FULL COLOUR THINKING

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The reform of the Electricity Supply Industry in Zimbabwe and its impact on power sector investments since 2002

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by

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ABSTRACT

The Zimbabwe Electricity Supply (ESI) reforms of 2002 were primarily meant to improve the quantity and quality of electricity supply through encouraging private participation, especially in generation, introducing regulation and competition and restructuring the utility. The reforms have not yielded the expected results, two decades on. This research explores the reform process and the extent to which it is structured to encourage private investments. The research approach used was primarily qualitative, based on survey research and expert interviews as well as longitudinal power sector performance data. The research found that a transitional ESI structure was adopted to deal with legacy debt issues, as well as to allow the different companies time to develop to a level where they can commercially trade. The regulator was found to be fairly independent, with a good licensing framework and tariff methodology. However, the off-taker's tariff is below cost, though IPPs have been awarded cost reflective tariff and largely view the tariff methodology as acceptable. Only small IPPs have been able to commission their projects, with the larger ones failing to reach financial closure. This has not helped some of the objectives of the reform, as the installed capacity in the country remains below demand. The reforms proposed in the Electricity Act of 2013, meant to further restructure the utility, have not been implemented as the government felt that the conditions in the country were not yet conducive for the generation, transmission and distribution companies to be spun out of ZESA Holdings.

The research concluded that the reforms managed to improve the attractiveness of the industry to investment, though only small IPPs managed to commission their projects, leaving a large demand-supply gap. It is recommended that further study be done to establish conditions necessary for further restructuring of the sector as this may be the panacea for unlocking bigger projects which will have an impact on improving the quantity and quality of power supply.

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GLOSSARY OF TERMS

ESI	Electricity Supply Industry
IDBZ	Infrastructure Development Bank of Zimbabwe
IPP	Independent Power Producer
MoEPD	Ministry of Energy and Power Development
MW	Mega Watts
PPA	Power Purchase Agreement
ZEDC	Zimbabwe Electricity Distribution Company
ZERA	Zimbabwe Energy Regulatory Authority
ZERC	Zimbabwe Electricity Regulatory Commission
ZESA	Zimbabwe Electricity Supply Authority
ZETCO	Zimbabwe Electricity Transmission Company
ZETDC	Zimbabwe Electricity Transmission and Distribution Company

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My family was behind me all the way; Miriam, Tashinga and Tavonga

CHAPTER 1

INTRODUCTION

In 2002, Zimbabwe initiated market-based power sector reforms, with the revision of the 1985 Electricity Act (previously revised in 1996). Through encouraging private participation, introducing regulation and competition and restructuring the utility, reformers hoped to improve the quantity and quality of supply as well as to increase electricity access, to support economic growth and development (Zimbabwe, 2002). However, reforms have not unfolded as expected. Now, more than two decades since the inception of reforms, Zimbabwe continues to face many of the same challenges. Critically, installed generation capacity remains stubbornly below demand, the quality and reliability of electricity services are low, and increasing access remains a priority.

In this dissertation, I explore the relationship between power sector reforms and power sector development. Specifically, I investigate the manner and extent to which reforms have contributed to attracting private sector participation and investment in generation. The research approach adopted is primarily qualitative, based on survey research and expert interviews, though it includes some analysis of longitudinal power sector performance indicators.

Through this introductory chapter, the background, rationale, problem statement and objectives of the research are charted. Following from this, the research design is relayed. The chapter concludes with a chapter summary, thus providing the reader with an overview of the dissertation's structure.

1.1 Background of the study

1.1.1 Institutional Structure and Reforms

At Independence in 1980, the ESI in Zimbabwe comprised the Central African Power Corporation (CAPCO), the Electricity Supply Commission (ESC) and the Electricity Departments of the cities of Harare, Bulawayo, Mutare and Gweru. CAPCO was jointly owned by the Zimbabwean and Zambian governments, and was responsible for the generation and transmission of electricity to the two countries from the Kariba hydroelectric power stations situated at Kariba South and Kariba north. ESC was responsible for thermal generation at Hwange and Munyati thermal power stations, as well as the distribution of power throughout Zimbabwe outside the four main cities. Four municipal electricity departments owned by the

cities of Harare, Bulawayo, Mutare and Gweru were responsible for the provision of electricity in these cities (Dube, 1999). The cities of Harare and Bulawayo owned the Harare thermal power station, and Bulawayo thermal power respectively.

The Electricity Act of 1985 led to the amalgamation of the five Zimbabwean owned utilities (ESC and the Electricity departments of Harare, Bulawayo, Mutare and Gweru) and the Zimbabwean share of CAPCO to form Zimbabwe Electricity Supply Authority (ZESA), a vertically integrated monopoly with the functions of generation, transmission and distribution of electricity (Kayo, 2002: 959). ZESA was also responsible for centralised planning, which was meant to enable long-term investment efficiency based on least cost options (Kayo, 2002: 959). Kayo (2002) explains that the amalgamation was meant to bring a three-pronged economic advantage to the power sector in Zimbabwe, namely:

(i) streamline the administration of the power sector through the ministry responsible for energy,

(ii) achieve efficiencies through economies of scale, and

(iii) remove duplication of functions among the utilities.

By the 1990s, however, the performance of the integrated utility was deteriorating. Energy sent out declined from 9,361.5GWh in 1990 to 6,995.8GWh in 2000 and total imports increased from 332.4GWh to 5,094.5GWh in the same period (ZESA, 2000). Total system losses increased from 8.7% to 13.2% from 1990 to 2000 on the backdrop of stagnant installed capacity, while maximum demand peaked at 2,034MW in 1999 - up from 1,573.9MW in 1990 (ZESA, 2000). Access to electricity saw some improvement, growing from 27% to 34% between 1996 and 1999 (World Bank, 2003).

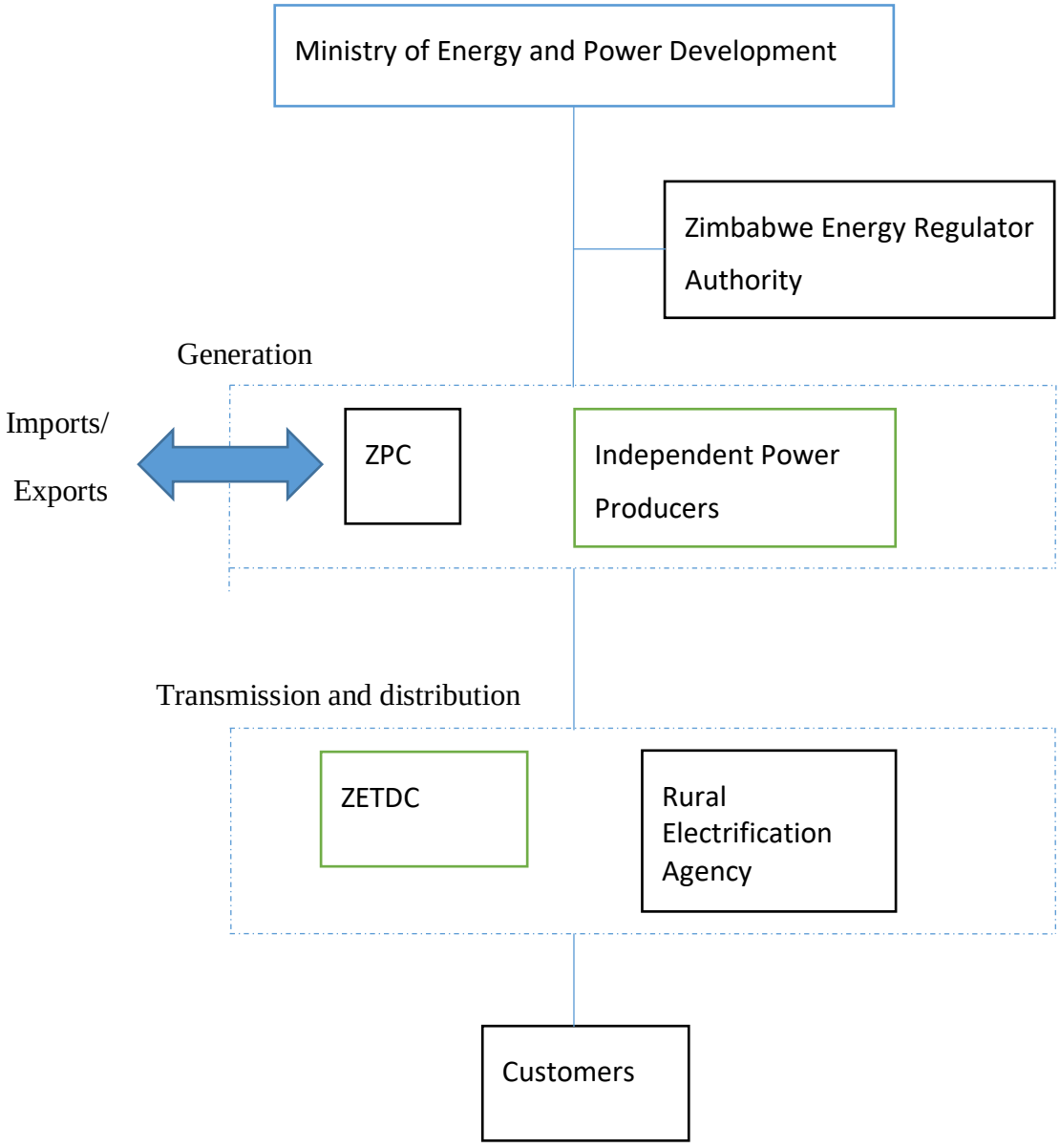
It became clear that advancing socio-economic development depended on drastically improving the reliability and availability of electricity services, as well as increasing electricity access. The Zimbabwean government thus decided to institute electricity sector reforms, in order to address underinvestment in and the progressive deterioration of electricity infrastructure and services (Zimbabwe, 2000). The revision of the Electricity Act in 1996 had failed to attract private capital, as it required any IPP with capacity of more than 100kW to be approved by ZESA and the relevant ministry (Kayo, 2002). This framework was not conducive for private sector investment (Mangwengwende, 2005), as the off-taker was given the regulating powers over the supplier. Investors would not put a significant amount of money where the buyer of their product regulates the market. Experience in other countries in the

region has shown that private investors require clarity of policy framework which is defined by transparent, consistent and fair regulation. This has to be aligned with credible industry structure where the creditworthiness of the off-taker is ensured for guaranteed revenue streams (Eberhard, Gratwick, Morella and Antmann, 2016). This was one of the rationales behind instituting reforms.

In 2000, the Minister of Mines and Energy signed the Electricity White Paper, providing the foundation for power sector reform going forward (Zimbabwe, 2000). This led to the review of the Electricity Act, which resulted in the Electricity Act Chapter 13:19 of 2002 (Zimbabwe, 2002). The Act paved the way for the unbundling of the vertically integrated utility ZESA into separate generation, transmission and distribution entities. It also made provision for the establishment of an independent regulator, the Zimbabwe Electricity Regulatory Commission (ZERC), (which was transformed to Zimbabwe Energy Regulatory Authority (ZERA) in 2011) and the Rural Electrification Fund (Zimbabwe, 2002), which would focus on improving electricity access in rural areas. The 2011 merging of the electricity and petroleum regulation was meant to streamline costs by merging the two regulatory functions into energy regulation. The transmission and distribution companies were merged in 2008 after the government realized that the services they provided were similar (Kaseke, 2013). There were then cost savings in merging the two entities into one transmission and distribution company. In 2013, the government attempted to re-separate the transmission and distribution businesses as well as do away with ZESA Holdings through an Electricity Amendment Act. The President did not sign this into law as it was felt that the conditions were not yet ripe for industry subsidiaries to fully trade amongst each other with full responsibility over their legacy debt.

In figure 1.1 below, the current structure of the industry is presented.

Figure 1.1 Overview of Zimbabwe Electricity Supply Industry



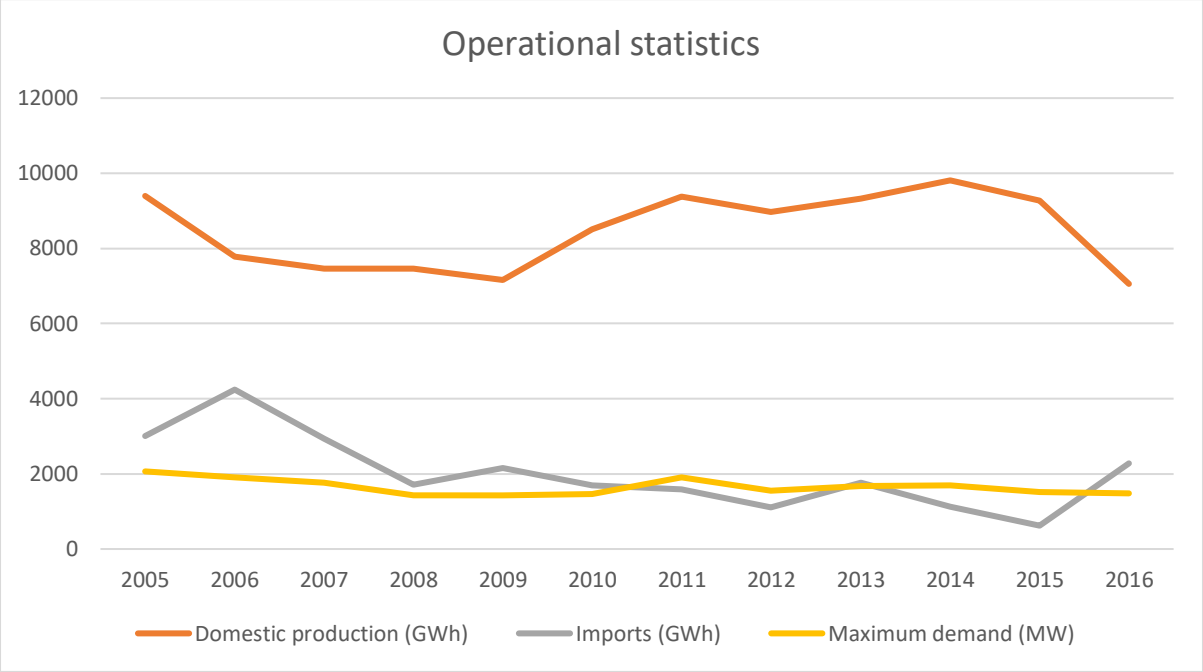
Due to partially implemented reforms, the Zimbabwean sector is an example of what Gratwick and Eberhard term a 'hybrid model', where private and public investment coexist in a sector that continues to be state-dominated (2008). In the next section, developments in sector performance under this structure are charted.

1.1.2 Power Sector Performance

The performance of the ESI can be tracked from the audited annual reports as from 2005 to 2016 as indicated on figure 1.2 below. The graphical presentation of the operational statistics

below indicates that there was no significant improvement in the maximum demand over the period. Domestic production initially improved around 2009 but started going down after 2014. The continued significance of imports signifies the existence of a power demand-supply gap which could not be closed by improvement in local generation capacity. Zimbabwe has a diverse set of options for generation, including hydro, coal, and renewable energy sources. Over 8,000 MW in generation projects had been licensed by 2014 (ZERA, 2014), which indicates vast opportunities in power generation, and yet not significant amount of power has been commissioned yet. There has been load shedding at peak during the period under review but this did not catalyze financial closure on a significant number of power projects.

Figure 1.2 Operational Statistics of ZETDC from 2005 - 2016



Source: Compiled by author from Annual reports of 2005 to 2016

The fact that the sponsors of 8,000 MW worth of projects went through the rigorous process to get licensed is indicative of the interest in investing in the ESI. However, failure to reach financial closure in an environment with opportunities shows limitations in the ability of the ESI to secure the much-needed capital. This raises questions around reforms and their impact on investment in the power sector.

1.2 Problem definition

It has been over a decade since these reforms were implemented and generation capacity has not increased in line with expectations. According to Zimbabwe Energy Regulatory Authority

(ZERA) (2014), licenses in excess of 8,000 MW have been issued and yet the available capacity for the country remains below 2,000 MW (Zimbabwe Electricity Transmission and Distribution Company (ZETDC), 2014). While there are external socio-economic and political factors that may account for this, little research exists on the implementation and impact of power sector reform in Zimbabwe, specifically with regard to attracting necessary investment especially in generation.

The Zimbabwean economy has been on a decline since 2000 when the government implemented reforms in the land tenure system. The economy, being agro based, suffered productive constraints which also affected downstream industries leading to stagnation in demand for electricity. Hyperinflation followed leading to the demonetization of the Zimbabwean Dollar in 2009. However, the demand supply gap remained with load shedding being the order of the day. The Southern African Power Pool lost excess capacity in 2007 leading to constraints by member countries to get power imports. This created opportunities for development of power projects. However, financial close for major generation projects remained elusive.

Power sector development in Zimbabwe hinges on attracting investment into generation infrastructure. This objective – attracting investment into generation - has been one of the core drivers of reform, yet little progress has been made over two decades. It is crucial to understand the underlying reasons for this failure, so as to advance better reforms and initiatives to advance investment in Zimbabwe's power sector going forward.

It is expected that the survey research will find that reforms did not adequately address the concerns of investors, including shortcomings associated with the regulatory environment of the ESI in Zimbabwe.

The primary research question addressed in this dissertation thus asks:

Have power sector reforms in Zimbabwe influenced investment in the power sector, specifically in generation, since 2002?

Secondary questions include:

(i) Did reforms adequately address the investor requirement for independence of the regulator in licensing, tariff methodology and award?

(ii) How much power was added to the grid since the 2002 reforms were implemented?

