How do Institutions Get Back To Life after a Crisis? The Case of Zimbabwe Electricity Supply Holdings

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ABSTRACT

The study examines the strategies employed by Zimbabwe Electricity Supply Authority to enhance the provision of power to its clients. Energy is a key enabler to productivity and socio-economic development. The sector has experienced challenges largely due to dilapidated and obsolete generation equipment and infrastructure, inadequate financing and capitalisation. Within this context, the study sought to achieve the following objective: to assess the strategies employed by ZESA after more than a decade of socio-economic meltdown. The study revealed that ZESA adopted the following strategies to come back to life: prepaid metering system, all buildings are required to have solar water heaters instead of electric geysers, street lights running on solar power, distribution of more than 5, 5 million energy saver bulbs for free, and energy demand management.

Key Words: Prepaid metering, Zimbabwe Electricity Supply Authority,

Academic Discipline: Public Administration

1.0 INTRODUCTION

Zimbabwe Electricity Supply Authority (ZESA) has for a long time failed to produce enough electricity to meet the rising demand. Electricity supply interruptions and shortages have serious repercussions on Government on Zimbabwe’s efforts to successfully turnaround the economy and to achieve sustainable economic and social growth. The five power stations in Zimbabwe, that is, one hydroelectric power, Kariba Hydro power station and four thermal power stations produce a combined total of 1 200 Megawatts (MW) annually to a nation which requires about 2 200 MW per year (Business Writer 2014). This led Zimbabwe to importing a total of around 1 000 MW from South Africa, Mozambique and Democratic Republic of Congo (DRC). Coal shortages and maintenance problems made thermal power stations unable to produce adequate electricity. This explains why the Hwange Thermal Power plant which had a capacity of 920 MW is currently limited to 350MW. As a result of the below capacity utilisation there is a critical shortage of electricity in the country in relation to sharp increase in national demand for electricity. The demand percentage of electricity increased by 29% in 2012 (www.blomberg.com/news/2012).

ZESA has come up with both short and long term measures to alleviate the electricity shortage. The medium term strategies include the extension of Hwange and Kariba Power stations. The government has licensed Independent Power Producers (IPPs) that are implementing various initiatives from mini hydro plants to large thermal power plants, for example, Sengwa Station 1 400MW.

In response to the increased electricity demand, Zimbabwe power utility, ZESA, had to introduce the Prepaid Metering System or the Prepaid Charging System which replaces the Conventional Billing System (CBS). The management of state local services has a strong role in social reproduction, politics and urban social order. How electricity has been produced, distributed and priced in Zimbabwe has been complicated by non-payment, protests, riots, theft of property (cables) and illegal connections.

ZESA is experiencing serious problems in providing power. Electricity generation infrastructure has not been added to keep up with the growing needs over the years. Alternative sources of energy like solar, wind and biomass have not been explored enough. This resulted in long and frequent power cuts. Figures from a report submitted to a parliamentary committee by the former ZESA CEO states that “ZESA generated 7 267 Gigawatts in 2010, which costs US$552 million but it collected US$469 million, making a loss of US$83 million owing to billing challenges” (www.herald.co.zw).

ZESA has explored innovative techniques to control unruly citizens, limit illegalities and negotiates compliance. The use of the now ubiquitous prepaid meters can be construed in this light. The ZESA’s modernising project is meant to better manage energy consumption of by businesses and households. ZESA has been very concerned with creating public values such as “payment morality”, “rehabilitating” and drawing the poor into its administrative net. ZESA tried to promote understanding of the market duties of “customer-citizen”. Services play a big role in the disciplinary process. The
mechanisms of discipline and regulation are important not merely as repressive measures but as facilitators of new modes of accountability.

