distribution Losses	30%	12%
Return on Assets	Negative	Positive
Debtor Days	200+	less than100
Generation Installed Capacity (MW)	1500MW+	2300MW^{+}
Profitability	Negative	Positive

Source: ERB's own computations using data obtained from ZESCO

ZESCO has made a lot of improvement in its technical operations. The debtor days have significantly reduced, generation capacity has grown and the utility has been posting profits.

The establishment of an independent regulator has helped to put the utility on a path towards attaining cost reflectivity. This has improved ZESCO's revenues significantly. Figure 2 shows the tariff changes that have been made by the ERB from 2007.

Figure 2: ZESCO's average tariff trend



Source: ERB's own computations

As can been seen from the graph, progress has been made with regard to migrating the tariffs towards cost reflective levels.

According to Kapika and Eberhard (ibid:144) "for regulators to be independent, it is widely accepted that the law should provide clarity on the manner in which those charged with the responsibility of making regulatory decisions are appointed. The legislation should also provide regulators with security of tenure even in the face of difficult or sensitive decisions. Regulators also should have guaranteed source of funding, preferably outside of the government fiscal regime as well as the authority to apply such funds as they deem fit in carrying out their duties. Like any other corporate body, regulators should have the freedom to make administrative decisions". It has been observed that regulators in most developing countries do not have the independence and this affects their performance negatively. The argument has been extended to utilities. It is argued that as long as electricity utilities are wholly owned by the Government, there will be perceived political interference in their operation and that left alone the utilities can perform even better.

Private Sector Participation

One of the objectives of the reforms was to end the monopoly of ZESCO by attracting private sector participation in the industry. There is an increase in the number of private firms investing in the sector especially in the generation segment. The following are the private companies that have invested in the electricity sector

i. Maamba Collieries Ltd developing a 300mw thermal power plant;
ii. EMCO developing a 300MW thermal power plant
iii. Itezhi Tezhi Power Company jointly owned by ZESCO and Tata of India
iv. Lunsemfwa Hydor Power company
v. Copperbelt Energy Corporation
vi. North Western Energy Corporation-private monopoly distributing power in the mining townships in North Western provice.
vii. Zengamina Power Company Limited- Distributing power off-grid.

Access Rate

Zambia's electricity access rate still remains low. It is estimated that only about 22 % of the total population has access to electricity. Over 60 % of the population resides in rural areas but only about five (5) % has access to electricity. There is therefore need to intensify programs for increasing access to electricity.

Sector's outlook

The industry is destined to grow. There is an increasing attraction of private investment especially in generation as earlier discussed. As part of power generation diversification program and in a bid to attract more private investors, the Government of the Republic of Zambia has embarked on the development of Renewable Energy Feed-In Tariff Policy

(REFIT). There is a also a similar program under the auspices of the Germany Government dubbed 'GET FiT' also aimed at promoting renewable energy generation.

Currently the industry has a de facto single buyer ZESCO, as the off-taker. However IPPs have raised concerns on the continuation of ZESCO as the de factor single buyer and system operator. Stakeholders have questioned if ZESCO would operate the system fairly and efficiently because the utility also owns the majority of the generation plants. There is an increasing call for the introduction of an independent system operator to ensure fairness and efficiency in the operation of the system. These calls have been augmented by the intentions by the government to implement the open access regime of the transmission network. Dissatisfied with the overall performance of ZESCO, especially during the periods of power shortages, some stakeholders are still calling for radical reforms such as unbundling and privatization of ZESCO.

7. Getting the reforms right in Developing Countries

From the experiences in countries where reforms have been implemented, it is widely held that the general conditions obtaining at the initiation of the reforms should dictate the sort of reforms to be undertaken. The country's size, the power system size, the national income levels, the macroeconomic and political environment play a role in determining the kind and extent of the reforms. Besant-jones (ibid) outlines some factors that should guide the design of reforms.

Size of the system

The size of the system is an important factor to consider when contemplating reforms. Most developing countries have small power systems. Experience has shown that unbundling is more suitable for countries with large power systems with well-developed institutions and it is less suitable for countries with small power systems accompanied by underdeveloped institutions. Further, "unbundling of the generation and distribution segments of the power supply chain into tiny entities would not make sense in these systems, because economies of scale and scope would be lost without gaining the benefits of competition." He further added that "the case for unbundling is strongest in large power systems in countries well-endowed institutionally. The case is weakest in small systems in countries with underdeveloped institutional capacity and weak economic conditions." (ibid: pg.3). ESMAP (2011) also observed that there is an empirical case for determining a threshold of the power system and the per capita income below which vertical and horizontal separation of business units is not tenable. The country institutions must be well developed to handle the complex mechanisms that are associated with separated systems. This factor was largely ignored in Uganda. It can be argued that the system was too small to be unbundled and the benefits that could have accrued from economies of scale and scope have been lost.