(iii) Has the public-sector power producer (ZESCO) managed to increase investment and power output after the reforms were implemented?

(iv) Has private sector investment and power output increased since reforms were implemented?

(v) How does the performance of the off taker (ZESCO) impact investment by IPPs?

(vi) Did any other factors affect the investment climate in the generation sector since 2002?

1.3 Research Objective

The objective of the study is **to investigate whether the reform of the Electricity Supply Industry in Zimbabwe has had any impact on investment in generation since 2002.**

The objective will be achieved through:

- Establishing whether the reforms implemented in 2002 have been able to adequately address investor requirements for independence of the regulator in licensing, tariff methodology and tariff award.
- Establishing whether the reforms implemented since 2002 have managed to attract significant private sector investment in the power sector
- Establishing if there has been significant increase in power output following the reforms.
- Assessing the impact of operations of the off takers on power sector investment by the IPPs
- Interrogating whether the tariff methodology is favorable to private capital.
- Identifying any other factors affecting the investment climate in the generation power sector since 2002

1.4 Research Hypothesis

The null hypothesis (H_0) is: **The reform of the Electricity Supply Industry in Zimbabwe has positively impacted investment in the power sector since 2002.**

The alternative hypothesis (H_1) is: **The reform of the Electricity Supply Industry in Zimbabwe has not had a significant impact on investment in the power sector since 2002.**

The alternative hypothesis is the research hypothesis (Keller, 2011)

1.5 Research Design

Survey research will be used for the study. Questionnaires and interviews will be used to gather primary data. These two methods are used to enhance the response rate and clarity of questions during data gathering. The questionnaire will be administered among Independent Power Producers (IPPs) who are sampled according to categories set by the regulator in assessing their progress in setting up power plants. A questionnaire will also be administered to the public power producer, Zimbabwe Power Company (ZPC). In addition, interviews will be done on the same IPPs and ZPC, as well as banks that support infrastructure development in Zimbabwe. The off-taker, ZETDC, Ministry of Energy and Power Development (MoEPD) and the ZERA will also be interviewed. The questions posed are designed to investigate the impact of reforms on investment since 2002.

1.6 Research constraints

The economic environment has been deteriorating over the years. Performance of the ESI may then be difficult to attribute to the reform of the sector without regard to the wider environment. This may then compromise the conclusions derived from this study. An effort will be made during the survey for the respondents to isolate the impact of reforms on investment from the impact of the deteriorating economic environment.

1.7 Research biases

The researcher has extensive experience in the ESI and has been in the sector throughout the time of the reforms. There is a possibility of biased interpretation of results as a result. A mixed method approach will be employed to analyze both the qualitative and quantitative data concurrently to mitigate the impact of the possible biases.

1.8 Justification of the study

The development of the power sector in Zimbabwe will be achieved if the licensed generation projects were to be implemented. Ever since the reforms of 2002, there has been growth in electricity access while the development of generation capacity remained stagnant. This has led to increasing load shedding due to a widening electricity demand and supply gap. Investment in generation has been one of the core drivers of reform, yet little progress has been made over two decades. It is key to get a deeper understanding of the reasons behind this stagnation so as to better inform the further reforms that are necessary to improve the investment climate in the ESI in Zimbabwe.

1.9 Structure of the study

The rest of the dissertation report will be structured as follows:

Chapter two provides a review of the relevant literature.

Chapter three details the methodology used to carry out the study. It also discusses the methodological concepts that guide the study, like research design, sample size, data collection and data presentation.

In chapter four, the research findings are presented and analyzed.

In chapter five, conclusions are drawn and discussed and recommendations for future research are made.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction:

In order to understand the path, pace and progression of power sector reforms in Zimbabwe, it is crucial to consider the broader trend of market-based power sector reform that emerged in the 1980s and then spread across developed and developing countries alike throughout the 1990s. These reforms were a response, in part, to the need for strategies to de-risking the environment surrounding the investment in power projects (ref). This chapter thus begins with an overview of the power sector investment theories as the basis to understand the criteria used by investors as they decide to invest. This is then followed by an analysis of what has become known as the 'standard model', a set of market-based reforms that have informed reform processes across developing countries. By the end of the 1990s, 70 developing countries had begun the process of reforming their power sectors in line with the standard model (Besant-Jones, 2006). However, in the two decades since, reforms across these countries have not unfolded as expected (Nepal, Jamasb & Timilsina, 2015). This has led to a period of reappraisal among the development finance institutions who initially drove market-based reforms and the countries that initiated them. A review of this literature is presented in subsequent sections of this chapter.

The Zimbabwean power sector and reform experience is then explored, with special attention to the generation segment of the ESI. With reference to the above review, the challenges of attracting investment and the relation between reforms and investment in Zimbabwe are considered.

In the final section, I advance principal-agent theory as being of value in understanding the relationship between government, the power utilities, IPPs and electricity customers. In particular, the issue of information asymmetry and incentives are identified us useful in considering the challenges of attracting private investment in generation.

2.2 Power Sector Investment theory

Goetzmann (1996) describes investment theory as the body of knowledge that guides investment decision making. Power sector projects have several attributes which make investment decisions very unique in the way they are derived. Chief among them is the fact

that they are illiquid. This means that these projects are not easy to sell should the investor want to dispose of the assets and they cannot be easily converted into a different use without incurring significant costs. The development of the projects in normally through project finance structure which in itself is complicated because of the intricate interrelationship of different stakeholders through extensive contractual arrangements. They have long gestation periods such that it takes a long time before they start generating cash flow. These projects are also generally susceptible to political interference as governments take electricity supply to citizens as an indication of development (Ehlers, 2014)

2.2.1 Factors affecting Power Sector Investment

There is diverse literature on factors that impede investment in a particular economy. These barriers could be one or more of political, economic, social, technological and legal factors. World Bank (2013) explains that political and economic stability, governance, legal and regulatory environment, macroeconomic stability and strength of financial markets are particularly important in power project investment decision making. Allen & Overy (2009) discovered, in their research, that 90% of investors worry more about the conduciveness of the regulatory environment and rule of law in their choice of investment destinations. World Bank (2013) further observed that it is imperative to have a conducive political and regulatory environment for successful implementation of infrastructure projects given their sophisticated contractual arrangement and long gestation periods. It can therefore be deduced that the reform of the electricity sector is one of the important de-risking measures which are key to improve the attractiveness of the sector to investors. This research is endeavoring to assess the impact of the legal and regulatory reform of 2002 on the delivery of generation projects in Zimbabwe.

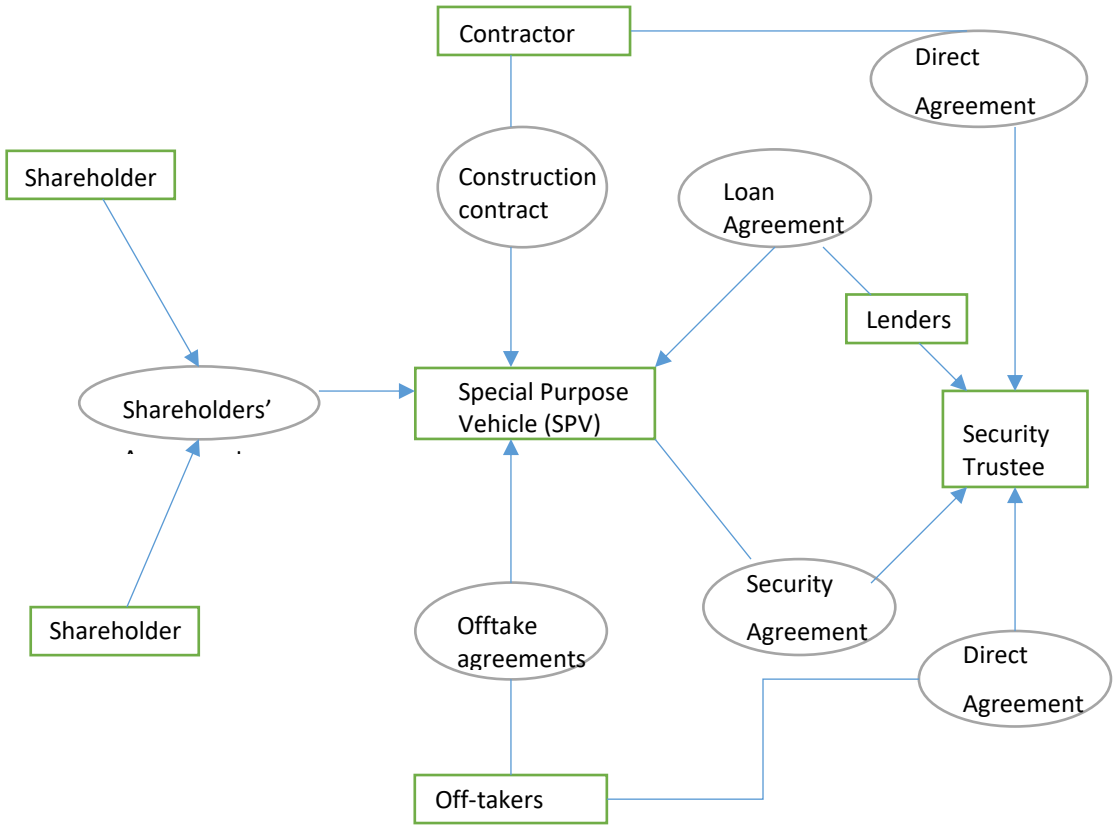
2.2.2 Project Finance

Project finance is increasingly being used by financial institutions to finance large infrastructure projects in developing countries with high risk profiles (Hainz & Kleimeier, 2012). There are several merits to this development, chief among them being the use of SPV, the non-recourse nature of the funding structure and the intricate contractual nature of the arrangements. These merits allow funding to be raised outside the sponsors' balance sheet (Denton Wilde Sapte, 2004) and on the merit of the project and its capability to create enough cash flows to repay the loan and giving a reasonable return. It then follows that sponsors are able to develop projects that are beyond their individual capacities both in terms of financing capacity and risk mitigation.

The traditional way of implementing projects by developing country governments has been corporate finance borrowing. In this financing structure, the assets of the electricity utility or government would be used to secure the borrowing. This brought limitations because of small balance sheets compared to the project being developed as well as high risk profiles of developing countries occasioned by poor governance and weak economic performance. This makes project finance a viable alternative that would see large projects being successfully developed for the betterment of the performance of weak economies.

Below is a typical project finance structure.

Fig 2.1 Typical Project Finance structure.



Source: Denton Wilde Sapte (2004): A Guide to Project Finance

Project finance is relevant to Zimbabwe in the context of a broke government with great need for infrastructure projects like energy projects. It makes it possible to develop projects on their merits with project cash flows repaying debt.

2.3 Components of ESI and market models

The ESI comprises different components which contribute different functions to the industry. The way these components are organized (under one company or different companies) and owned (private or public) determine the model under which the electricity market is being operated. The responsibility for investment will then be informed by the ownership (private or public) of the assets. Governments have increasingly wanted to have private sector participation in the electricity industry to augment dwindling national budgets which have to take care of other public infrastructure development requirements.

Renner and Van Hertem (2014) define electric power system as a system that 'generates electric energy and transports it from the generating units to the loads in a reliable and economic manner'. This definition means that the electric power system consists of generation, transmission, system operations, distribution and retail of power (Lambert, 2001). The different roles of the components of the electric power system are relayed below.

Generation

This component is responsible for the production of electricity. This production is done through different technologies, including thermal, hydro, solar, biomass, wind, etc. These technologies have different cost structures in the production of a unit of electricity (Hunt, 2002). This has implications on the procurement process of power, as the technology to be used for electricity production has to be specific. If the procurement is competitive, then different technologies have to compete on their own. A quota system then has to be in place to determine how much of what technology the grid should take. A country would have an Integrated Resource Plan (IRP) which stipulates the quotas according to the availability of resources in the country, and access to the relevant technologies to produce the energy. Other parameters specific to the particular technology have to be considered for the competitive bidding.

Transmission

This is the network of transmission lines and substations meant for the transportation of electricity which would have been generated at different sites in the country (Hunt, 2002). The transportation has to be at high voltage so as to reduce technical losses which are caused by the flow of high electric currents. The high voltages result in less current flow, thereby limiting technical losses.

System Operations

This component is mandated with the matching of demand and supply of electricity on a real time basis. One attribute of electricity as a commodity is that it cannot be stored once produced. It also does not follow specific routes from the generation point to the consumer. It has to be consumed at the time of production. There is therefore a need to ascertain the demand on a continuous basis, and to match it with generation. This function is called dispatch. System operations use the transmission network to transfer power from generation sources to consumers connected on the distribution network on a real time basis (Hunt, 2002)

Distribution

The main function of this component is to transport electricity from transmission to consumers (Hunt, 2002). The overall electricity transfer system comprises the transmission and distribution components of the ESI, albeit at different voltages.

Retail

This concentrates on the commercial functions like metering, billing and revenue collection (Hunt, 2002).

2.3.1 Power market models

Market models explain the interrelationships of the different components of the industry. The common models according to Hunt (2002) are: (i) Vertically integrated, (ii) Single buyer, (iii) Open access and (iv)Retail competition. There is no correct or wrong model, as this is determined by the stage of development of the electricity market as well as government policy (Murray,1998).

Vertically integrated ESI structure

This is where all the components of the ESI are in the ownership of the state (Murray, 1998). 'From the beginning of electrification up to the 1980s vertically integrated monopoly utilities were managing the electric supply' in most countries (Renner and Van Hertem, 2014:1179). This structure has served the industry for over a century (Hunt, 2002) but there is no competition, which can lead to inefficiencies and over-investment (Murray, 1998). It can, nevertheless, be argued that this structure brings efficiency in planning, as all functions are in one entity and there is closer coordination of planning activities.

Single buyer

This is where generation is weaned off the vertically integrated utility and there is competition among many generation companies. The remaining, still integrated monopoly, is the only entity permitted to buy power from the competing generators (Hunt, 2002). In some cases, the single buyer is barred from owning its own generating power stations to avoid cases of conflict, where there will be a tendency to dispatch more of their own plants (Murray, 1998). This has been an important factor in the ESI reforms in Zimbabwe.

Open access

The power generation market in this instance is open to the distribution companies, as well as large electricity consumers (Hunt, 2002). The small customers continue to be supplied by the distribution companies. According to Hunt (2002), this difference in structure encourages improvement in market efficiency through increased number of buyers. It is important that the access to the transmission network is non-discriminatory to avoid 'higher than competitive prices and other abuses' (Lambert, 2001:5). The transmission network owner should still not own generation plants.

Retail competition

Also known as retail-access or customer-access, this structure allows the customers to have a choice of their supplier of electricity, leading to even more competition (Hunt, 2002). There is more demand for competitive pricing of electricity from a wider array of consumers who have direct access to power generators. Craig and Savage (2013) define this as retail choice where consumers have a choice of who should supply them with electricity. The trading arrangements for meter reading and bill settlements are more sophisticated for this structure (Hunt, 2002).

With the development of the market, the power market model tends to evolve from vertically integrated structure to retail competition through reforms that are supported by legislation. Murray (1998) explains that developing countries may need more government control in the ESI, as investments would normally need government guarantees. The ESI model then tends to be more integrated. The most liberal model of retail competition is more prevalent in developed countries like United States, United Kingdom, New Zealand and Australia (Hunt 2002).

2.3.2 The origins of ESI reforms

Market based power sector reforms were first initiated in England, Wales, Norway and Chile in the 1980s. These countries had already attained excess power capacity and were grappling

with economic inefficiency and increasing calls for tariff reduction (Jamasb, Nepal and Timilsina, 2015). The strategy was to introduce competition in the generation of electricity and attain private sector-type efficiency in the power sector. Reforms in these countries entailed 'deregulation'. This meant that prices would be set by markets rather than regulators, the expected outcome of which was lower, competitive prices (Gratwick and Eberhard, 2008).

The reform models which were initially designed could not deliver desired results from the word go. Adjustments, and in some cases complete redesigns, were done to ensure attainment of objectives as originally envisaged (Gratwick and Eberhard, 2008).

However, with inadequate power capacity in the developing world, as well as poor financial management and technical skills, the challenges were different. Reforms in the third world were mainly driven by the need to improve the financial and technical performance of utilities, increasing electricity access and attracting investment (Jamasb et al, 2015). The World Bank (2006) estimated technical losses in the third world to be around 20%, compared to 9% in the developed world. The poor performance was the result of years of non-cost-reflective tariffs, which made recapitalization and network expansion difficult. Developing country ESI reforms were meant to address the shortage of capital to further develop the sector (Byrne and Mun, 2003). According to Williams and Ghanadan (2006:821), 'success depended largely on attracting capital from outside the country, of which governments only had limited control'. Therefore, one of the success factors of reforms in these countries would be an increase in tariffs (Gratwick and Eberhard, 2008), which would then attract investment through assurance of a reasonable return. However, this tariff increase had the risk of reducing the growth of electricity access, especially for the rural poor, as private capital pursues high-end market in urban areas (Byrne and Mun, 2003). This is opposed to the reduction of tariffs, which was sought by the early reforms of the developed world (Gratwick and Eberhard, 2008)

The table below summarizes the drivers of electricity sector reforms, including the external factors which assisted in influencing the outcomes.