Electricity plays a critical role in sustainable socioeconomic development. The case for interrogating the performance of prepaid programme is compelling given that the nation is yet to recover from the decade-long socio-economic meltdown. The success of the programme is needed to turnaround. Against this backdrop, the main agenda of this study is to analyse the implementation of prepaid metering strategy by Zimbabwe Electricity Supply Authority to address challenges that were inhibiting electricity delivery efforts to its clients. In pursuant of this goal, the study:

- Reviewed relevant concepts and policy experiences in selected countries.
- Describe the performance of prepaid meters, in terms of, revenue inflows, loading shedding and debt management.
- Examined initiatives that have been adopted in case study.
- Examined the challenges that are compromising implementation of the ZESA's efforts.

The search for these goals and objectives was guided by the following three substantive questions:

- What initiatives are being taken by ZESA to improve electricity generation and demand management?
- What major challenges are faced by ZESA in its efforts to implement the initiatives?
- What specific measures should be adopted by ZESA to ameliorate the challenges?

2.0 METHODOLOGY APPROACH AND RESEARCH DESIGN

The study combined desk and field research. Desk research entailed extensive review of conceptual and policy experiences in selected countries. It also entailed review of policy documents, strategic plans, national development plans, budget statements, quarterly and yearly fiscal reviews, audit and parliamentary reports, among others. The print media has remarkably reported the crisis that obtained in Zimbabwe since 2000. The research also interviewed respondents from ZESA, Zimbabwe Energy Regulatory Authority (ZERA), academics, policy analysts, residents associations such as Combined Harare Residents Association, Urban Councils Association of Zimbabwe (UCAZ), Harare Residents Trust and Parliament of Zimbabwe particularly the Portfolio Committee on Energy. Judgemental sampling was employed in choosing respondents who had knowledge and roles to undertake in the policy formulation and implementation of the prepaid metering system. Members of Parliamentary Portfolio on Energy selected ZESA officials were interviewed or asked to complete structured questionnaires.

3.0 GENERAL ECONOMIC OVERVIEW

Zimbabwe is reported to have the world’s fastest shrinking economy. It is estimated that the economy of Zimbabwe has declined by about 50% since 1997 (Makumbe 2009, 10). The following are some of the depressing features of this economy today where Zimbabwe Electricity Supply Authority operates in:

- Most of the companies in the private sector in Zimbabwe are operating well below capacity due to lack of foreign currency, electricity load shedding and malfunctioning machinery, among other problems. Less than 5% of the industry is operating at full capacity, while a few are operating at 30% and others have literally closed their shops;
- The economy is currently receiving less than 10% of the direct foreign investment it received in 1998. Meanwhile, the national debt has escalated to over US$10 billion;
- The rate of unemployment continues to increase to levels well above 80%; and
- Corruption has become endemic. With the avaricious people in high places looting everything possible (Reserve Bank of Zimbabwe 2012, Makumbe 2009).

4.0 CONCEPTUAL FRAMEWORK

Prepayment systems have been introduced for the first time in South Africa, but are now widely used in the United Kingdom, Turkey and India (Tewari and Shah 2003). Yet, their use is still controversial. On the one hand, those that support the diffusion of prepaid meters claim that they benefit both consumers and utilities because help users to consume more efficiently and to improve the management of their budget while allowing firms to reduce financial and operation costs as well as bad debts. On the other hand, those that are against prepaid meters argue that their adoption is expensive for firms and risky for low income consumers, as the insecurity and volatility of their income may force them to make little use of the service or bring about involuntary self-disconnection (Casarin and Nicoller 2009). In the utility sector, public values such as affordability, safety and protection of the environment require safeguarding (Bruijn, Dickie and Willemin 2012).