Political consideration

The social political factors address the interest of all the political players in the given country. It includes the willingness of the opposition political parties. Political consensus must be reached before undertaking the reforms more especially on reforms that involve the sale of private enterprises to the private investors. Policies are implemented in the context of institutions such as markets, courts, regulatory bodies and utilities that are greatly influenced by political considerations. Therefore the country's politics contribute to the determination of reforms.

Contribution to national Ideology

The role that the provision of electricity plays, in the national ideology, constitutes part of the political perspective of the electricity market reforms in many developing countries. Access to electricity is a symbol of qualitative life. It has been observed that scenes of society with universal access to affordable electricity are important manifestation of state driven development. For many developing countries, electricity is considered as a public good that must be left under the control of government and is a source of discontent if the service is lacking. The reforms must address the social and political apprehensions. Reforms that result in higher tariffs with no corresponding plan to guard the access to core electricity services face political opposition and are likely to fail. In pursuit of labour productivity, most reforms have resulted in retrenchment of workers. Such reforms are not politically correct and are likely to face political resistance.

Ability to Pay

Electricity is unaffordable to the majority of the population in developing countries. This is consequentially a result of the low household income levels and high cost of supplying the product. Having identified electricity as a vehicle for achieving development and better quality of life, to keep it affordable to the population, the tariffs are heavily subsidized. The subsidies may come in the form of price control or through public enterprise.

In most developing countries, the electricity supply chain is state owned. When the state controls the tariffs, it is done to the benefit of domestic consumers and for stimulation of economic growth. Higher tariffs will result in high production costs for the business sector and this may adversely affect economic growth.

Unbundling and privatization may lead to the rise in the tariff. Private investors are always motivated by profit. If most utilities in developing countries were to be privatized, the tariffs will have to rise significantly for the investors to earn a return. Unbundling causes the tariffs to rise because of double marginalization of profits. Each

business segment would want to earn a return on the investment. The cost build-up is then passed on to the end-users. Therefore, the developing countries must consider the ability to pay of the citizens when embarking on the reforms. It is argued that efficiency gains that come with privatization will eventually lead to reduction in tariffs. Empirical evidence suggest otherwise as the case is in Uganda and Kenya.

Electricity Access rate

For a myriad reasons and albeit all the economic arguments that can be advanced for radical reforms, it is unthinkable that many developing countries especially SSA can consider electricity supply in the same manner as other products for the government to abandon its responsibility of providing electricity as a public service.

Further, for many developing countries, the electricity access rate is considerably very low, for most of these countries rural electrification still remains to be undertaken. This is contrary to the electricity access rate in the West, Latin America and Asia. Girod and Percebois (ibid) observed that that the majority of the African population requires the extension of the electricity distribution network. This is a key segment of electricity supply chain that the government must keep hold of. The duo also added that "for electricity operations in low population density zones, perspectives of profit are not sufficiently inciting taking into consideration returns". Clearly it can be seen that the private investors with their rent-seeking behavior coupled with profit motive cannot be benevolent to drive the rural electrification agenda.

It has been observed that the majority of people with no access to electricity reside in rural areas and peri-urbun areas where the population density is significantly very low. The load demand is very low and so is their income. The connection fees are beyond what they can afford. Provision of electricity to such a population is untenable in a business sense to a private sector (Wamukonya, 2003). Therefore, reforms must strictly consider the access rate and adopt a model that would accelerate the rate of electrification and increase the population's access to electricity.

It has been observed that the most efficient and effective way of undertaking rural electrification is through extension of the national electricity network. This can only be achieved if the company that owns the transmission and distribution infrastructure is owned by the government. The private sector will have no profit incentive to extend the transmission and distribution network to rural areas where there are small loads and the population is sparsely populated.

Cost-benefit analysis

It has been observed that some reforms are undertaken based on a narrow analysis of the sector. The reforms must be undertaken within the broader sense of society (Paul L Joskow, 2008). All the social costs and benefits must be examined. The gains from separating the systems must be quantified. So are the transaction costs that arise from the unbundling.

8. Conclusion

The failure to achieve such important outcomes as lowering the tariffs, increasing access, poor quality and the lower pace of private investment in countries that have undertaken reforms have left most countries skeptical about radical reforms such as unbundling and privatization of state owned electricity enterprises. However, the persistence of underperformance of the power sector in developing countries justifies calls for reforms.

Each country has got unique social, economic, political and technical conditions. Therefore developing countries must not adopt the one size fits all text book model of reforms. Each country must design reforms based on the prevailing social, economic and political environment. Reforms should not just be aimed at achieving financial efficiency of utilities. Reforms must be based on clear objectives. They must target such outcomes as affordable tariffs, increased access to electricity and improved quality of service. It has been argued that the design of most reforms has narrowly been based on the performance of the industry alone. A cost benefit analysis based on the economy as a whole must be undertaken. Both intrinsic and extrinsic factors must be fully examined. A full environment scan must be undertaken to ensure that reforms are complimentary and supplementary to the economy as a whole.

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