Table 2.1 Drivers of electricity sector reforms

Electricity sector drivers	External driver

Developed countries Excess capacity, use of costly generation technologies, economic inefficiency, growing consumer demands for cheap energy. ***Developing countries*** Lack of public sector financial resources to meet growing demand, institutional inefficiency, burden of energy subsidies, low service quality, high energy losses, poor service coverage, capacity shortage and energy sector investment constraints.	a) *Political and economic ideology:* faith on the forces of market, competition and privatization. b) *Technological innovation:* such as the development of CCGTs c) *Macroeconomic events:* such as the post-Soviet economic transition (1989), Latin American debt crisis (1980s), Asian financial crises (1997-1998) d) *Capital raising options:* privatization of state owned assets e) *OECD energy deregulation:* creation of new energy multinationals looking for new investment opportunities. f) *Lending policies of donors:* such as those of the World Bank and IMF with strings attached. g) *National economic reform context:* as a result of economic crisis and structural adjustment programs

Source: Jamasb, Nepal and Timilsina (2015)

There are different views on how the reform process should be sequenced. The literature of reforms suggests that the process should sequentially start with the establishment of a sound regulatory framework, then unbundle public sector utility, followed by organizing of the markets and lastly privatizing. However, Millan (2005) proposes that privatization should start with the distribution segment, and further argues that the textbook prescription of the reform process is good for creating a market-driven sector, which is attractive to private investors. Only Chile is known to have managed to follow the textbook sequence, and is an example of things going right in the reform process (Millan, 2005). However, Chile may have been helped by the autocratic rule of the 1980s to push a determined reform agenda without question from stakeholders (Millan, 2005).

2.3.3 The standard ESI reform process

The broad steps of the 'standard model' of reform are outlined by Gratwick and Eberhard (2008) as follows: corporatization, commercialization, regulation, restructuring and privatization. Corporatization involves transformation of the public utility into a private limited company, registered under the same legislation which registers private companies. This would pave the way for the corporate to have a separate governance system from parent ministry, as well as manage its own budget. This step takes the sector away from direct management by

government, thereby reducing the impact of political interference on operations of the sector. Commercialization would address the need for cost recovery and efficiency in operations, including metering, billing and revenue collection cycles (Eberhard et al, 2016). This improves the viability of the sector, giving assurance to industry players that they will be able to get a return on their investment if their cost structure is efficient. Privatization would start with allowing private players to participate in the sector through IPPs, with an independent regulator ensuring fairness in the industry and protection of electricity consumers.

The reforms, which initially were haphazard, slowly converged into a 'standard model' (Gratwick and Eberhard, 2008). World Bank (1993) acknowledged that country specific situations would require that variations to the standard model be considered for changing circumstances of the specific country. In 2003, The World Bank's position was that there is no standard model for ESI reforms but a coterie of options in varying sequential orders, depending on the country's development strategy and environment (World Bank, 2003). Besant-Jones (2006) has similar views with the World Bank (2003) when he says that the conditions prevailing at the beginning of reforms determine the design of reforms. Those large to medium income economies can achieve remarkable results with ambitious reforms, but the same ambitious reforms may prove disastrous for low income countries (Besant-Johns, 2006).

The table below summarizes the impact of starting conditions on success of reforms.

Table 2.2 Types of power market reforms with different starting conditions.

	Small low-income countries	**Large middle-income countries**

Country starting conditions		
Power system size	Very small	Small to large
Access to electricity	Low	High
Investment climate	Too poor to rate	Low to medium
Institutional capacity	Very weak	Low to good
Government rating	Poor	Poor to good
Initial reform characteristics		
Market structure	Limited vertical unbundling. Single buyer with some simple bilateral trading for wholesale power	Substantial vertical and horizontal unbundling. Bilateral trading or a central exchange for wholesale power
Regulation	Semi-autonomous regulatory agency mainly responsible for oversight of concessions.	Autonomous regulatory agency with power to issue licences and approve retail tariffs and trading arrangements.
Role of private sector	Mainly independent power producers (IPPs); concessions in distribution under public-private partnerships	Privatized generators and IPPs. Privately owned and financed distributors under long-term licenses
Role of public sector	Continued ownership of most power supply facilities. Primary responsibility for financing sector development.	State owned in sensitive generation sectors (hydro, nuclear), transmission and non-viable distribution service areas.
Role of competition	Limited to bidding for long term agreements by IPPs and by private operation for distribution concessions.	Competitive bidding for wholesale power contracts under bilateral trading or bidding into a power exchange.

Source: Besant-Jones, J.E. (2006)

It can then be deduced that proper analysis of where the country is in terms of the tabulated factors has a bearing on the success of the reform prescription.

2.4 Factors affecting investment in the power sector

Investment decisions are affected by many factors. Gratwick and Eberhard (2008) single out clear policy framework, regulatory oversight and power sector planning linkage to procurement process as important determinants of attractiveness of power sector to investment. The World Bank (2003) opines that the private sector's successful investing in ESI depends on the host country's political will and commitment to advancing the sector's reforms. IPPs have been applauded for quick to market projects which have resolved supply bottlenecks, as well as

augmenting public sector investing capacity (World Bank, 2003). Eberhard, Gratwick, Morela and Antmann (2016) also emphasize that the price and reliability of power produced by IPPs are relevant outcomes of a reform process. Any reform of the ESI is thus expected to have an impact on tariff and reliability of electricity supply, which should be used to evaluate whether the reform has been successful or not.

Rao (2003) observed that Foreign Direct Investment (FDI) is subject to global equilibrium of demand and supply of investment capital as a country may have good investment policies but may still lag behind in receiving investment because of relative attractiveness of competing countries. He also argues that existing infrastructure and credibility of institutions to implement contracts have a role to play in attracting FDI. Imperfect credit markets, that typically characterize developing countries, lead to higher transaction costs and further tilt the equilibrium of capital flow against developing countries (Rao, 2003).

Eberhard et al. (2016) summarize the factors which affect investment in the power sector in Sub-Saharan Africa as tabulated below.

Table 2.3 Factors Contributing to Successful Independent Power Project Investments, Sub-Saharan Africa

Factor	**Details**
Country Level	
Stable country context	-Stable macroeconomic policies. -Legal system allows contracts to be enforced, laws to be upheld, and arbitration. -Good repayment record and investment-grade rating. -Previous experience with private investment.
Clear policy framework	-Framework enshrined in legislation. -Framework that clearly specifies market structure and roles and terms for private and public-sector investments (generally for a single-buyer model, since wholesale competition is not yet seen in the African context). -Reform-minded "champions" to lead and implement framework with a long-term view.
Transparent, consistent, and fair regulation	-Transparent and predictable licensing and tariff framework. -Cost-reflective tariffs. -Competitive procurement of new generation capacity required by regulator.
Coherent power sector planning	-Power planning roles and functions clarified and allocated. -Planning function skilled, resourced, and empowered.

	-Fair allocation of new build opportunities between utility and IPPs. -Built-in contingencies to avoid emergency power plants or blackouts.
Competitive bidding practices	-Planning linked to timely initiation of competitive tenders/auctions. -Competitive procurement process adequately resourced and fair and transparent.
Project level	
Favorable equity partners	-Local capital/partner contribution where possible. -Risk appetite for project. -Experience with developing country project risk. -Involvement of a DFI partner (and/or host country government). -Reasonable, fair ROE. -Development-minded firms.
Favorable debt arrangements	-Competitive financing. -Local capital/markets that mitigate foreign exchange risk. -Risk premium demanded by financiers, or capped by off-taker, matches country/project risk. -Some flexibility in terms and conditions (possible refinancing).
Creditworthy off-taker	-Adequate managerial capacity. -Efficient operational practices. -Low technical losses. -Commercially sound metering, billing, and collections. -Sound customer service.
Secure and adequate revenue stream	-Robust PPA (stipulates capacity and payment as well as dispatch, fuel metering, interconnection, insurance, force majeure, transfer, termination, change-of-law provisions, refinancing arrangements, dispute resolution, and so on). -Security arrangements where necessary (escrow accounts, letters of credit, standby debt facilities, hedging and other derivative instruments, committed public budget and/or taxes/levies, targeted subsidies and output-based aid, hard currency contracts, indexation in contracts).
Credit enhancements and other risk management and mitigation measures	-Sovereign guarantees. -Political risk insurance (PRI). -Partial risk guarantees (PRGs). -International arbitration.
Positive technical performance	-Efficient technical performance high (including availability). -Sponsors who anticipate potential conflicts (especially related to O&M and budgeting) and mitigate them.
Strategic management and relationship building	-Sponsors who work to create a good image in the country through political relationships, development funds, effective communications, and

	strategic management of their contracts, particularly in the face of exogenous shocks and other stresses.

Source: Eberhard, A., Gratwick, K.,Morella, E., and Antmann, P. (2016)

ESI reforms have been associated with improvement in the attractiveness of the industry to private capital (Jamasb et al, 2015). However, Eberhard et al. (2016) argue that there is no correlation between reforms and investment in IPPs, despite the fact that literature proposes this to be a necessary condition (Jamasb et al, 2015).

2.5 The Zimbabwe ESI market and regulatory structure since 2002

In 2002, the Electricity Act [Chapter 13:19] of Zimbabwe provided for the establishment of the Zimbabwe Electricity Regulatory Commission (ZERC), as well as the generation, transmission and distribution companies which would fall under a company that would hold shares on behalf of government (Zimbabwe, 2002). Any other companies could be established in the electricity supply industry at the discretion of the minister and fall under the same holding company (Zimbabwe, 2002). The Electricity Act was implemented in 2003, resulting in the formation of six companies, namely:

(i) Zimbabwe Power Company (Pvt) Ltd (ZPC) responsible for power generation.
(ii) Zimbabwe Electricity Transmission Company (Pvt) Ltd (ZETCO) responsible for electricity transmission.
(iii) Zimbabwe Electricity Distribution Company (Pvt) Ltd (ZEDC) responsible for electricity distribution.
(iv) Zesa Enterprises (Pvt) Ltd responsible for transformer manufacturing and other non-core activities
(v) Powertel Communications (Pvt) Ltd responsible for Information Communication Technologies for the group.
(vi) Zesa Holdings (Pvt) Ltd responsible for holding government shares in the five companies.

ZETCO and ZEDC were later amalgamated in 2010 (ZETDC, 2010) following the promulgation of Electricity Amendment Act of 2007 (Zimbabwe, 2007). This was in an effort to reduce staff costs at executive level, as the benefit of the reform was getting elusive. The argument was that these were similar businesses in the value chain and that there was no need for separate companies. This is, however, against Milan (2005), who suggests that distribution should actually be privatized first to create confidence in the investment markets. According

to Milan (2005), it means distribution should remain separate in readiness for privatization either through sale of equity in the public entity or introduction of private competitors.

In 2011, the government, in an effort to reduce cost on regulatory bodies in the energy sector, realized that there was need to regulate electricity and petroleum under the same regulator. The Zimbabwe Energy Regulatory Authority (ZERA) Act was promulgated as a result (Zimbabwe, 2011). It took over the regulatory functions of electricity and petroleum. This, however, has implications on diluting the focus that is required to regulate the ESI.

The primary instruments for regulation of the ESI are the Electricity Act: Chapter 13:19 and the Zimbabwe Energy Regulatory Authority Act: Chapter 13:23. These legislations mandate the regulator to develop guidelines and codes that should be used to guide licensees in their operations. The Electricity Licensing Guidelines and Regulations were developed as a result. The tariff code was also developed to illustrate the tariff application parameters for licensees. The Transmission Code and Distribution Code give operational guidelines and reporting requirements for Transmission licensees and Distribution licensees.

The regulation instruments are meant to ensure credibility, transparency and independence of the regulator. An independent regulator is critical in balancing the needs of all stakeholders in the licensing, conflict resolution and tariff awards (AfDB, 2015). Zimbabwe (2011) emphasizes that ‘Subject to this Act, the Authority shall not, in the lawful exercise of its functions under this Act, be subject to the direction or control of any person or authority.’ This clause in the ZERA Act assures licensees of the independence of the regulator, and therefore is meant to improve investment attractiveness. The instruments are not only important in the regulatory function that they play, they also give credence to the attractiveness of the sector to investment.

The government's realization that 'private sector will be the engine of economic growth and recovery in Zimbabwe' led to the necessity of 'promoting competition, efficiency and investment in the energy sector' (Ministry of Energy and Power Development (MoEPD), 2012). This was attempted through the National Energy Policy of 2012, which was approved as a program to improve the efficiency of the ESI and attract private capital through IPPs and tariffs that are cost-reflective and transparent (MoEPD, 2012).

Xxx paragraph saying – I now turn to describe offtake arrangements, power sector planning etc. which have a bearing on sector performance and its attractiveness to investors (or something like it).

2.5.1 Off-taker arrangements

The regulator authorizes the primary transmission licensee to purchase power for bulk resale to other licensees while licensing the generation licensee to sell power ‘to any transmission, distribution or supply licensee who purchases electricity for resale and, with the approval of the Commission, to any one or more consumers’ (Zimbabwe, 2002). This means that power producers can sell directly to distribution licensees or even consumers by paying for the use of the transmission system. This is in line with AfDB (2015), which explains that the off-taker flexibility is necessary for the power producers to have a way to sell the power they produce should the PPA be terminated for any reason.

The Government of Zimbabwe (2002) also requires the primary transmission licensee to "purchase power in an open, transparent and competitive manner". This suggests the need for competitive tendering for IPPs based on tariff, technology and other factors. However, this process has not been done yet in the procurement of electricity supply. Power deficit has been worsening over the years, with load shedding increasing in 2010 ‘by 142% to 2,659.783GWh up from 1,097.244GWh shed in 2009’ (ZETDC, 2010:13). This was in the background of introduction of a multi-currency regime in 2009, which led to the stabilization of prices, ending the drawn-out period of hyper-inflation (ZETDC (2009:7). This indication of deterioration in the load shedding indicates the availability of a ready market for electricity, which would have been a factor to attract investment, especially when there is a strong currency as a revenue currency. There are other factors, however, about the off-taker that may affect investment attractiveness. The debtors’ book grew from USD 4,611,360 (Four million six hundred and eleven thousand three hundred and sixty united states dollars) (ZETDC, 2009) in 2009 to USD 1,069,246,607 (One billion and sixty million two hundred and forty-six thousand six hundred and seven United States dollars) (ZETDC, 2015) in 2015. This is an indication of poor revenue collection by the off-taker. This presents a risk that the off-takers may not be able to pay for energy supplied by the power producer if they are not able to collect revenue. Other securitization arrangements like escrow accounts and letters of credit are then required to improve the creditworthiness of the off-taker.

2.5.2 Power sector planning

ZETDC is mandated to undertake least cost system development planning for the expansion of the national generation and grid capacity to meet electricity demand growth (ZETDC, 2010;

Zimbabwe, 2002). This process involves proper demand forecasting, which allows matching with prospective power producer for demand and supply balancing. Competitive procurement is then the best way of ensuring best pricing for power production, by way of exposing power producers to bidding. The planning process should also allow for the lead time inherent in the procurement process, so that demand and supply are properly matched over time (AfDB, 2015). ZETDC has a 20-year system development plan which is developed through forecasting the demand by consolidating future electricity requirements for different customer categories. This forecasted demand is used to schedule prospective power projects on a least cost priority basis. However, AfDB (2015) also emphasizes that this bidding process is not effective under circumstances of power shortage, which invariably necessitates government to expedite the procurement process by going for unsolicited bids. In this case, the projects are implemented based on the ability for the developer to reach financial close and implementing the project without regard of the competitiveness of the cost.

2.5.3 Licensing framework

The Government of Zimbabwe (2011) mandates ZERA to license all players in the Zimbabwe ESI with capacity of more than 100kVA. The generation licensee "may supply electricity to any transmission, distribution and retail/supply licensee who purchases electricity for resale" (ZERA, 2012). The prospective generation licensees should meet a number of requirements before being issued with a license. These include power purchase agreement (PPA), interconnection agreement, land use permit, environmental and social impact assessment, among others (ZERA, 2012).

The PPA is an agreement between the power producer and the off-taker. It defines obligations of the parties and also serves as an assurance for the regulator that there is a market for the power to be produced by the IPP. The PPA would also indicate the load factor (how many hours per day the power station will be producing power), and this will assist in the assessment of the tariff requirement that would adequately meet fixed and variable costs and give a fair return to the investor. Power projects are naturally long lifetime investments (Eberhard et al, 2016). Investors would also want long term PPAs that would guarantee the market for the power produced for the life of the project.

The interconnection agreement is the outcome of grid impact studies, which is an assessment of the effect of connecting the IPP to the grid. The incoming project should not derogate the grid such that it will adversely affect other users already connected to the grid. If there is any

derogation, then the investors in the IPP should also fund projects meant to mitigate the impact of their connection.

The licensee should prove ownership of the land on which the project is going to be developed. Clear ownership rights give comfort to financiers in ensuring certainty in the ability 'to exercise step-in rights and take over the company and its assets in the event of loan defaults' (AfDB, 2015). This then aids to attractiveness of the project to finance.

All licensees are to comply with conditions of the license. However, in practice the IPP gets a letter of support from the off-taker as an indication that there is scope in the market for the IPP to be able to supply. The IPP is given an interim license which they use to fulfil all the other conditions like apply for grid impact studies, secure land, etc. The PPA will be negotiated during the course of fulfilling other conditions and is approved by the regulator as the last condition before construction can start.

2.5.4 Regulatory Codes

The National Energy Policy was approved by government in 2012 with an objective to set the framework which would support implementation of the new ESI structure (ZERA, 2013b). The framework has three broad categories of supporting the structure, namely Acts of Parliament, government policy and instruments issued by ZERA (ZERA, 2013b). Amongst the instruments issued by ZERA are the grid code, the distribution code and the tariff code.