Prepayment systems refer to a situation where goods and services are delivered and consumed by the customer before the payment is made. A prepaid meter refers to “an electrical gadget which measures and records the consumption of electricity” (Government of Zimbabwe, Statutory Instrument 44A of 2013). Smart meter refers to “an electrical gadget which records sales of electricity sales and allows a two-way communication line between the consumer and the supplier
of electricity" (ibid). Meters enable the correct measuring of electricity to make sure that customers pay for their use or consumption whilst also enabling power utility to charge their services based on the consumption (Austin 2002). A Prepaid Metering System (PMS) is a system with many subunits in its operation (Chadwick 1978). The electricity system comprises of the utility, the master station, the meters, the vending machine and the customer. The meter records how much electricity has been consumed by the customer from the utility’s total output whilst the master station ensures the customer has the correct amount of electricity sold to him through the vending machine. As a result, in this system, some sub-system have to deal with the inputs and the output for the system in order to work effectively, particularly pertaining to meter reading, customer billing and bill distribution (Kettless 2004). The structure of the Prepaid Metering System is illustrated below:

![Prepaid Metering System Diagram](image)

**Figure 1: Prepaid Metering System**

Source: Chadwick 1978

There are many types of prepayment meters, namely, fixed charged collector-hand reset type, fixed charge collector-time switch type, flat rate tariff meter, part-two tariff rate, part-two tariff-variable rate, double tariff-current change-over and electrolytic prepayment meter.

The process of Prepayment Metering system involves the following activities:

- Customer buys credit from a vending station using his or her smartcard. In Zimbabwe, these include the majority of ZESA offices distributed countrywide, OK Supermarkets, Netone, Commercial Bank of Zimbabwe (CBZ) among others.
- The customer receives a voucher with a unique code upon the payment of money to the utility.
- The customer keys in the code into the meter and the meter updates the credit and dispenses electricity to the customer.

5.0 GLOBAL EXPERIENCES

According to Estache et al. 2000 prepayment systems were very popular in India and in some OECD countries in the late 1990s and are said to have reached maximum improvement in Great Britain (Waddams et al. 1997). Prepaid meters were firstly introduced in Argentina in 1993, when a number of meters were placed in small shops at the Mendoza Bus Central Station by Energia, Mendoza Sociedad del Estado (EMSE).

5.1 United States of America

According to [www.navigantresearch.com](http://www.navigantresearch.com), in the United States of America (USA), the concept of prepayment for electric services is not yet well understood (Hedin 2012). In the USA, observers estimate that less than 10% of the 3200 utilities in the country offer prepaid electric services. Companies serve rural and low-income communities with other transients like college or university students. The barriers to electric prepaid services stemmed from objections from consumer advocacy groups, Public Utility Commissions (PUCs) and regulatory agencies. The major fear was that the utilities would shut off power to certain “disadvantaged” customers, such as, elderly, individuals with disabilities or life-threatening medical conditions (Bruijn and Dicke 2006).
5.2 United Kingdom

Electric prepayment is a common practice in South Africa, United Kingdom, Ireland and many parts of Asia Pacific. With the oldest prepaid programme in Europe, the United Kingdom has approximately 14-15% of all households on an electric prepaid plan (Bruijn and Dicke 2006). According to Ofgem, prepaid meter usage increased by 5% in 2010. Around 5, 9 million people in the UK have a prepayment energy meter. The British government gave the following as motivations for liberalising energy:

- Helping customers to manage their debt and energy usage;
- Preventing large, unexpected bills;
- To pay for gas and electricity upfront; and
- Top up with credit to get gas and electricity: smartcard. (Bruijn and Dicke 2006).

Prepayment energy meters are usually installed for those who had slipped into “debt with their energy supplier” at some point, to help them manage their debt and their budget more effectively. The strategy enabled them to pay off their debts bit by bit while paying for the electricity.

In Britain, the prepayment meter strategy is not compulsory. It is permissible to switch from prepayment meter to a standard meter.

5.3 South Africa

As part of its manifesto in the local government elections of 2000, the national office of the ruling African National Congress (ANC) made an unprecedented promise that all poor South Africans would get a quantum of free basic services (Ruiters 2011). This was quantified as a minimum of 6000 litres of water a month and 50 kWh of monthly electricity per household for qualifying households. In South Africa, 50% of the residents are using the prepaid system (ESKOM Report 2010).

The prepayment technology was initially developed in South Africa in the late 1980s with the objective of supplying energy to a large number of low-income and geographically dispersed users. The system was initially geared towards minimising the difficulties arising from users’ irregular incomes and to overcoming the limited development of the infrastructure required for the dispatch or reception of credit slips (www.iae.edu.ar).

One can glean the following lessons from the case studies: no meter reading, no bill delivery, no accrued debts, no billing problems, less fraud and better customer relationships.

6.0 RESULTS AND DISCUSSION

The findings of the study are presented and discussed under the headings below.

6.1 Precursor to Prepayment

Power crisis emanated from “low generation capacity” in Zimbabwe and “the inability to import adequate”. At least 35% of ZESA’s equipment is dysfunctional due to ageing plant and equipment and lack of maintenance. One key-informant observed that “with reports of massive resistance to pay bills by top politicians, power generation capacity could remain subdued, with load shedding escalating”. A senior business reporter with a state owned paper noted that “Zimbabwe’s ZESA problems are exacerbated by customers who refuse to pay bills, for example, government officials such as ministers. Members of Parliament and resident ministers refused to pay ‘power bills of US$140 000’”. Furthermore, government departments that received power from ZESA owed it a total of US$19 million. Information gathered from ZESA showed that it is struggling to force its customers to pay the debt of over US$400 million. ZESA is struggling to supply electricity to an ever growing population whose demands have been rising without an adequate investment in infrastructure, spare parts or maintenance since independence in 1980. Mismanagement and corruption have also contributed to the crisis.

Following the Cabinet resolution for the Zimbabwe Electricity Transmission and Distribution Company to implement the prepayment metering programme, four companies ZTE, Nyamazela, Solahart and Finnmark were awarded contracts to install 490 000 prepaid meters. The programme was officially launched on 28 August 2012 and was supposed to be completed by 31 August 2013. The ZESA is a strategic enabler of the Zimbabwe’s socio-economic transformation under the Zimbabwe Agenda for Socio-Economic Transformation (ZIMASSET) and as such the bank rolling of prepayment meters is one of the pillars to turn around service delivery in the short and long term.

6.2 Why Did ZESA Install Prepaid Meters?

The Zimbabwe Electricity Transmission and Distribution Company (ZETDC), a subsidiary of ZESA Holdings directed its efforts towards the installation of 530 000 free prepaid meters countrywide to replace the conventional billing system that had been posing challenges to both power utility and consumers. Zimbabwe has been experiencing power shortages as a result of the lack of additional generation capacity against a background of load growth across all sectors in the economy. The power shortfall was worsened by the loss of dependable capacity at Hwange Power Station as a result of maintenance challenges emanating from the economic decline that the country experienced in the millennium. The dependable capacity fell from 780MW in the late 1990s to an average of 90MW to 300MW during the harsh economic climate period (www.theindependent.co.zw). However, the capacity has remarkably improved to an average of
500MW currently. Power import constraints are being experienced as the entire Southern African Development Community (SADC) region has been in a power deficit situation since 2007.

Prepayment energy meters are usually installed into high, low and medium densities as well as businesses and farms to help them manage their budgets more effectively. A ZESA official, however, informed the study that priority was given to high density suburbs because of Ministerial directive not to load shed the areas. The customer survey carried out in Kuwadzana suburbs consistently shown high satisfaction with the prepaid initiative. About 75 per cent of prepayment ZESA clients are either satisfied or very satisfied. Prepayment consumers are happy that they are in control of their electricity usage. They are now able to manage their budgets by choosing when and what they pay each week or month for electricity. As one respondent put it, “it is easier to pay US$20 every week than US$80 at the end of every month”. As one prepaid customer put it “it is easier to pay US$25 every week than US$100 at the end of every month”. Indeed, ZETDC official informed this study that consumption has dropped with about 20%. The study observed that there is a drop in consumption ranging from 18% to 29%. The table below shows the analysis of change of consumption after conversion to prepaid.