Grid code

ZERA developed the Grid Code with the objective of setting a framework of accountabilities for the ESI players to have open access to the transmission grid (ZERA, 2013b). These are achieved through the setting up of minimum technical standards for those wanting to connect to the national transmission system, as well as those providing the service. The System Operator's obligations as well as those of other players are properly defined so as to maintain efficiency and safety in the operation of the national transmission system (ZERA, 2013b). ZERA supervises the adherence of all licensees through regular reports on performance, as well as accidents that may happen on the network from time to time. A schedule of penalties is also provided to guide those that would have failed to meet requirements, to encourage them to perform (ZERA, 2013b). The details of the code are delivered in the form of other sub codes: governance code, grid connection code, performance standards code, network planning code, scheduling and dispatch code, system operation code, metering code, transmission tariff code and information exchange code (ZERA, 2013b).

Distribution code

The distribution code was developed by the regulator in consultation with all stakeholders for the primary purpose to 'ensure efficient coordinated development, operation and maintenance of the electricity Distribution System' (ZERA, 2013c). This is achieved through the setting of minimum standards for operations, technical requirements and safety and customer handling procedures. Any deviation from the minimum requirements is subject to penalty after investigation by the regulator (ZERA, 2013c).

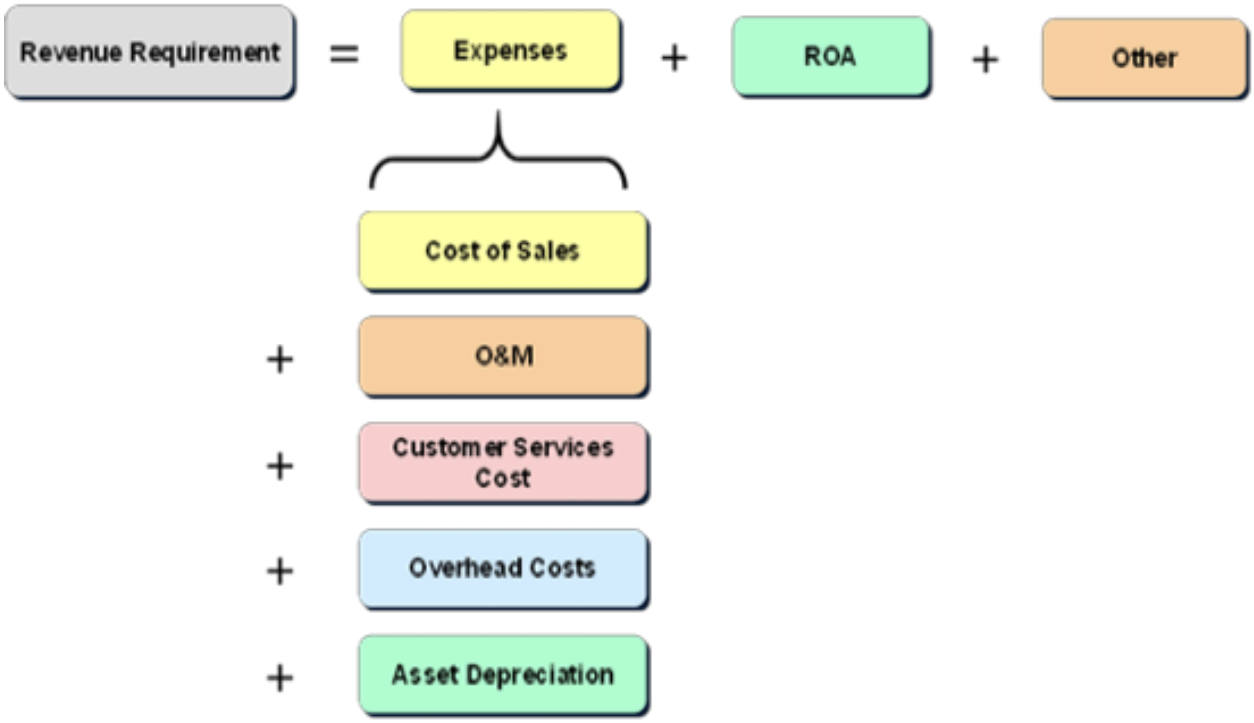
Tariff Code

The tariff code details the methodology used to arrive at the tariff, which is used in the industry by power producers and retailers. It was designed to meet one of the basic functions of ZERA which Zimbabwe (2011) says is 'to ensure that the prices charged by licensees are fair to consumers in light of the need for fair prices to be sufficient to allow licensees to finance their activities and obtain reasonable earnings for their efficient operation'. It means consumers have to meet the full cost of the electricity they receive (ZERA, 2011). The tariff methodology therefore guides that the revenue to be earned by a licensee should be the sum of the costs of supplying electricity, a reasonable return and any other expenses as may be allowed by the regulator (ZERA, 2011). The United States of America's Federal Energy Regulatory Commission (FERC), which oversees interstate electricity trade and the Public Utilities Commission (PUC), which is responsible for intrastate electricity regulation, both have the same tariff structure which considers production cost plus a fair return (Craig and Savage, 2013). The costs as claimed by the licensee should be incurred in a transparent manner which should involve competitive bidding for procurement of any services (ZERA, 2011). Technical and non-technical loss reduction becomes key to ensure efficiency in the cost build-up of the tariff (AfDB, 2015).

AfDB (2015) also stresses that while cost reflective tariff is important to ensure financial viability of both the power producer and the off-taker, financial solvency has also got to be enhanced through robust metering, billing and revenue collection strategies to ensure sustainability of the ESI.

ZERA uses a Revenue Requirement methodology to set the tariff as detailed in figure 2.2 below.

Figure 2.2: Revenue Requirement methodology



Source: ZERA (2013)

It is very clear that the revenue requirement methodology, if implemented to the letter, would not fail to deliver a cost reflective tariff. However, political considerations have always led to turn down of properly justified applications for tariff increase. Some customer categories have always complained that the tariff is too high citing tariff in other regional countries. Tariffs are driven by the generation technologies and the respective production cost of each technology. This means that requests for tariff review should be looked at with the generation mix of Zimbabwe in mind and the respective cost of generation.

2.5.5 Investment in the generation sector

The private sector has only been issued with generation licenses. Government of Zimbabwe (2002) provides or three categories of licenses, namely;

(i) Generation license
(ii) Transmission and bulk supply license
(iii) Distribution and retail license

In excess of twenty IPPs have been licensed since 2002. Only a few of these with small capacity - not exceeding 20MW - have been commissioned (ZERA, 2014), but the big ones that would have changed the power supply landscape are struggling to get fully developed. This implies

that the growth in the supply of electricity is lagging behind the projections of the regulator. The reasons for this development are the subject of this study.

ZERA (2014) categorizes the issued licensees according to the stage of project development into five, namely: (i) Concept/Prefeasibility stage

(ii) Feasibility/Proof of bankability

(iii) Funding

(iv) Construction

(v) Operational

Investors initially came up with proposals for large projects with the hope of resolving power deficit problem once and for all. However, the securing of funding increasingly became elusive. Smaller projects started getting funding and were being commissioned. This led to an increase in the number of small IPP projects which got commissioned. These are then summarized as tabulated below;

Table 2.4 Licensed generation projects as at 31 December 2014

Stage of development	**Licensed projects**	**Total Capacity (MW)**

Stage 1 – Concept/Pre-feasibility stage (Completion of all activities to define project for full feasibility)	i. Sengwa Power station ii. Essar Hwange Power Plant iii. Essar Captive Power (Kwekwe) iv. Geobase Gwanda Solar v. Great Zimbabwe Hydro vi. Manako Power	2,117.5
Stage 2 – Feasibility/Proof of bankability (Completion of all activities to prove project bankability including EPC contract and PPA approval)	i. Lusulu ii. Southern Energy iii. Gairezi iv. Kupinga Renewable Energy	2,661.6
Stage 3 – Funding (Completion of all activities leading to financial close and fulfilment of conditions president)	i. China Africa Sunlight Energy Gwayi Power Station ii. Hwange Expansion Project	1,200
Stage 4 – Construction (Completion of all activities to project commissioning)	i. Kariba Extension Project ii. Pungwe B	315.25
Stage 5 – Operational (Commercial Operation)	i. Border Timbers ii. Duru iii. Nyamingura iv. Pungwe A v. Hippo Valley Estates vi. Triangle Estates vii. Green Fuel	101.75
	State owned power stations i. Kariba Hydro Power Station ii. Hwange Thermal Power Station iii. Munyati Thermal Power Station iv. Harare Thermal Power Station v. Bulawayo Thermal Power Station	1,936
Total Capacity		**8,332.1**

Source: ZERA 2014 Annual Report

There was later a realization that it is difficult for large capital-intensive projects to be developed by public sector or private sector operating independently. In 2015, the Joint Venture Act [Chapter 22:22] was promulgated (Zimbabwe, 2015) to guide project development, with the public sector partnering the private sector. The effect of this regulation is yet to be felt.

2.6 Principal - Agent problem in the Zimbabwe ESI

The principal agent theory explains the lack of alignment between the interests of the principal and those of the agent where the principal risks incurring losses in the process (Schnader, Bedard and Cannon, 2015). The agents will have private information which they use to make private decisions, which decisions may be detrimental to the principal. The agent is therefore not motivated to discharge his duties to the best of his ability. The principal normally has to give incentives to motivate the agent to deliver their duties diligently.

The players in the Zimbabwe ESI are the government, ZERA, ZETDC, ZPC, IPPs and customers. These players have different interests and the relationships can be explained by the principal-agent theory. Each one has interests that may not be consistent with the interests of others, and this impedes proper implementation of legislations.

The government has an obligation to protect the customer from being overcharged by power producers who are IPPs and ZPC. Prior to the reforms of 2002, the government (the principal) was the approving authority of ZESA (the agent) tariff applications. At the same time ZESA was the licensing authority for any power producer above 100kVA. In an effort to protect the consumer, government would delay approval of ZESA consumer tariff and in some cases not approve at all. ZESA, being the regulator for IPPs would not grant high tariff to IPPs as this would be detrimental to their cost structure. IPPs also would see the off-taker's role of regulating the market as a risk and would then hold back investment. This principal-agent problem between the government and ZESA lead to the need to institute reforms to deregulate the market culminating in reforms of 2002.

Through the reforms of 2002, ZERA was appointed to regulate the industry using the ZERA Act and instruments like the tariff code and licensing of industry players. It was envisaged that an independent regulator would review and approve both the consumer and producer tariff. With the cost-plus tariff methodology, power producers want to load as much of costs into the tariff formula to increase their profit. This is done through efforts to justify cost on the basis of country risk perception, cost of capital, etc. ZERA is mandated to analyze and benchmark the costs when reviewing the tariff applications by all licensees for approval, to ensure that the costs are efficiently incurred (Zimbabwe, 2002). In this particular case, the government is the principal through ZERA. IPPs, as the agents, have the interests of making money ahead of providing adequate electricity. ZERA has to design the correct incentives in order to motivate IPPs to develop their projects.

The government is also the principal in its relationship with ZPC and ZETDC. ZERA is again representing government in regulating the operations of licensees in their discharge of service. In this case ZETDC is mandated to deliver electricity and get paid for the service provided. ZETDC applies for a cost reflective tariff which will ensure continuous provision of quality service. The government in turn protects some consumers from being disconnected even if they don't pay for the service. Tariff increase applications are also turned down so as to protect the consumers from high costs, but it is against the requirements of the investors who would want to be assured that the service they give after investing will be paid for at the right price.

This principal-agent problem breeds a situation where reforms are properly crafted but investments do not materialize, because the parties in the industry do not practice what is in the reform agenda.

Asymmetric Information has also had a role in the outcome of ESI reforms. Rao (2003) define asymmetric information as 'lack of equivalence of information contents between parties to a common issue that affects each other's interests'. This can also be occasioned by 'unequal capacities among the parties to a common issue to process a given set of information', (Rao, 2003). It has been argued that the cost of electricity has a direct bearing on the cost of products on the market and this has a direct impact on export competitiveness and therefore economic performance. Industrial and mining consumers have always lobbied the government of lower tariff for this reason and this has often been listened to by government. The result has been non-cost reflective tariff. The has always argued that the electricity utility should manage cost so as to avert the requirement to increase tariff. The intention by government has mainly been misunderstood by the electricity utility who accuse the government of working through the regulator to block tariff increases. This has compromised the perception of independence of the regulator.

While the government realizes the need for private sector participation in the ESI, it has not been doing the right things to attract investments i.e. move towards cost reflective tariff and give the regulator unfettered independence. The principal-agent problem and the asymmetrical information clearly apply as definition of the non-response of investors to fund licensed IPP projects.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Research Design & Methodology

The research seeks to establish the impact of the reforms of 2002 on investment in the generation sector of the ESI in Zimbabwe. The impact will be measured by the number of licenses issued after the reforms, and investments embarked on after the reforms, as well as the improvement in the amount of power supply out of those investments. The purpose of this chapter is to describe how the study was carried out.

3.2 Research design

Creswell (2003) alludes to three possible research approaches; qualitative, quantitative and mixed methods. Qualitative approach is largely open-ended and the results thereof are difficult to generalize while quantitative approach is close-ended with highly generalizable results. Mixed methods approach is a combination of qualitative and quantitative approaches. Its main advantage is its ability to strike a balance in generalizability between the qualitative and quantitative approaches (Creswell, 2003).

Within the mixed methods approach, Creswell (2003) further clarifies that there are three designs that can be used for data collection; convergent parallel, explanatory sequential and exploratory sequential. Convergent parallel is where the quantitative and qualitative data are collected simultaneously and integrated for analysis. In explanatory sequential and exploratory sequential, either quantitative or qualitative data is collected and analyzed first and the other data collected to build on the findings of the earlier method (Creswell, 2003). The convergent parallel design was chosen for this study.

Survey research methodology was used to collect qualitative and quantitative primary data, which were then used to answer the questions. Stratified sampling was done by considering the ZERA (2014) tabulated progress report on IPP development as the sampling frame and then picking the first two IPPs from each category. A questionnaire was administered among ten power producers according to the categories of project development, as illustrated by ZERA (2014). Two representatives from two power producers in the same category were chosen. The two power producers and two respondents were meant to balance the views of respondents in the same category and in the same power producer. The respondents were in the project development and finance departments of the power producer, as they were the ones closest to the dynamics of the reform and investment.

The power producers sampled are as tabulated below:

Table 3.1: Sample of respondents

Category	Number	Power Producer	Proprietor
Concept/Prefeasibility Study	1	Sengwa	RioZim
	2	Essar	Essar Holdings
Feasibility/Proof of bankability	3	PER Lusulu	Pan African Energy Resources (Pvt) Ltd
	4	Southern Energy	Southern Energy
Funding	5	China Africa Sunlight Energy Company (CASECO)	CASECO
	6	Hwange 7&8	Zimbabwe Power Company
Construction	7	Kariba 7&8	Zimbabwe Power Company
	8	Pungwe B	Nyangani Renewable Energy (NRE)
Operational	9	Border Timbers	Border Timbers
	10	Duru	Nyangani Renewable Energy

According to the sampling procedure, two proprietors own power projects in two different categories. It would follow that there would be duplication of administration of questionnaires and interviews on the same respondents. The respondents were then reduced from ten power producers to eight.

Structured interviews were also conducted with one employee from each of the IPPs sampled for questionnaire administration. This was done to balance the views elicited from the questionnaire with those from the interviews. One employee was also interviewed from each of the following banks; Infrastructure Development Bank of Zimbabwe (IDBZ), Africa Development Bank (AfDB), World Bank and Stanbic Bank Zimbabwe. Interviews allow for clarification of questions and have a higher response rate (Sherblom, Sullivan and Sherblom, 1993). The banks were chosen on the basis of their clear mandate on infrastructure investment in Zimbabwe and their active role in pursuing this mandate. Senior people in the infrastructure

divisions of the banks were targeted. These were representing the views of financiers of the investment in ESI. Interviews were conducted with one executive employee from ZERA, the regulator and one executive employee from ZETDC, the off-taker and one executive employee from the Ministry of Energy and Power Development (MoEPD) to gather their respective views.

The introductory section of the questionnaire and the interview questions, which introduced the researcher, the purpose of the study and assured their anonymity, helped to improve the response rate (Plump and Spyridakis, 1992).

Wimmer and Dominick (1991) assert that response rate reduces drastically when the questionnaire takes longer than 20 minutes to complete, and that respondent fatigue for interview survey begins to affect responses when an interview lasts longer than an hour. The questionnaire was designed to be brief and to the point so that it would not take time for the respondent to answer the questions. Interview questions were also brief and straightforward, to avoid the need for clarifications. Pilot testing, as explained below, also helped in identifying areas which needed simplification and review, and the necessary changes were made.

3.3 Sampling and sample size

Sampling is the creation of a subset of a population under study when the study cannot be carried out on the entire population. The study is then carried out on the sample and the results generalized on the population. Certainty is therefore abandoned in favour of generalization through the inference process (Bless and Higson-Smith, 1995:86)

The population for the study consists of all licensees of ZERA, as well as the local and foreign banking institutions operating in Zimbabwe. The regulator, the off-taker and the Ministry of Energy and Power Development are also part of the population.

The table below summarizes the sample and the sample size.

Table 3.2: Sample size of respondents

Item	Respondent	No. for questionnaire	No. for interview	Total

1	RioZim	2	1	3
2	Essar Holdings	2	1	3
3	PER Lusulu	2	1	3
4	Southern Energy	2	1	3
5	CASECo	2	1	3
6	NRE	2	1	3
7	Border Timbers	2	1	3
8	ZPC	2	1	3
9	IDBZ		1	1
10	AfDB		1	1
11	World Bank		1	1
12	Stanbic		1	1
13	ZERA		1	1
14	ZETDC		1	1
15	MoEPD		1	1
16	Grand Total (Sample size)	16	15	31

3.4 Pilot testing

It is critical to have a data gathering instrument that can be effectively used to collect the required data. A pilot study helps to assess the relevance and clarity of questions leading to useful revision of the survey (Sherblom et al, 1993).