### Table 1: Analysis of Change of Consumption after Conversion to Prepaid

<table>
<thead>
<tr>
<th>Category</th>
<th>% Drop in Consumption after Conversion to Prepaid</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Density</td>
<td>29%</td>
</tr>
<tr>
<td>Medium Density</td>
<td>21%</td>
</tr>
<tr>
<td>Low Density</td>
<td>18%</td>
</tr>
<tr>
<td>Average</td>
<td>23%</td>
</tr>
</tbody>
</table>

Source: ZETDC Report 2013

ZESA Holdings came up with the idea of prepaid metering system in order to establish an efficient billing system. ZETDC official had this to say “A lot of consumers were complaining and to us the prepaid system is the way to go as we solve the issue of consumption and bills” (www.herald.co.zw). ZESA’s billing system was based on estimates, a situation that prompted many consumers to refuse to settle their debt.

Compounding the situation, ZESA had a poor debt management system. The power utility employed the disliked power disconnections as the debt management strategy. For instance, Mozambique’s Hydro Cahora Bassa (HCB) in 2012 halted exports to Zimbabwe in order to force the country’s cash strapped power utility, to settle part of the US$75 million outstanding debt (Africa News Services 2013). During the interview with the former Minister of Energy and Power Development, the minister said HCB switched off supplies in 2012. Responding to the question why switching off, he said Harare had failed to honour a string of promises made in the past to settle the US$75 million debt. “You can say they have switched us off, yes. What they are giving us now is just matandanyadzi (inconsequential). But technically and legally we have not been switched off” the former minister observed.

One ZESA official responding to the question, “How did ZESA accumulate such a huge debt”, said electricity is viewed as a basic modern right and need. Hence, there is tremendous political pressure to subsidise to “affordable” levels so that low income earners like high density areas can afford. For example, during the 2013 harmonised elections, Zimbabwe African National Union Patriotic Front (ZANU PF) promised the electorate that once voted into office, electricity debts would be cancelled. It eventually cancelled US$160 per each household. It is important to observe that the electricity was imported and the country is having serious liquidity challenges. How then can ZESA continue to provide even a modicum service? This means that the power utility must charge less than the cost of generation and delivery which means no money for maintenance or new investment.

### 6.3 Cashflow Improvement

The prepayment programme has significantly improved revenue collection and cash flow for Zimbabwe Electricity Supply Authority. The traditional post-pay system had serious problems. The administrative cost savings are very impressive. There is no need for resources to track and collect deposits for initiating electricity for customers, to send monthly bills and to collect reconnection fees from consumers that have been disconnected. This is a win-win situation. Electricity debt on the post-paid account is being transferred to the new pre-paid account, meaning that 20% of pre-paid electricity purchase would go towards clearing the customer’s debt. The 20% debt redemption enables customers who had slipped into debt with the post-paid system to pay off the debt bit by bit.

### 6.4 ZESA Initiatives

The electricity utility has other strategies to improve electricity generation in the country apart from the prepayment strategy. All new buildings are required to have solar water heaters instead of electric geysers. Some street lights are now running on solar power instead of sapping expensively generated power. Energy saving bulbs were for free to all high density customers for lighting. ZESA distributed more than (5, 5 million) 350000 energy saver bulbs for free in Chitungwiza, Bulawayo, Gweru. The initiative saved up to 200 megawatts daily. Farmers and other users in open areas suitable for wind power are being given special incentives for installing wind power.
6.5 Prepayment Process
A ZESA official informed the study that once a prepaid meter is installed, a customer receives a final bill to confirm the balance and thereafter the bill ceases to be functioning as the prepaid meters have an in-built mechanism of making customer debt. To that effect each time a customer feeds a prepaid token into the meter, 20% is deducted until the debt is cleared. The general perception from some respondents is that electricity has now been turned out into a commercial service rather than a basic right.

6.7 Measures taken by the Ministry Energy and Power Development
During the interview with the Minister of Energy, the study was informed that, there are measures crafted by the Ministry of Energy namely: Demand Management and Institutional issues, Generation Capacity and Supply Side activities. These strategies are pigeon-holed into three categories, namely, short-term, medium and long-term.