A pilot test was done for both the interview questions and the questionnaire for purposes of clarifying the questions on all points that could be unclear to the respondents. This was done by administering the questionnaire and the interview questions to respondents from two organizations that would not participate in the study but were part of the population from which the sample was drawn. Recording of any points that needed clarification before embarking on a full-scale data collection was done, and the adjustments implemented. Pilot testing was also used to gauge the amount of time required to complete the questionnaire or the interview, so that the respondents could be advised correctly on how much time it would take to go through the questionnaire responses or the interview.

3.5 Data collection

The questionnaire design used a five-point Likert scale to capture respondents' views. Five-point was chosen because it is viewed by most social research scientists as the most optimal (Van der Ejik & Rose, 2015).

Options of administering the questionnaire through email, telephone or face-to-face depend on the time and financial budget of the research. The sampled respondents were telephoned to arrange for ethical clearance, form-signing, interviews and the questionnaires.

The Managing Director of the sampled organizations were targeted for interviews. The interviews were all done at the offices of the respondents. Questionnaires delivered at the same time and Finance Directors were requested to be one of the respondents for questionnaires and any other senior employee of the Managing Director's choice who was conversant with investments in IPPs. The respondents were not supposed to discuss the questionnaire so as to reduce the bias and internal invalidity that would result from two questionnaires given to one organization ending up reflecting the same view. One interview was targeted per day so as to allow for transcription of the gathered data on the same day while memory of the researcher is still fresh to improve on accuracy. The majority of questionnaire were collected on the same data as they were filled in while the interview was going on. The informed consent forms were also delivered to respondents and signed on the same day.

3.6 Data analysis

According to Sherblom et al (1993), "the most straightforward method of analysis is the descriptive reporting of the frequencies and percentage of responses in each response category of each question". The data from questionnaires was tabulated and also presented on graphs. An analysis of the graphs was then done to extract the trends of the views of the respondents according to the thematic areas. The thematic areas were taken from literature and used to craft the question.

The interview data was analyzed using NVivo qualitative data analysis guidelines in the following steps:

1. Tabulating the questions in the same wording that they were asked.
2. Summarize the responses using codes that capture the words carrying the main meaning of the response.

3. Reviewing the trend in the responses to the questions. The interview questions were crafted according to themes that were derived from literature such that the questions formed the themes of the interviews.
4. Analysis of the themes across the tabulated codes to discern the impact of the reform to investment especially in generation.

The NVivo software was not used as the volume of data is small and can be handled manually.

CHAPTER 4

RESEARCH FINDINGS AND ANALYSIS

4.1 Introduction

In this chapter, the research findings and an analysis of the same are presented in three sections. In the first, significant themes and perspectives which emerged through the interviews are discussed. This then provides a backdrop against which the questionnaire survey results are interrogated. In the following section, an analysis of these results is advanced, with reference to the theoretical literature. In the third and final section, an exploration of the outcomes of this study is undertaken with reference to the research questions and objectives outlined in Chapter 1.

4.2 Research Results

4.2.1 Interviews

Interviews were carried out on 6 IPPs, the publicly owned generation company ZPC, the off taker ZETDC, the regulator ZERA, banks Stanbic, IDBZ and AfDB and the parent ministry MoEPD. The interviews questions were crafted to address identified ESI reform themes and expected outcomes. The responses recorded during data gathering were coded for data analysis following the NVivo qualitative data analysis guidelines. The detailed responses are attached as appendix 1 and the coded responses are attached as appendix 3.

These themes are:

(i) Independence of the regulator, tariff negotiation and tariff methodology
(ii) PPA negotiation process and securitization requirements.
(iii) Financiers' views on the reform

The expected outcomes of the reform which are also tracked in the interviews are:

(i) Whether there is improvement in capital investment and the MW output of the ESI both from IPPs and ZPC
(ii) The impact of off-taker operations on investments by IPPs including revenue collection.

IPPs and ZPC generally view the regulator as independent while banks and ZETDC expressed reservations. It was surprising that amidst all other stakeholders giving the regulator some semblance of independence, the regulator feels they are not independent. MoEPD acknowledged that the regulator cannot be so independent as government will have to give policy direction so as to exercise their mandate of protecting the consumers. The tariff methodology was acceptable though the tariff negotiation takes longer than expected.

PPA negotiation was found to be fair though it takes time. Escrow accounts and government guarantees were the main securitization instruments demanded by financiers.

Financiers were not consistent in their view of the reforms. They however agreed that deepening the reforms would improve attractiveness of the ESI. The current form of the reforms was meant to be transitional while the economic environment improved.

During the interview with the regulator, some data was offered to give detail to responses to some questions. The table below details the data.

Table 4.1: Licenses issued by ZERA

	LICENSEE	TECHNOLOGY	CAPACITY	ESTIMATED
	A. OPERATIONAL		MW	
1	Border Timbers*	Biomass- wood	0.5	
2	Duru	mini-hydro	2.2	2,969,604
3	Green Fuel	Bagasse	18.3	
4	Nyamingura	Mini-hydro	1.1	6,769,053
5	Pungwe A	Mini hydro	2.75	4,474,576
6	Hippo Valley Estates	bagasse (co-gen)	33	
7	Triangle Estates	bagasse (co-gen)	45	36,814,167
8	Pungwe B Power Station	mini-hydro	15.25	26,588,488
9	Pungwe C Power Station Pvt Ltd	mini-hydro	3.72	7,000,000
	SUB-TOTAL		**121.82**	
	B. NOT YET OPERATIONAL			
1	Sengwa Power Station (RioZim)	Thermal (Coal-	2400	4,400,000,000
2	PER Lusulu (Pan African Energy	Thermal (Coal-	2000	4,000,000,000
3	Southern Energy	Thermal (Coal-	600	1,100,000,000
4	China Africa Sunlight Energy	Thermal (Coal-	600	2,323,000,000
5	Great Zimbabwe Hydro Power (Pvt) Ltd	Mini-hydro	5	6,700,000
6	Zimbabwe Power Company Gairezi	Mini-hydro	30	128,012,352
7	Manako Power (Pvt) Ltd	Mini-hydro	2.5	13,000,000

8	Kupinga Renewable Energy	Mini-hydro	1.6	4,434,500
9	Kariba Hydro Power (Pvt) Ltd	Hydro	300	483,000,000
1	GeoBase Klean Energy Africa	Solar	250	240,000,000
1	Hwange Power Station Stage III	Thermal (Coal-	600	1,153,792,052
1	Yellow Africa	Solar PV	50	109,950,000
1	H.T.Gen	Mini-hydro	3.3	6,048,016
1	Plum Solar	Solar PV	5	6,723,000
1	Immaculate Technologies	mini hydro	1.7	2,962,000
1	Shilands Enterprises	gas fired	345	405,604,134
1	De Green Rhino Energy	solar PV	50	100,000,000
1	Lueven Investments	Solar PV	10	20,000,000
1	Hauna Power Station Private Limited	mini hydro	2.3	7,301,835
2	Sinogy Power	Solar PV	175	489,760,000
2	Centragrid Private Limited	Solar PV	25	50,334,049
2	Utopia Power Company Private Limited	Solar PV	15	25,100,000
2	SolGas (Private) Limited	Solar PV	5	8,423,750
2	Richaw Solar Tech Private Limited	Solar PV	5	10,018,000
	SUB TOTAL		**7481.4**	
	GRAND TOTAL		**7603.22**	
	C.CANCELLED LICENCES			
1	Essar Africa Holdings (Pvt) Ltd **	Thermal(Coal-	600	
2	Essar (Captive power)**	Thermal(Coal-	60	
3	Rusitu Power Corporation***	mini hydro	0.75	
		TOTAL	**660.75**	

Number of licensed projects = 33

Number of state owned licensed projects = 3 (highlighted in grey)

Number of operational IPPs = 9

Number of IPPs still to be developed = 21

*Border Timbers not operating due to lack of spare parts

**Essar's licence was cancelled in 2015

***Rusitu Power Plant has not been operating since 2008, and its license has been cancelled.

Source: Provided by ZERA during interviews

The estimated costs for Border Timbers, Green fuel and Hippo Valley could not be verified during the period of the study so these were not submitted. From the interviews, Border Timbers uses power for own consumption so would not need a tariff. This could be the reason the regulator was not worried about the development costs.

Hippo Valley Estates is a sugar plantation company. The company owns Hippo Valley power station, which produces power only seasonally during the milling season. The power station has a power banking arrangement with the off-taker where they supply the off-taker during the sugar milling season when they generate and then withdraw the energy banked with the off-taker during off-milling season. The off-taker charges 20% which is paid in energy. This means

that Hippo Valley does not have to prove investment costs to the regulator hence the figures were not provided.

Green fuel is sugar cane producers like Hippo Valley. They have capacity to produce excess of their requirements. They would want to sell excess to the off-taker. Their costs have not been agreed with the regulator though they have been licensed and have commissioned their power station.

Only 121.82 MW have been commissioned out of the 8000 MW licensed. The commissioned plants are also the small ones which would not have much impact on improving the power supply. The big ones remain struggling to reach financial closure.

IPPs view poor revenue collection by the off-taker as a great risk as it affects the off-taker's ability to pay for delivered power.

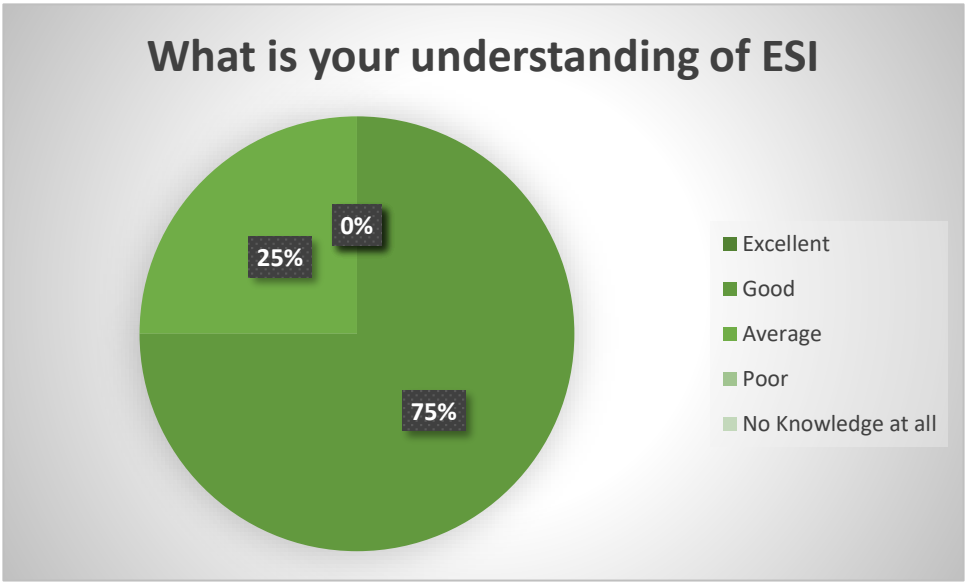
4.2.2 Questionnaires

The analysis of responses was done on the questions on the questionnaire and the analysis is tabulated and graphed below. Detailed analysis of these results is contained in section 4.3. The questionnaire is attached as appendix 4.

Table 4.2: What is your understanding of the electricity sector with regard to the reforms, electricity pricing and system development issues?

	Excellent	*Good*	*Average*	*Poor*	*No Knowledge*
Respondent 1			x		
Respondent 2		x			
Respondent 3		x			
Respondent 4		x			
Respondent 5		x			
Respondent 6		x			
Respondent 7		x			
Respondent 8		x			
Respondent 9			x		

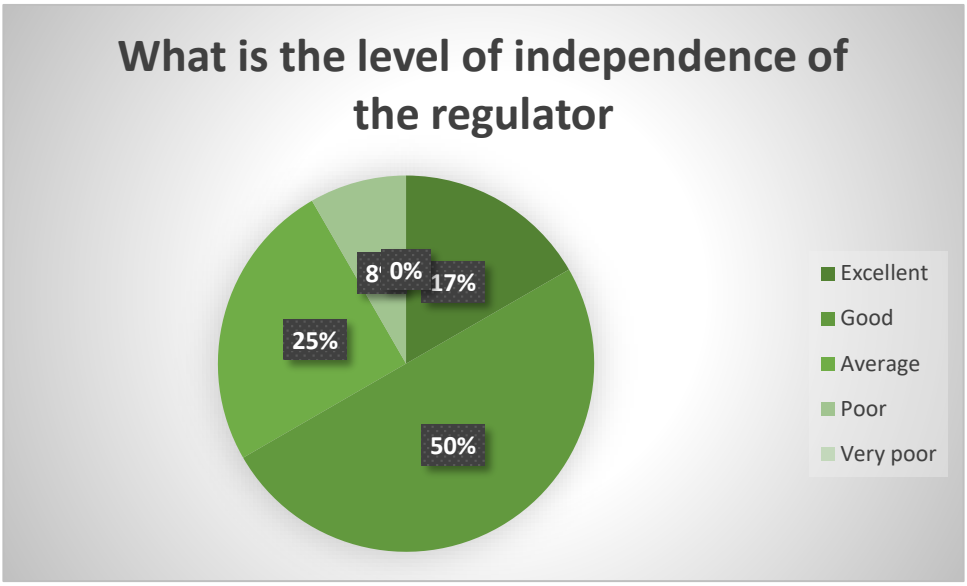
Respondent 10			x		
Respondent 11		x			
Respondent 12		x			



The response to the question on the understanding of the ESI of the respondents indicates the majority have good understanding at 75%. 25% had average understanding. The result gives the researcher confidence that the responses are a reflection of how industry players view ESI reforms. The results can therefore be trusted as views of respondents who understand the subject matter.

Table 4.3: How do you rate the level of independence of the regulator?

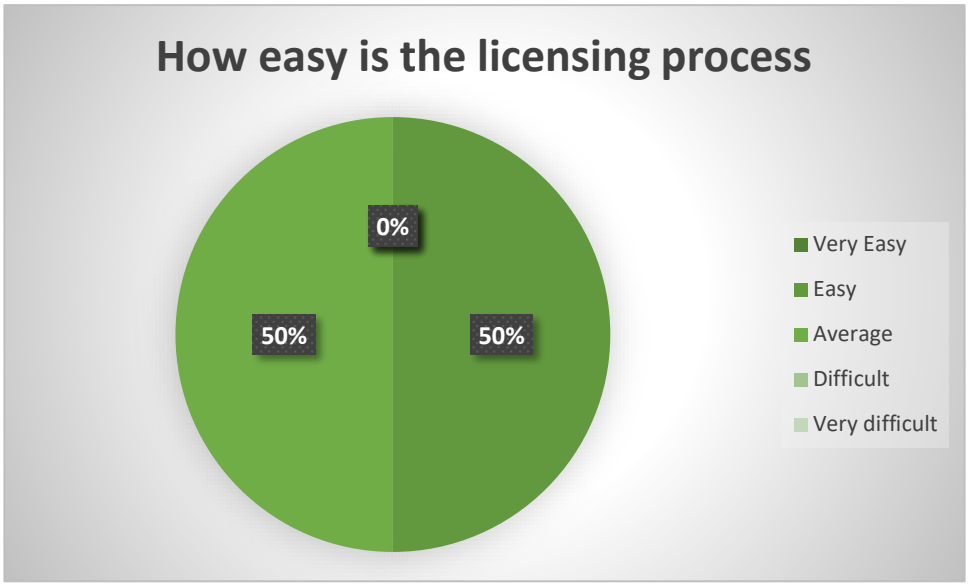
	Excellent	***Good***	***Average***	***Poor***	***Very poor***
Respondent 1		x			
Respondent 2		x			
Respondent 3				x	
Respondent 4			x		
Respondent 5		x			
Respondent 6		x			
Respondent 7			x		
Respondent 8			x		
Respondent 9	x				
Respondent 10	x				
Respondent 11		x			
Respondent 12		x			



17% of the respondents think that the independence of the regulator is excellent while half of the respondents think the regulator's independence is good. 25% think the independence is average and 8% think its poor. There is no respondent who thought the independence is very poor. The responses give a view that the regulator is fairly independent. It shows that the regulator, in the view of industry players, has been able to carry out their duty as expected. This aspect is one of the key pillars of the framework requirements for investor confidence and analysis of the same will indicate how this has impacted on the investment in ESI in Zimbabwe.

Table 4.4: How easy is it to go through the licensing process?

	Very easy	*Easy*	*Average*	*Difficult*	*Very difficult*
Respondent 1			x		
Respondent 2			x		
Respondent 3		x			
Respondent 4		x			
Respondent 5			x		
Respondent 6			x		
Respondent 7			x		
Respondent 8			x		
Respondent 9		x			
Respondent 10		x			
Respondent 11		x			
Respondent 12		x			



50% of respondents think that the ease of IPP licensing is easy while 50% think it's on average. This indicates that the process is acceptable to investors and there are no impediments to investing in the sector emanating from the licensing process.

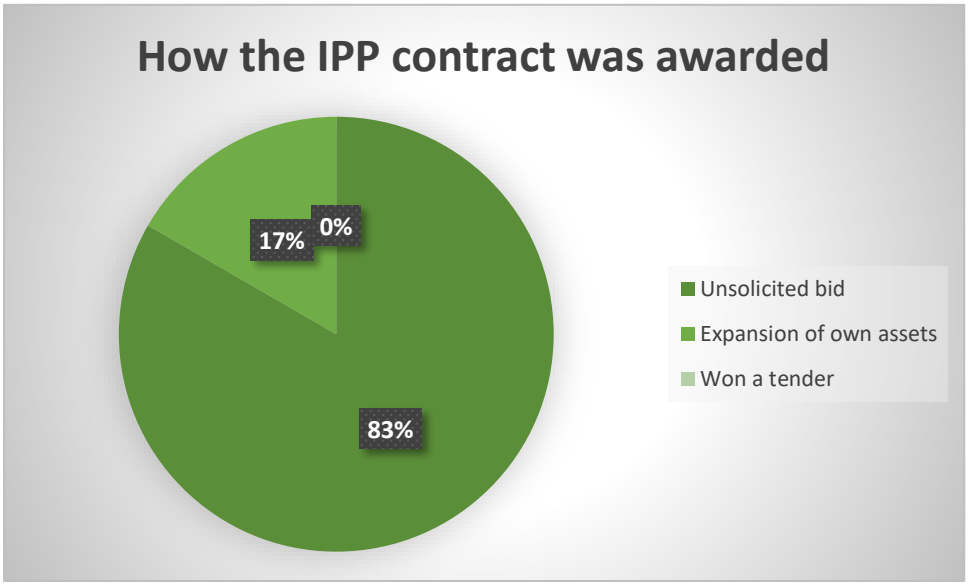
Table 4.5: How easy is it to go through the power purchase agreement negotiation process?

	Very easy	*Easy*	*Average*	*Difficult*	*No Knowledge at all*
Respondent 1			x		
Respondent 2			x		
Respondent 3			x		
Respondent 4			x		
Respondent 5			x		
Respondent 6			x		
Respondent 7			x		
Respondent 8			x		
Respondent 9					x
Respondent 10					x
Respondent 11			x		
Respondent 12			x		

83% of the respondents think that the ease of going through the tariff negotiation process is average. This indicates that the process does not quite support the IPPs. However, 17% have no knowledge of how the PPA negotiations are done. These were the respondents from the IPPs for own consumption. They do not have to go through PPA negotiation process.

Table 4.6: How was the IPP awarded contract to develop power plant?

	Unsolicited bid	*Expansion of own assets*	*Won a tender*
Respondent 1	x		
Respondent 2	x		
Respondent 3	x		
Respondent 4	x		
Respondent 5	x		
Respondent 6	x		
Respondent 7	x		
Respondent 8	x		
Respondent 9		x	
Respondent 10		x	
Respondent 11	x		
Respondent 12	x		



83% of the respondent IPPs developed their power stations through unsolicited bids while 17% were expanding their owns assets. These are the IPPs which were developed for own consumption. No IPP developed through a tender process. It is symptomatic of a market with deficit and requires quick to market solutions. There is not enough time to interrogate costs in this procurement strategy. This leads to the cost of procurement of the power being inefficient and may lead to high tariff requirement.

The table below summarizes the questionnaire findings

Table 4.7: Summary of Questionnaire findings

	Understanding of ESI	***Regulatory Independence***	***Licensing Processes***	***PPA Negotiation***	***Un/solicited Bid***
Respondent 1	average	good	average	average	unsolicited
Respondent 2	good	good	average	average	unsolicited
Respondent 3	good	poor	easy	average	unsolicited
Respondent 4	good	average	easy	average	unsolicited
Respondent 5	good	good	average	average	unsolicited
Respondent 6	good	good	average	average	unsolicited
Respondent 7	good	average	average	average	unsolicited
Respondent 8	good	average	average	average	unsolicited
Respondent 9	average	excellent	easy	not at all	expansion
Respondent 10	average	excellent	easy	not at all	expansion
Respondent 11	good	good	easy	average	unsolicited
Respondent 12	good	good	easy	average	unsolicited

In the following section, analysis of results is advanced.

4.3 Detailed analysis of research findings

The detailed analysis of the interview and questionnaire findings will be focused on the different aspects of the electricity sector reform that form the themes of the data gathering instruments and then the expected outcomes as outlined in the research questions. These themes have been outlined in the previous section and they will be analyzed in detail below.

Independence of the regulator, tariff negotiation and tariff methodology

From the point of view of IPPs and ZPC in the interviews, the majority believe that the regulator is independent. This view is also shared by respondents in the survey. The banks and the off-taker expressed reservations on the independence in practice though there was acknowledgement that the statutory provisions have enough safeguards. It was striking to note that the regulator itself feels stifled by the legal provisions which require that they consult the Minister on their decisions. Section 4 subsection 4 of the Energy Regulatory Authority Act reads:

'Subject to this Act, the Authority shall not, in the lawful exercise of its functions under this Act, be subject to the direction or control of any person or authority'. Zimbabwe (2011).

This section clearly spells out the independence of the regulator. However, Section 24, subsections 1, 2 and 3 of the same Energy Regulatory Authority Act read:

' (1) The Minister may give the Board such general directions in writing relating to the policy the Authority is to observe in the exercise of its functions as the Minister considers to be necessary in the national interest.

(2) The Board shall take all necessary steps to comply with any direction given to it in terms of subsection (1).

(3) When any direction has been given to the Board in terms of subsection (1), the Board shall ensure that the direction and any views the Board has expressed on it are set out in the Authority's annual report'. Zimbabwe (2011). This section negates the provisions of section 4 without even giving the regulator the option of refusing to take advice from the minister when they believe the advice is against common good, except to express it in the annual report.

This is deemed to be a case of giving independence through the front door and taking it away through the back door. The MoEPD is of the view that the regulator cannot be too independent because government has to give policy direction. This gives credence to the submission by the regulator that they were not independent.

This seems to explain why regulatory processes take longer than expected despite power producers and financiers viewing the regulator as independent. In reality, the regulator is not completely independent in the performance of its duties due to government interference. This interference results in the regulator taking a much longer period of time to make certain decisions in order to balance the expectations of government with those of the other stakeholders, to come to a decision that is fair. It may be said that the regulator is doing a good job under the circumstances.

With regard to the tariff, there was general acceptance of the tariff methodology was acceptable as well as the tariff negotiation process as fair though it takes longer than expected to fully negotiate the PPA.

This is a case where the principal, in this case the government, and the agent, the regulator, are at cross purposes in the principal-agent problem. While the government wants investment in the ESI and demonstrates that by instituting a sector reform agenda, there is obvious realization that a properly structured framework may be against the government need to protect the consumer. This protection is not always for the good of the customer but sometime for political capital. The regulator is trying to ensure the reforms are implemented as fairly as possible so as to improve the investor-friendliness of the ESI. The government loses the investment opportunities by crafting legal framework that has loopholes which look intentional. The agent does not deliver the service that is expected by the principal because the investor realizes that the legal framework is not water-tight enough to protect their investment.

PPA negotiation and securitization requirements

All IPPs in the interviews submitted that the PPA negotiation process is fair though it takes more time than anticipated. In the survey, the rating of the difficulty in concluding the negotiations was rated as average. The tariff component of the PPA is approved by the regulator. Part of the delay in concluding the PPA would then be caused by waiting for the tariff approval for incorporation in the PPA. The same issue of regulator independence would be at play as the regulator would be handling the government consultation process which needs to be done for every PPA

There was unanimous agreement for the need for escrow accounts or/and government guarantees as securitization of the PPA. This clearly indicates concern by investors that there is a high risk that the off-taker may not pay for energy delivered. This is buttressed by the submission that the IPPs view revenue collection as the greatest challenge that the off-taker is

facing, further reflecting the prevalence of the payment risk for energy delivered. The opening of escrow accounts would involve assigning customers with foreign currency revenues to pay their bills in foreign currency into a local Foreign Currency Account (FCA) or an offshore account opened for the purpose of repaying the loan. Enough customers would need to be assigned to cover the periodic loan repayment amount plus some buffer.

As long as the relationships between the regulator, off-taker, and IPPs are influenced by political interests, risks are high. Eberhard et al (2016) indicate that commercially sound metering, billing and revenue collection, over and above transparent, consistent and fair regulation would reduce the risk profile of a country. In a situation where the government can influence the collection capability of the off-taker and the regulator can do nothing about it, the principal agent problem again comes into play. The government's effort to protect non-paying customers for political expedience leads to diminishing capacity for the off-taker to pay for delivered energy thereby increasing the risk on the off-taker. Investors would then demand securitization measures that are punitive to the off-taker and this leads to failure of investment projects.

Financiers' view on the ESI reform.

The view of the financiers was not consistent. While there is a feeling that the ESI would never be allowed by government to go bankrupt and that this is an incentive enough to invest, there is a view that the reforms have not been completed and the structure would be attractive were the next phase be implemented. This phase is when ZESA Holdings is disbanded and all the current subsidiaries report directly to the parent ministry. MoEPD explained that the reform had to be structured in a way where there is a Holding company so that ESI debt can be housed in ZESA Holdings to allow for subsidiaries to have clean balance sheets to enhance access to capital. This was also to allow arms' length trading among subsidiaries while they develop capacity to trade commercially. The move to the next phase has been delayed by the protracted sub-optimal performance of the Zimbabwean economy. Eberhard et al (2016) explain that stable macroeconomic policies characterized by good repayment record, investment-grade rating and rule of law contribute to successful IPP investments.

Improvement in capital investment and MW output

From the information submitted by ZERA on table 4.1, 9 IPPs with installed capacity of 121MW were licensed and operational. Of these, Triangle Estates (45MW) and Hippo Valley Estates (33MW) existed before the reforms. This leaves only 43.82MW having been

commissioned after the reforms. ZETDC submitted that they only dispatch a maximum of 30MW from IPPs during the rainy season as the IPPs are largely mini hydro as submitted by the IPP respondents in appendix 1. This is outside the Triangle and Hippo Valley Estates (78MW) which is mainly for internal consumption.

The fact that PPA securitization requires assignment of exporting customers would limit the amount of foreign currency cash flow available for securitizing IPP PPAs. There will be need for more customers with a solid payment record to support the bigger projects. This would explain why the smaller IPPs have been more successful than the big ones leading to small incremental MW output since the reforms.

Impact of off-taker operations on investments by IPPs

Revenue collection is poor, leading to debt accumulating to beyond US$1billion. When revenue is not collected, it compromises the implementation of critical aspects of the sector like maintenance, and then subsequent outages due to lack of maintenance cause revenue-opportunity costs. The government has been to blame to a large extent, protecting consumers by instructing ZETDC not to discontinue service to defaulters. Access to capital is also affected, as funders require assurance that revenue from investment projects is collected when they consider funding the ESI.

IPPs view the failure to collect revenue as the greatest challenge for the off-taker. It worries IPPs, as it poses a risk that they may not be paid for delivered power. This is aggravated by the below-cost tariff that the off-taker is awarded by the regulator. ZPC is not paid full invoice amounts for the power supplied as they are part of the revenue sharing strategy of ZESA Holdings, where the collected revenue is shared at a predetermined ratio so that the non-collection of revenue does not harm ZETDC alone. The operating IPPs are paid their full invoice for delivered power according to terms of the PPA and securitization arrangements.

There is generally no fear that the ESI structure where the off-taker is a sister company to ZPC, the government power producer under ZESA Holdings, could pose challenges in bias in dispatch. This may be so because there is power shortage in the market and all available power plants are largely dispatched.

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In summary of chapter 4, the research has found out that the reforms did not adequately cover investor requirements for independence of the regulator. There has not been power output improvement in the market after the reforms, neither was there significant investment in the

ESI. The off-taker's inability to collect revenue has further complicated the securitization requirements by the investors to the extent that larger power plants have not been able to reach financial closure. Other socio-economic and political factors may have worsened the investment environment of the Zimbabwe ESI.

CHAPTER 5

RESEARCH CONCLUSIONS AND DISCUSSIONS

5.1 Introduction

This chapter will summarize the whole study from the research objectives, literature review, research methodology and the main findings. Main conclusions will be drawn from the key findings and recommendations for further study done.

5.2 Summary of the study

The objective of the study was:

To investigate whether the reform of the Electricity Supply Industry in Zimbabwe has had an impact on investment in generation since 2002.

The study adopted a mixed-methods approach to addressing the research questions and objectives, using the results of a survey questionnaire and interviews administered among a sample of respondents from the population of IPPs, development banks, ZETDC, ZPC, ZERA and MoEPD. The investigation was convergent parallel as the survey and interview was done simultaneously for each company to ensure respondents did not discuss the questions and result in biased responses.

The key findings were:

(i) The regulator is not fully independent from government, however they are doing a good job to balance the expectations of stakeholders given current institutional relationships between all actors. The government (principal) and the regulator (agent) suffer the principal-agent problem in the sense that the government wants to protect the consumer by blocking regulatory decisions while the regulator wants to exercise fairness and independence which will attract investment into the ESI. The result is working at cross purposes with the result of failing to attract investment into the sector as envisaged by the reforms.

(ii) PPA negotiation processes are viewed to be fair but take more time than anticipated. Some possible reasons for this include consultation with government for concurrence as required by the ZERA Act. This is when the principal-agent problem is being debated and the asymmetric information reconciled.

(iii) Based on the outcomes of the interviews, it appears that escrow accounts and/or government guarantee to securitize PPAs would mitigate against agent risk.

(iv) There has not been significant improvement in power output since the reforms were implemented. IPPs and ZPC have been able to license their generation projects but have failed to reach financial close so as to implement their projects. This has been attributed to the large size of the projects which need large capital outlay and financiers have not been keen to put large capital in one project in a high-risk environment. This has not done well to the development of the ESI.

(v) ZETDC operations, especially revenue collection, are sending negative signals to the market on the credibility of the off-taker. The poor revenue collection is largely driven by government protectionist tendencies where ZETDC is not allowed to switch off certain customer categories, like farmers and mines, for nonpayment. The principal agent problem shows its head where the government as the principal expects to gain political capital by protecting customers and ZETDC as the agent is trying to collect what is due and maintain credibility of the sector. However, the small IPPs that have managed to commission their plants are being paid their full invoice because of sound securitization measures that have been implemented. These measures have been limited to the small IPPs due to the limited number of well paying customers who can be assigned to pay their bills into an escrow account.

5.3 Discussion and Conclusion

In this section, a review and discussion of the reform process and components is presented and conclusions drawn on the impact of these reforms on investment in the sector. Recent or potential interventions which may improve some of the challenges discussed are also relayed. A final conclusion is drawn, before turning to the closure of the hypothesis test and providing suggestions for future research in the final sections of this chapter.

The 2002 ESI reforms were largely driven by the failure of the Zimbabwe government to meet the capital investment requirements of the sector, which were critical to improve the quantity and quality of electricity supply. At the time when reforms were initiated, investors seemed to be crowding to countries with unbundled market structures, largely independent regulation and extensive participation of private sector (Besant-Jones, 2006). Investors had grown wary of government interference in sector entities, especially at operational level, as this increased risk.

Standard model reforms provided a new model, which was geared toward attracting investment by instituting some of the above reforms. Experience has shown, however, that reforms have not been implemented in full for political reasons. In many such cases, information asymmetry arises, as government continues to control information across the sector – using this justify the protections certain customer classes, protecting their own interests. This has certainly been the case in Zimbabwe.

In Zimbabwe, the design and implementation of reforms did not adequately address many of the investor risks. In addition, because reforms have only partially been implemented, in effect two different models are in operation and what Gratwick and Eberhard term a 'hybrid model' exists (2008). This means that principal-agent relationships are highly complex, with many of the institutional rules not being followed. In this final concluding section, the disappointing outcomes of partial reforms on investment in generation, and to increasing generation capacity and output, are discussed.

At the outset of reforms in Zimbabwe, a transitional structure was adopted were a holding company would hold all the shares in the subsidiary companies which would be running the generation, transmission and distribution components of the sector. This transitional structure was meant to facilitate the restructuring of legacy debt, as well as allow the subsidiaries to build capacity to trade commercially. Financial markets accepted this government strategy, and this is evidenced by the number of IPPs which got licensed on the backing of different financial institutions.

The regulatory legislation was also crafted to give the required level of independence to the regulator. It is common that a regulator cannot be totally independent from government due to rules governing the relationship with the appointing authority. However, this poses a principal agent problem, as discussed in the previous chapter. To address this problem, it would likely be more effective if the regulator was to report to a different ministry to that to which other industry actors, especially ZETDC and state generation, report. This would minimize the negative impact of the consultations which the legislation calls for the regulator to do when passing decisions. This has impacted the ability of the country to raise tariffs to cost reflective levels and manage public and private sector relationships, so as to secure investment and improve sector performance.

Revenue collection is the basis of good cash flow for a utility like ZETDC. Good cash flow ensures funding for critical activities like maintenance. If equipment is not maintained,

reliability of the network is compromised, leading to outages which lead to lost revenue opportunities. Diminishing revenue then justifies increased tariff requirements. The tariff may then end up increasing, because of failure to collect revenue. Investors in the sector want an assurance that the power delivered will be paid for. The assurance also comes in the ability of the off-taker to collect revenue for the service rendered. The prepayment system currently being implemented by ZETDC will go a long way in ensuring that revenue is collected. The current customer debt is too high, at above US$1 billion, to assure any investor that revenue will be collected. Poor revenue collection is a risk to investors as the project will not have cash flow to repay the loan.

Despite reforms, legacy debt continues to effect the borrowing capacity of the ESI. Its resolution through possible rescheduling or taking over by government would create borrowing space for the sector to expand and refurbish the network. This could allow for measures that would increase electricity access as well as reliability of the existing network to be implemented. Legacy debt resolution is also in the way of moving to the next step of the reforms. This is because the strategy has been to house the debt in the Holding company and allow subsidiaries access to capital while the economic environment of the country improves.