6.7.1 Short-Term (900MW)
1. Supply Side and Generation Capacity activities
Optimisation of Hwange Power Station (250 MW). Hwange Power Station has capacity 950 MW. However, producing 300-500MW due to inadequate maintenance and deficient of alignment of the production facility. For example, the stage two turbines (generations) have a capacity to generate 220 MW each, but the boilers can generate around 150MW.

Repowering small themals 120MW. Coal supplies could be enhanced by investment at Hwange Colliery Company (HCC) and Gairezi Hydro 30MW. Zimbabwe Power Company (ZPC) is planning to build the Gairezi Hydro Scheme. Lupane Coal Bed Methane 500 MW. Solar into Grid 100MW. Solar panels on homes.

2. Demand Management
Prepaid meters programme was conceptualised. The State Procurement Board (SPB) awarded tenders to
- Nyamazela Consulting Engineers cc (RSA);
- Finmark Marketing (Pvt) Ltd (Zim);
- ZTE Corporation (China); and
- Solahart Zimbabwe (Pvt) Ltd (Zim);

The tenders were for the installation of prepaid meters. The tenders were floated, adjudicated and awarded to REVMA. The adjudication process was fraudulent. The SPB said REVMA had not misrepresented their position, but that the adjudicators had falsely misrepresented the facts. As a result, the SPB could not reverse their award. The recourse was sought by the ZETDC from the Administrative Court for the nullification.

Compact Florescent Lamps (CFLs). 5, 5 million lamps were installed. These were energy savers.

6.7.2 Medium-Term Strategies
1. Kariba and Hwange Expansion Projects (900MW)
2. Hwange-Western Areas (1000MW): Construction of coal fired power station in the Western Areas coal fields. The Western Areas coal fields' concession was granted to Zimbabwe Power Company (ZPC) by Cabinet in July 2010 for the purposes of attracting investors into power generation, for example, the China Railways International (CRI).
3. Independent Power Producers (IPPs): Many IPPs have been licensed. There are 3 big projects namely, Sengwa (2400MW), Lusulu (2000MW) and Essar (6000 MW).
4. Institutional Issues
   i. Funding: ZESA funding by Ministry of Finance and Economic Development is inadequate.
   ii. Restructuring the utility organisation so that it becomes responsive to the customers’ needs.
   iii. Setting up an Electricity Industry so that services and spares to ZESA are locally available cheaply.

6.7.3 Long Term Strategies
1. Bindura Gas Plants (2200MW): Rovuma Basin through the bridge at Tete to Bindura. A gas fired power station is then constructed in Bindura and feed into the Bindura-Songo transmission lines.
2. Batoka (800MW): Zambia and Zimbabwe agreed on February 10, 2012, to embark on the Batoka Hydro project with a total capacity of 1600-2000MW.

6.8 Institutional Framework: Zimbabwe Energy Regulatory Authority (ZERA)
Consumer energy rights come with responsibilities. Consumer Rights include:
- Right to access reliable and safe energy and to receive accurate and timely bills
• Right to access and to be informed about price structure, compliant procedures, planned power outages in good time
• Right to be informed about suppliers’ intention and reason to terminate service
• Right to be treated with kindness, respect and to be treated equally without prejudice
• Right to have all faults attended to in a timely manner
• Right to privacy and to have confidential information respected and protected

Consumer Responsibilities include:
• Pay energy bills on time every time
• Use energy only for purposes in the contracted terms and tariff category
• Allow record of consumption to be reflected in the appropriate metering device
• Cooperate with and support programmes on the effective and efficient use of energy
• Allow energy supplier employees access to consumer’s premises of inspection, meter reading, installation, testing, replacement or disposal of utility apparatus
• Report any fault or damage to the utility property which can potentially cause fatal accidents
• Report all cases of vandalism and theft of the utility/energy service provider’s property

Affordable and reliable clean energy is almost a birth right for modern day society. Energy is a critical enabler of social, economic and technological development in all sectors; hence, it is a fundamental entitlement to all customers. The Government of Zimbabwe has demonstrated its commitment to ensure everyone has access to an affordable, clean and reliable energy supply by establishing ZERA.

ZERA regulates the procurement, production, transportation, transmission, distribution, importation and exportation of energy derived from any energy source. Its mandate is derived from the Energy Regulatory Authority Act [Chapter 13:23], Electricity Act [Chapter 13:19] and the Petroleum Act [Chapter 13:22].

Under the prepaid project, ZERA educated the customers about the energy saving tips. One ZERA official informed the study that consumers have an obligation to inculcate a culture of saving energy starting at household level. The strategies to save energy were flighted in both daily and weekly newspapers so that customers could read. This is a commendable effort. Some of the strategies that appeared in newspapers include:
• Replace energy-guzzling incandescent lamps with the more efficient compact fluorescent lamps (CFLs) which are four to five times more efficient
• Switch off lights in all unoccupied rooms
• Use natural light as much as possible
• Switch off TVs, radios and DVDs from the mains when going to bed or going out
• Set the geyser temperature within the 55-60°C range
• Use a microwave to warm and cook food as alternative to the traditional stove
• Switch off stoves five minutes before end of cooking

According to ZERA, the merits of prepaid metering system and up-front payment include: debt recovery on the part of ZESA. Some of the advantages include:
• No more disconnections and administrative hassles and reconnection fees
• No problems of disputed and inaccurate meter reading
• The customer learns to manage a budget
• No waiting for reconnection
• Empowering customers by giving them responsibility
• Improves ZESA’s revenue flows
• No postage costs
• No meter readers needed

The system assist customers to amortise their debt with the ZETDC as part of (20%) the money used to purchase power is directed towards servicing the debt. From ZETDC’s perspective, other benefits of smart/prepaid metering are:
• Consumers can monitor their electricity usage.
• ZESA used to hire workers whose main task was to read meters and disconnect electricity of those whose payments were overdue. This is now a thing of the past.

• Consumers can benefit from reduced frequency of load shedding if the concentration of smart meters in an area is high.

• Addresses the structural violence of cost recovery.

• The financial position of the utility will improve allowing for better service delivery and ability to carry out projects in the power sector.

According to ZETDC official the experience of using electricity has been changed radically by the advent of the prepaid meter. This is explained by the self-disconnecting meters installed by ZESA.

6.9 Prepaid Metering System's Demerits

The system can be very inconvenient as some households cannot afford to buy a whole month’s supply but must make repeated trips to vendors to buy a few units at a time. Repeated trips add up in transport costs and running out of power can mean lost food when the fridge goes off. Some residents skip a week without power. All prepaid meters force poor households to consume less but cutting themselves off. So, rather than ZESA having to go in and cut off electricity for non-payment, the ZESA lets the technology do it for them. Prepaid meters are remote-controlling households, using money as a disciplinary device.

6.10 Challenges

The migration from post paid to smart prepaid metering was expected to be completed by end of April 2013. Unfortunately, the target completion date was missed. The implementation of the prepaid metering programme has been faced with a number of bottlenecks. The major challenges encountered include:

• Financial constraints to pay the contractors; ZETDC went into market in 2012 to raise USD$30 million to fund the prepayment metering programme through Industrial Development Bank of Zimbabwe (IDBZ). However, only US$17.5 million was raised.