Many of the factors discussed above have contributed to a situation where only small IPPs have managed to reach financial closure and commission their projects. It shows that financiers have not been keen on putting huge sums of money into a single transaction. This is considered to have more risk, considering the wider economic environment and the size of the Zimbabwean economy itself, which is not big enough to support such projects. Legacy debt issues, as well as revenue collection capability of the off-taker, certainly curtail the appetite of financiers for big projects.

This research also suggests that there has been a failure to link planning to procurement. All the IPPs which are supplying the grid were developed as unsolicited bids. This is done by governments, especially in a situation of power shortage, as it shortens the procurement process. It is, however, inefficient and always results in higher tariff. An auction system is a promising option if the country is to ensure tariffs are contained, but this requires up-to-date planning and robust procurement systems need to be put in place. Experience in other countries has shown that, like regulation, some independence can go a long way to achieving this by reducing information asymmetry between public and private players and managing the different interests of actors.

In conclusion, the 2002 reforms can be considered successful in that they improved the investment attractiveness of the ESI with 33 projects totaling 7,603.22MW being licensed. The impact on generation capacity, however, has been limited with only 121.82MW being commissioned. This leaves the objectives of the reforms largely unfulfilled as power shortage stubbornly persists, with funding for larger projects of greater impact remaining elusive. The government has to address three major issues which are negatively affecting investment in bigger projects. Firstly, retail tariffs are perceived to be below cost. Investors need the ESI to be sustainable for them to commit funds. Cost reflective tariffs are the hallmark of sustainability assessments. There has either got to be cost rationalization of the ESI through reviewing cost drivers like staff costs and industry structure or reviewing the tariff upwards. Secondly, revenue collection challenges by the off-taker have to be effectively addressed. Third, the reforms have to be progressed as planned to address current bottlenecks associated with the revenue sharing model and legacy debt. There is further need for greater regulatory independence to ensure the inconsistencies that are in the current regulations are addressed. This is inhibiting development of bigger projects which require large capital investment.

5.4 Hypothesis Test

The ESI has failed to post significant improvement in power output over the period 2000 to 2016 after the promulgation of the ESI reforms. While the ESI players submitted that the regulator was largely independent, the concerns of the regulator that they were not independent could be demonstrated by illustration from the Regulatory Authority Act. In excess of 8000MW capacity power plants were licensed but less than 200MW were developed and commission over the period. Imports continued to be the means to close the gap between demand and local supply.

It can therefore be concluded that the null hypothesis, that '**The reform of the Electricity Supply Industry in Zimbabwe has positively impacted on investment in the power sector since 2002'** should be rejected in favour of the alternative which is: **The reform of the Electricity Supply Industry in Zimbabwe has not had a significant impact on investment in the power sector since 2002.** Nevertheless, the fact that private sector has shown strong interest in investing – more than 12 IPPs– is positive, and shows that there is potential for the reforms to have an impact by attracting private sector investment. If reforms were implemented as planned and included measures to improve the performance of ZETDC, independence of the regulator, and provide mitigation measures for agent (IPP) risk, it is likely that some of the blockages to harnessing this potential might be reduced.

5.5 Recommendations for future research

From the conclusions drawn from this research, the following recommendations are made for future research:

(i) The legacy debt of the ESI has stifled investment and progress of the reforms. It will be necessary to research into the possible ways of resolving this debt.

(ii) A study be carried out to establish the exact conditions that will be necessary to advance the reforms to the next level. There is no clarity as to what conditions the government would want to proceed to the next step of the reforms, where ZESA Holdings will be collapsed and the generation, transmission and distribution components of the ESI are run as separate entities.

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Appendices

Appendix 1

Interview responses from IPPs

Respondent IPP1

Question	Response
How many power stations do you own?	One
What technologies do you use for power generation?	Thermal
What influenced the idea?	Shortfall of power in the country. Legislation allowed for IPPs. We got our own coal concession so that we won't depend on 3rd parties for coal supply.
How much have you invested so far?	USD12 million
What is your view of the independence of the Regulator?	The regulator cannot take independent decisions, and has to refer all decisions to the parent ministry. The fact that ZPC, ZETDC and Regulator report to the same ministry makes independence of the Regulator unachievable.
How do you view the PPA negotiation process?	PPA negotiations are fair, and cover all IPP concerns. They however take much longer than anticipated.
Tariff negotiation process and tariff methodology	Tariff methodology is acceptable, and the IPP only has to prove efficient costs.
Payment for delivered power	Not yet operational

PPA securitization requirements	There is a need for an escrow account or a government guarantee.
Challenges in the initial stages of the project.	There have been several shareholding changes which greatly affected fundraising activities.
What do you think the challenges of the off-taker are, and how can this be fixed?	Revenue collection has to improve to assure power producers that they will be paid for power delivered. Electrification rate is slow and yet we are developing large power stations in anticipation of load growth. This could be a chicken and egg situation though. ZETDC may then need to facilitate our export to the region
What do you see as the greatest challenges in investing in the Zimbabwean power sector?	Ease of doing business and policy inconsistence.
How do financiers view the reformed structure of the sector in terms of attractiveness?	Financiers can't separate Zesa Holdings, ZETDC and ZPC. As a result, it becomes difficult to align the structure required by financiers and the structure of the Zimbabwe ESI.
What challenges do you think your competitors are facing?	The biggest challenge is funding.
What advice would you give to someone who would want to invest in the sector?	They should invest to cover the internal generation gap of the country.

Respondent IPP2

Question	Response
How many power stations do you own?	One
What technologies do you use for power generation?	Thermal
What influenced the idea?	Shortfall of power in the country and the campaign by government for investment in energy. Legislation allowed for IPPs.
How much have you invested so far?	USD8 million
What is your view of the independence of the Regulator?	The regulator fairly independent
How do you view the PPA negotiation process?	PPA negotiations take too long but are fair in their coverage of essential IPP concerns
Tariff negotiation process and tariff methodology	Tariff methodology is acceptable, and the IPP only has to prove efficient costs.
Payment for delivered power	Not yet operational
PPA securitization requirements	There is a need for an escrow account or a government guarantee.
Challenges in the initial stages of the project.	Securing mining concession and generation license.

What do you think the challenges of the off-taker are, and how can this be fixed?	There is need to have a strong off-taker balance sheet for credibility to offtake from large power plants like PER Lusulu. Revenue collection and demand growth are key.
What do you see as the greatest challenges in investing in the Zimbabwean power sector?	Perceived country risk and the macroeconomic environment
How do financiers view the reformed structure of the sector in terms of attractiveness?	The reform has ring fenced the generation subsector and introduced the regulator. This should improve the attractiveness.
What challenges do you think your competitors are facing?	The biggest challenge is funding.
What advice would you give to someone who would want to invest in the sector?	They should invest to cover the internal generation gap of the country.

Respondent IPP3

Question	Response
How many power stations do you own?	One
What technologies do you use for power generation?	Thermal
What influenced the idea?	We realized there was a shortfall of power in the country. New public utility could not do it alone. Legislation allowed for IPPs. We applied for a coal concession, which we got. ZPC was struggling to get coal from 3rd parties, so our model was to self-provide.
How much have you invested so far?	USD20 million
What is your view of the independence of the Regulator?	The regulator cannot take independent decisions, and has to refer all decisions to the parent ministry. The fact that ZPC, ZETDC and Regulator report to the same ministry makes independence of the Regulator unachievable.
How do you view the PPA negotiation process?	PPA negotiations are fair, and cover all IPP concerns.
Tariff negotiation process and tariff methodology	Tariff methodology is acceptable, and the IPP only has to prove efficient costs.

Payment for delivered power	Not yet operational
PPA securitization requirements	There is a need for an escrow account or a government guarantee.
Challenges in the initial stages of the project.	The model required that the company does coal mining and constructs a dam for water supply. Getting government approval for the coal mining and dam construction was a big challenge.
What do you think the challenges of the off-taker are, and how can this be fixed?	Revenue collection. A lot of interference in collection efforts. A good off-taker on paper, but bad at providing the means to pay for delivered power. People not paying, and ZETDC can't pay the invoices. ZETDC has to facilitate exports instead. There is a lot of transfer pricing, as ZETDC and ZPC are part of the same group of companies.
What do you see as the greatest challenges in investing in the Zimbabwean power sector?	Ease of doing business and policy inconsistence.
How do financiers view the reformed structure of the sector in terms of attractiveness?	Financiers can't separate Zesa Holdings, ZETDC and ZPC. As a result, it becomes difficult to align the structure required by financiers and the structure of the Zimbabwe ESI.

What challenges do you think your competitors are facing?	The biggest challenge is funding.
What advice would you give to someone who would want to invest in the sector?	They should invest to cover the internal generation gap of the country.

Respondent IPP4

Question	Response
How many power stations do you own?	Five
What technologies do you use for power generation?	Mini-hydro
What motivated the investment idea?	It was started in 2005-2007, triggered by investors who were interested in tea estates in Honde Valley in the Eastern Highlands. Electricity supply was poor, and they wanted to construct mini hydro power stations for self-supply. It was later realized that it was good to have a stand-alone company to do power generation and supply excess power to the grid, as the revision of Electricity Act allowed for this. While there were some IPPs before this time, it was made easier by the new Act.
How much have you invested so far?	$40m
How independent is the regulator?	The regulator (ZERC) was ineffective, as the members would just rubberstamp the negotiated position between IPP and off-taker. No independence was therefore exercised.

	All decisions were referred to the minister and cabinet, and the regulator was often embarrassed by being overruled. Investors need certainty on the effectiveness of the regulator. The current regulator, ZERA is fairly independent.
PPA negotiation process.	Off-taker negotiation process of PPA is good, though it takes too long. We should now have a standard PPA. Negotiation should not take more than 2 weeks. PPA term is also in line with loan tenor.
Tariff negotiation process and tariff methodology.	Tariff is effectively negotiated between off-taker and power producer and reviewed and approved by ZERA. Tariff methodology is good, as it ensures cost recovery plus a return. However, cost of capital is too high and beyond view of the market so that it ends up with a high tariff requirement. Loan tenor is also short.
Payment for delivered power	Invoices are being paid on time due to a good payment mechanism which is in place. All power stations are linked to the mechanism and there are no complaints on payments. Without it, there would be a problem. It also means the off-taker follows the clauses of the contract. The biggest worry is the ability of the off-taker to pay, given the perennial loss-making position.
PPA securitization requirements	We have escrow arrangements with the offtaker
Challenges in the initial stages of the project	Load shedding posed challenges for embedded generators in the initial years. Lack of a direct communication link with the control centre and the general unreliability of the distribution network meant that the distribution loads that are fed by the embedded generators would be lost without notice. A lot of blind faith was needed to go into further

	investments. Hyper-inflation was also such that no one would come in at the time, as there was no knowledge of what the tariff would be, though the tariff methodology was good. The off-taker was also supportive of IPPs.
What do you think are the challenges of the off-taker and how can this be fixed?	The economic environment is depressed and capital flow looks beyond the sector itself. There is limited knowledge of the reality on the ground to take advantage of the good reform structure ahead of the macroeconomic environment. Consumers are not paying for service and the off-taker becomes constrained for cash flow. All those who owe should be on prepaid system and should pay their debt.
What do you see as the greatest challenges in investing in the Zimbabwean power sector?	Understanding the local terrain and reconciling reality with perception. The perception of risk from the perspective of international financial institutions is worse than reality.
How do financiers view the reformed structure of the sector in terms of attractiveness?	Reforms were to encourage IPP investment. The reforms are properly structured to achieve this, though it is a work in progress. It hasn't achieved the results sought, and it failed because of the perception of the country.
What challenges do you think your competitors are facing?	The biggest challenge they face is access to capital.

What advice would you give to someone who would want to invest in the sector?	I would simply tell them to come and invest, as there are good opportunities, given our experience.

Respondent IPP5

Question	Response
How many power stations do you own?	One power station with 2x330MW generators
What technologies do you use for power generation?	Thermal
What influenced the idea?	The idea was triggered by the shortage of electricity in the various countries within the Southern African Power Pool (SAPP)
How much have you invested so far?	Roughly $6 million in development costs
How do you rate the Independence of Regulator?	There isn't any doubt about the Regulator's independence. However, this entity is under heavy strain due to funding constraints.
How do you rate the PPA negotiation process?	The process has been time consuming, probably because IPPs are still a

	relatively new concept, particularly in baseload scenarios, within Africa.
Tariff negotiation process and tariff methodology	Negotiation process also takes time but the tariff methodology is good.
Are Payments for delivered power done on time?	Power is still to be delivered to the ZETDC
What are your PPA securitization requirements?	The primary requirement is for bankability. The PPA terms and conditions, as well as the counterparties must be acceptable to lenders and investors. The closer to the revenue source the better.
What were the challenges in the initial stages of the project?	Our biggest challenges are still the finalization of the PPA.
What do you think the challenges of the off-taker are, and how can this be fixed?	The biggest challenge is the availability of capital and a solid balance sheet, as well as the efficient collection of revenues. This can be fixed by the total installation of pre-paid electricity meters to all customers, and sound balance sheet management.
What do you see as the greatest challenges in investing in the Zimbabwean power sector?	Payment risk and slow economic growth.

How do financiers view the reformed structure of the sector in terms of attractiveness?	The sector holds much promise, but external investors perceive the local laws to be unpredictable.
What challenges do you think your competitors are facing?	Access to capital given the perceived country risk
What advice would you give to someone who would want to invest in the sector?	It is the time to invest as the future looks bright

Respondent IPP6

Question	Response
How many power stations do you own?	1
What technologies do you use for power generation?	Biomass
What influenced the idea?	Power shortages
How much have you invested so far?	Around $1million
How do you rate the Independence of Regulator?	The regulator is fairly independent
How do you rate the PPA negotiation process?	Not applicable
How easy is the tariff negotiation process and tariff methodology.	This does not apply

Are Payments for delivered power done on time?	Power is for internal consumption
What are your PPA securitization requirements?	We have no PPA
What were the challenges in the initial stages of the project?	Funding
What do you think the challenges of the off-taker are, and how can this be fixed?	Non-payment of bills. Government support is required to enforce payment
What do you see as the greatest challenges in investing in the Zimbabwean power sector?	Funding
How do financiers view the reformed structure of the sector in terms of attractiveness?	A little positive though not certain in future due to politics
What challenges do you think your competitors are facing?	Capital to enhance project performance
What advice would you give to someone who would want to invest in the sector?	Trade carefully but it is the best avenue to get into since we anticipate power shortage in the near future.

Interview responses from non IPPs

ZPC

Question	Response
When were you unbundled out of the vertically integrated ZESA?	2003
How did the reforms of 2002 affect the operations of ZPC?	We now have to have power purchase agreements with ZETDC, unlike in the past. We also needed more commercial arrangements to access some skills in operating the plant.
What were the objectives of the reforms?	To unbundle ESI so as to allow private players in generation, as well as to introduce a regulator.
How did the reforms affect your access to capital?	Only the ZPC balance sheet was to support access to capital.
How fair do you find the regulator on issues to do with the off-taker, IPPs and yourselves?	The legal instruments spell out proper independence of the regulator, and we have largely found the regulator to be independent. Some controversial decisions would be from the government whose involvement is also provided for in the Act.

How many power stations have you managed to build since reforms and how many MW have you managed to add to the grid?	No new power station has been constructed, but Hwange has been rehabilitated and output improved by 300MW. Construction of Kariba extension is 60%, and will add 300MW in 2018.
Are you being paid for the power delivered?	We are not being paid for delivered power in full and we are owed over USD700 million.
Is ZETDC not paying all producers or it's selectively ZPC, and why?	We are using a revenue sharing model and we don't get the full payment because ZETDC cannot collect all the revenue for reasons largely beyond their means. Government protects some customers for being in sensitive and subdued industrial sectors, and some are just unable to pay. IPPs are largely paid according to terms of their PPAs, probably to give a perception of good off-taker.
What is the impact on non-payment?	Maintenance of plant is not done timeously and properly due to poor cash flows, and the result is frequent breakdowns, which cause more costs. It increases the tariff requirement as costs escalate.

What mechanism would you think best applies to ensuring payment?	Escrow accounts are demanded by funders, but ring fenced local accounts also work. LCs and bank guarantees also work, but they need to be funded, and this is the handicap of the off-taker.