<table>
<thead>
<tr>
<th>Contractor</th>
<th>Harare Region</th>
<th>Western Region</th>
<th>Southern Region</th>
<th>Northern Region</th>
<th>Eastern Region</th>
<th>Total per Contractor</th>
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<tr>
<td>Solahart</td>
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<td>30 900</td>
<td></td>
<td>30 348</td>
<td>98 610</td>
<td></td>
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<tr>
<td>Finmark</td>
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<td>1 499</td>
<td>37 730</td>
<td>41 527</td>
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<tr>
<td>Nyamezola</td>
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<td>8 681</td>
<td>15 374</td>
<td>31 339</td>
<td>59 071</td>
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<tr>
<td>ZTE</td>
<td></td>
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<td>2 729</td>
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<td>1 277</td>
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<td>12 347</td>
<td>614</td>
<td>20 204</td>
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<td>Total Per Region</td>
<td>74 654</td>
<td>49 488</td>
<td>49 470</td>
<td>75 231</td>
<td>63 578</td>
<td>312 421</td>
</tr>
<tr>
<td>Total meters to be Retrofited</td>
<td>212 000</td>
<td>150 000</td>
<td>80 000</td>
<td>97 000</td>
<td>78 000</td>
<td>617 000</td>
</tr>
<tr>
<td>% Retrofitted</td>
<td>35%</td>
<td>33%</td>
<td>62%</td>
<td>78%</td>
<td>82%</td>
<td>58%</td>
</tr>
</tbody>
</table>

Source: Survey Data 2014

• Delays in tendering procedures caused by own technical capacity challenges in preparing project specifications

• ZETDC does not have enough capacity to carry out tests of the meters before installation. The testing is an important aspect to ensure that the meters meet specification before they are installed

• There were delays in securing the smart metering platform due to hosting issues which have since been resolved.

• There are challenges with Under Voltages in some areas resulting with prepaid meters switching off during peak times when voltages are low. Prepaid meters have a low and over voltage setting of 0.7 Vn and 1.3 Vn. For areas experiencing low voltages, the low voltage settings are disabled to avoid inconveniencing customers.

• Slow approval from State Procurement Board on securing Third Party vending. Customers are being inconvenienced by the limited vending outlets.
• Limited vehicles to carry out inspections of the programme
• Resistance from some Ministries/Government departments resisting the installation of prepaid meters because there is no arrangement for them to get money upfront from Treasury to purchase credit. Government departments which are resisting installation of prepaid meters include the army, Air force, Police and Judiciary service Commission (ZETDC Reports 2013, Interviews with ZETDC officials).
• Illegal reconnections, tampered meters, meter by passing and taping from street lights
• These constitute risky by desperate strategies that indicate lack of affordability, political alienation and social exclusion—mass unemployment and unaffordable tariffs (economic hardships)
• These everyday transgressions have a political or activist element to them.
• Poor households use it only for lighting not for cooking.
• Use wood and paraffin for cooking.

7.0 CONCLUSIONS
The study has identified many strategies initiated by ZESA besides the prepaid metering system. These strategies have improved the delivery of electricity in Zimbabwe, for example, reduced load shedding and improved revenue collection. Prepaid metering system is a way to circumvent the angry citizen and privatise cut-offs. However, it promotes non-participatory politics. The prepaid system has removed the public visibility and awareness of disconnections. Barring these negative observations, the prepaid system is a good tool which enables households to manage electricity consumption since the prepaid meter provides a continuous display of how much electricity have been left and also a flashing light showing how fast electricity is being used. Many customers find it much easier to budget their electricity usage and to actually save power. The prepaid system improves ZESA’s cash flow position, monitors electricity demand and reduces the frequency of load shedding.

8.0 RECOMMENDATIONS
ZESA should engage with Treasury to come up with a system to pay for electricity upfront for the Government departments. Some of the affected Departments include: Army, Air force, Zimbabwe Republic Police (ZRP), Judiciary Services Commission. The Main challenge highlighted by these departments is getting money upfront from Treasury. This measure, however, is not feasible taking into account the limited fiscal space and liquidity challenges Zimbabwe is going through. Review of tariff rate for domestic customers from 10cents/kwh to 13cents/kWh. ZETDC is losing about US$2.9 million per month as a rate of change from conventional billing to standard rate for domestic prepaid customers is low.

The Zimbabwe Electricity Power Authority needs a solid institutional framework that forges power generation in the country in order to reverse de-industrialisation the country is going through. To deal with funding challenges, the government in general and ZESA in particular, should embrace public-private partnerships.

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