ZETDC

Question	Response
How has the reform of 2002 affected the operations of the off-taker?	It has created more awareness in terms of power quality issues. The fact that there is someone watching changes the way the system is run. Economic dispatch has to be closely monitored, as there are more players.
How active has been the development of power sources since reforms?	Only small IPPs have been constructed but there have been many discussions, and even PPA negotiations with bigger ones. The reason is that the tariff of the off-taker is below cost and the off-taker may not be able to pay the invoice for energy delivered. They are aware that the off-taker is not recouping the full cost. Country risk perceptions are also playing

	a part, as most of the money is from international DFIs.
How are the dispatch arrangements of generation companies, and are they successful arrangements?	Economic order dispatch is used. Has been successful to the extent that, due to the shortage of power, all sources are always needed.
How many IPPs are you dispatching now, and how many MW are they contributing?	They are 9 in total, and they give about 30MW during summer and less than 5MW during winter.
What aspects of the reform are supportive to the off-taker's access to capital?	Ring fencing risks associated with off-taker and focusing on investments in the specialized transmission and distribution sector make it easier for evaluation by financiers, as they lend to the off-taker.
The transmission company and distribution company were initially separate. What motivated their bundling?	This is good for the size of the economy and the stage of development of the industry. While it is good to keep them separate, the economy was small at the time and the overheads associated with running the 2 companies separately were not justified.
Are the reforms conducive to investment in the generation subsector?	It is conducive, as it separates entities. Investors can invest in generation as private players with separate balance

	sheets, which can be used to access financing.
Is the Regulator independent?	Practically no, but theoretically yes. The regulator has to toe the line of the parent ministry, which is the same as the off-taker. Government naturally is mandated to protect the people from expensive service. Aspects like tariff review suffer because the same ministry supervises the regulator. It would have been better if the regulator was to report to the President's office. In theory, the Act is crafted to give independence to the regulator.
Have you been able to collect all the revenue billed? If not, how much is owed?	Collections are very poor. The reason is that ministry as government has to protect the interests of the consumer. The government intervenes when the utility wants to disconnect customers for non-payment, leading to accumulation of debt. The utility is sacrificed to appease the consumer. Around $1.1billion is owed.
How has the debtors' book size affected your ability to securitize PPAs for IPPs?	It has negatively affected ability. The perception created is that when the power is delivered by power producers, there may be no payment for it if the revenue is not collected, resulting in default in

	paying invoices. Securitization will have limited scope because of cash flow constraints, and the instruments then require cash cover.
How do you securitize?	Government guarantees for public sector investments. IPPs accept escrow accounts, assigning customers to pay into a ring-fenced account, LCs and other work-around hybrid instruments.
What securitization measures have you been able to implement to ensure securitization of PPAs and how successful have they been?	Preference has been ring fenced accounts with a local bank, because it is difficult to open a foreign account due to central bank requirements. Capacity constraints on the banking sector have also constrained securitization for larger IPPs, as no local bank can pull together the required amount, as either guarantee or LC.

ZERA

Question	Response
How was regulation of ESI achieved prior to formation of ZERC in 2002?	Zesa was regulating the industry. Operator was the regulator especially in terms of determining the prices. Operator was vertically integrated including determining prices.
What motivated the ESI reforms of 2002?	Government needed augmentation in investment in the sector. Government had to do Hwange with YTL and Sengwa with National Power of UK and failed. There was realisation that there was need to get private sector to do projects.
What is your view of the structure of the reformed ESI, the companies formed and their interrelationship as a group?	Separation of companies is the ultimate thing, with registered companies trading at arm's length.
How independent is the regulator?	Challenge is that regulator and ZESA report to the same ministry so compromise is defined where the needs of the minister as the owner may be given precedence over reasonability. The provision of the Act spells out that the regulator should not be influenced, and the other that says the minister may give policy directive, as well as that the regulator should give solutions in consultation with the minister.
What issues in the ESI do you think need to be regulated?	Licensing, tariff, quality, safety, operations.
Have all these issues had policies put in place to regulate the ESI?	Not yet. More than 30 regulations are required, and a few of them are being developed on the basis of their priority.
How easy is it for industry players to comply?	There are no big challenges with the existing regulations.

How much do you think reform has affected the investment climate?	IPPs are now allowed and it has created interest, and this was not there before. IPPs are now also allowed to sell directly to consumers though there is no such IPP at the moment.
What was the motivation behind the formation of ZERA from ZERC?	Electricity is just one part of the energy, and there was need for a regulator who would look at the entire energy portfolio. At the, time there was need to appoint a regulator for petroleum when it was decided that the energy regulator be the one to be in charge of both.
Was it a good move in your view?	Yes. These structures have no need to be duplicated in view of the attendant costs.
Has regulation been enhanced as a result?	It does not take away the focus on electricity as there are people focusing on electricity. Principles used are the same.
How many licensees are there to date?	This will be provided as a separate schedule
How much power has been added to the grid since reforms?	This will be provided as a separate schedule
How much money has been invested since the 2002 reforms?	This will be provided as a separate schedule

MoEPD

Question	Response
What were the objectives of the reform of 2002?	Primarily, to address the allowance of other players to be involved, especially in generation, as the public sector was unable to cover the generation gap. It was also to improve the corporate governance of the sector by reviewing the Executive Chairman-led board of directors. The sector would be separated into generation, transmission and distribution companies, with a regulator supervising on the sector.
What was the rationale of the merging of Transmission and Distribution companies in 2007?	There had been no investment in the sector due to a deteriorating economic environment. There was a need to reduce the executive staff cost by merging the two companies, and cutting the number of directors from 7 to 3, and MDs from two to one, as well as removing one board altogether.
How independent is the regulator?	It is not practical for the regulator to be totally independent of government. The Energy Regulatory Act calls for the consultation of the regulator with the government. This is where the balance is lost. Political interventions are then taken, with the excuse that they are consultations which are provided for in

	the Act. They are there because of the economic environment. The Electricity Act also requires ministers to give policy advice. This then has the same impact as the Energy Regulatory Act, in allowing political interference. The Regulator is very independent from a governance point of view. PPA tariffs are deliberated on by regulator and the ZERA board sits to approve, which clearly shows independence. Though government is consulted last, feedback still comes back to ZERA. The regulator has not been consistently seen to be independent, as there have been public pronouncements by politicians on issues that are supposed to be the mandate of the regulator.
What is the envisaged reform process by government?	The sector would be divided into generation, transmission and distribution under a holding company. The holding company was meant as a short-term measure to manage legacy debt and supervise a framework where subsidiaries would be able to share revenue until they are able to trade. The arrangement was meant to last 3 years. The next step was then to dissolve holdings and have the subsidiaries report to MoEPD directly.

How far has the reform process gone?	There has been no meaningful progress in the transformation of the structure, as a result of the economic environment remaining subdued. It is the reason why the Electricity Act of 2013 was not implemented. There is still a long way to go in the implementation of the reforms.
The current state of having ZESA Holdings does not take the off-taker far away enough to assure IPPs that there will not be dispatch favoritism of ZPC. What are your views on that?	The off-taker has had a good record in adhering to commercial agreements, to the point that it can be said that the off-takers have demonstrated that they are above that possible compromise.
Why was the electricity act of 2013 not implemented?	The Act largely was going to dissolve Zesa Holdings and separate Transmission from Distribution and have all subsidiary companies reporting directly to MoEPD. It is the position of government that Transmission and Distribution should be separate, and this should be the next step in the reform agenda. Government views that this structure will give better results when the economy is performing above current levels. The individual companies could not effectively trade, and the legacy debt issue had not been resolved.

What are the government's views on the perennial loss-making position of off-taker?	Loss position has to be turned around. There is a drive towards cost reflective tariff to ensure the viability of off-taker. They are trying to achieve the tariff step by step. Stakeholders are still debating the cost structure of the off-taker. While tariff increase is necessary, costs have to be incurred efficiently, as this could be the driver of the loss position.
What is the impact of the off-taker being owed over USD1 billion by consumers?	When revenue is not collected, it compromises the implementation of critical aspects of the sector like maintenance, and then subsequent outages due to lack of maintenance cause revenue-opportunity costs. The government has been to blame to a large extent through the protection tendencies of consumers by instructing ZETDC not to discontinue service to defaulters. Government is now behind the off-taker to ensure that revenue is collected. Public pronouncements have been made by government encouraging defaulters to pay. There has also been support of the prepayment metering system. Prepayment arrests growth of debt. Recovery of debt is also instituted by deducting 50% of all prepayment purchases through the system. Offset of parastatals' debt with tax obligation has also been approved, where off-taker tax

	obligations are used to offset the debt of government electricity debt, thereby ensuring public companies' payment. There is, however, difficulty in getting some sensitive customers to pay whom the government continues to protect for the reasons that they are in critical sectors.
How has private capital responded to the reforms of the ESI?	There has not been much, in part because of the economic challenges. Generation would have benefited by now, but it has not happened. Only small IPPs have been attracted. The off-taker has been paying for power delivered, and this has sent a very good message. The off-taker has been honoring commercial agreements.
What is the procurement process of prospective IPPs on the System Development Plan (SDP)?	The procurement has largely been through unsolicited bids. This is obviously an expensive way of doing it but the government had to respond to the shortage, as there has been load shedding for many years. No SDP has been officially approved for many years now.

Before the reforms there were IPPs. How were IPPs regulated before the 2002 ESI reforms?	They were regulated by ZESA through the guideline which said that anybody generating should sell at 85% of retail tariff. ZESA would also license all IPPs producing more than 100kVA.

Respondent Bank1

Question	Response
What is your mandate insofar as infrastructure development is concerned?	Investment banking and long-term solution for corporate clients. Infrastructure is one of the core sectors which include power & infrastructure; this is actually a theme in which the bank has realized there is a gap. The bank has not invested enough in power and infrastructure, so the quota remains underperformed. This is because of the country's risk, which makes it difficult to sell outside the country, for external support.
How have you been involved in the power sector?	Corporate banking and advisory.

What structural issues of ESI do you consider when you want to invest in the ESI?	Sustainability, ability to charge economic tariff, reliability of supply and ability to collect. Environmental impacts are also highly considered, as they conform to equator principles.
How attractive do you find the reforms of 2002 to investment?	The fact that the energy sector can never go under makes it an attractive sector, which may be restructured from time to time
How independent do you think the regulator is?	To the extent that they report to the same ministry as the entities that they regulate, their independence is greatly compromised.
How many IPPs have you funded in the sector?	There has only been one success story. Others have not been able to bring bankable feasibility studies. Some of them are oversized for the comfort of the lenders, who are not prepared to bring in much money into the country at this time. There is also a lake of equity, for borrowers and lenders do not want to lend to a borrower who has not put in anything in the project. Lenders are also not comfortable with a single buyer model as it does not give flexibility in the off-take of produced power.

Have you been funding ZESA projects and if so how much?	Yes, in corporate loans targeting generation and transmission projects.
How much have you invested in the ESI?	ZAR 500 million in the last 2 years, plus a current $10m.
Does the structure where ZETDC and ZPC are under the same holding company compromise dispatch fairness between IPPs and the ZPC?	IPPs have not reported any preferential treatment over the ZPC. There are therefore no direct concerns from the IPPs we are dealing with.
Is there anything you think should be done to enhance the attractiveness of the ESI?	Tariff should be cost reflective for investors to be attracted. The balance sheet is shrouded with a lot of legacy issues, affecting borrowing power. It therefore needs restructuring.

Respondent Bank2

Question	Response
What is your mandate in as far as infrastructure development is concerned?	The statutory mandate set out in terms of our enabling Act is to mobilize resources for deployment and investment in key infrastructure required to stimulate economic growth across the country in critical sectors which include, but are not limited to, energy; transport; water & sanitation; housing and ICTs. This also includes a mandate to build and strengthen institutional capacity for entities or implementing agencies

	involved in the infrastructure value chain in Zimbabwe.
How have you been involved in the power sector?	The bank has funded transformative projects in the energy sector such as the introduction of the pre-paid metering systems for energy consumers to enhance collection by the power utility against billed consumption of energy on the distribution side. We have also funded refurbishment and repowering projects for existing power plants to improve reliability and power generation levels from installed generation capacity.
What structural issues of ESI do you consider when you want to invest in the ESI?	We consider the structure of the market and bankability/credit quality of the off-take under power purchase agreements for power produced from funded projects. Mitigation of possible inefficiencies born out of a single-buyer market for national grid off-take versus a liberalized (and competitive) market in which all power producers, whether state owned or private sector owned, can sell power directly to their chosen quality customers. Tariff adjudication is still more mired with interventionist practices than open market determinants accepted by the Regulator. The current structure of our energy supply industry needs to be streamlined to enhance efficiencies, which will in turn create savings for additional investment in new value adding projects for the sector; at the same time attracting the badly needed private sector investment in the ESI.
How attractive do you find the reforms of 2002 to investment?	The conceived reforms were positive in that individual and more focused Strategic Business Units were set up to concentrate on generation on the one hand and transmission and distribution on the other. The only challenge is that the reforms were partially implemented with the full unbundling of the

	monopolistic state-owned power utility being left incomplete, and therefore still constraining optimal attraction of investment into the sector.
How independent do you find the regulator?	Whilst by law there is apparent independence of the Regulator, in practice this is severely curtailed by the exercise of appointive powers exercised by the line Ministry as well as directives (both on policy and procedure) affecting the adjudication of matters coming under the purview of the Regulator. Rarely would the Regulator pass any crucial decisions within their remit without seeking the approval or acquiescence of the line Ministry.
How many IPPs have you funded since 2002?	We have positively considered and appraised three (3) IPP projects which up to now have not yet reached financial close.
Have you been funding Zesa projects and if so how much?	Yes we have funded ZESA projects. Total cumulative funding is *circa* US$110million.
Does the structure where ZPC and ZETDC are both under Zesa Holdings compromise dispatch fairness between IPPs and ZPC?	ZPC and ZETDC are related parties. By this fact alone, rarely would their dealings with each other on dispatch and other crucial off-take parameters on grid access be completely at arm's length as would be the case for IPPs. This may even extend to pricing of wheeling charges as well as prioritization of access, which in all probability will be skewed in favour of a sister company ZPC ahead of a privately owned IPP.
How much have you invested in the ESI?	Our cumulative investment to date could be approximately US$150million, taking into account para. (7) above.

Is there anything you think should be done to enhance the attractiveness of the ESI?	The single-buyer market for grid off-take should be done away with through liberalization, so as to render the national grid open to all producers. In addition, tariff policy should be opened so that it is fully cost reflective and offers a competitive return to an investor in ESI. The Regulator should act autonomously, and independently arbitrate on tariff applications based on sound business and market considerations, and not social safety guards born from external pressures exerted by political principals. The power utility should be fully unbundled and the market should be liberalized further in order to attract significant investment from the private sector in the mainstream aspects of ESI where fiscal support is coming short.

Respondent Bank3

Question	Response
What is your mandate in as far as infrastructure development is concerned?	Funding of infrastructure projects with a primary objective of eradicating poverty
How have you been involved in the power sector?	Greenfield investment and rehabilitation projects
What structural issues of ESI do you consider when you want to invest in the ESI?	The funding of any ESI project has to enhance sustainability of the sector. AfDB is not lending to the sector in Zimbabwe because government is in arrears with repayment of loans. It is understood the economic performance at large has hampered the ability of government to repay the loans. Poverty eradication is driving grants in the economy. Donor funds are used for the projects.

How attractive do you find the reforms of 2002 to investment?	Efficiency is compromised where the sector seems top heavy. The Holding company does not seem to be adding enough value through its role of housing legacy debt and facilitating intra-sector trade.
How independent do you think the regulator is?	Before the regulator, government would approve tariff through parliament. IPPs would charge 85% of retail tariff. Regulator is independent from the view of the bank. They have proved through rejection of tariff increase. Political interference cannot be ruled out though.
How many IPPs have you funded in the sector?	There has been engagement but no funding has been advanced yet. The bank prioritizes public sector in Zimbabwe. The private sector fund faces challenges of the wider economic environment which is constrained.
Have you been funding ZESA projects and if so how much?	Only through grants but no loans.
Does the structure where ZPC and ZETDC are both under Zesa Holdings compromise dispatch fairness between IPPs and ZPC?	It would compromise to the extent that these are sister companies working to improve the bottom line of the group.
Is there anything you think should be done to enhance the attractiveness of the ESI?	Government has to support revenue collection efforts by the utility as well as ensure the tariff is cost reflective, preferably through reducing costs
Any structural changes you may suggest?	Advancing reform to enhance choice of supplier by the customer is awaited. The bank recommends removal of ZESA Holdings, as its value addition is not convincing. Transmission and Distribution should also be separated.

Appendix 2

Informed Consent Agreement

UNIVERSITY OF CAPE TOWN
FACULTY OF COMMERCE
Igniting Knowledge and Opportunity

Informed Consent Agreement

Please read this consent agreement carefully before you decide to participate in the study.

Purpose of the Agreement: This agreement is meant to receive official consent of participating organizations in the research study. It is the requirement of the University of Cape Town that this Agreement be signed by the participating organizations before any research commences.

Identity of the Researcher: The name of the researcher is Howard Choga. He is in the second and final year of a Master of Commerce degree in Development Finance with the University of Cape Town. In partial fulfilment of the requirements of this degree programme, he is required to carry out a research project.

Project Title: The reform of the Electricity Supply Industry in Zimbabwe and its impact on the power sector investment since 2002.

Purpose of the research study: The purpose of the study is to investigate whether the Electricity sector reforms have had any impact on investment in the sector since 2002.

What participants will do in the study: The participants in this study are expected to respond to questionnaire and interview questions honestly and to the best of their knowledge and experience, how the electricity supply industry has been impacted by the 2002 reforms as revised and reviewed to date. Participants will not be photographed, audio-tapped or video-taped. If any participant feels uncomfortable with any question in the survey, they are free to contact the researcher or stop the survey altogether. The researcher assures the participants that there will be no consequences at all to any participants should they decide to take such action on the research.

Time required: The study will require about 10 minutes of your time for questionnaire and 20 minutes for interview. Only completion of this questionnaire will be all the time required to complete the study.

Risks: There are no anticipated risks to the participants in this study.

Benefits: There are no direct benefits to you for participating in this research study. The study may help us understand the effectiveness of the Electricity Supply Industry reforms as implemented from 2002 to date.

Confidentiality: The data collected from participants will be used only for the purposes of the study and will be confidential. Only the analysis of the collected data will be submitted in a dissertation report to the University of Cape Town. The collected data will be destroyed after the final submission of the report by end of December 2016.

Voluntary participation: Your participation in the study is completely voluntary. It is acknowledged that the researcher is an executive in Zimbabwe Electricity Transmission and

Distribution Company, which is a critical player in the industry. It is emphasized that the treatment of the participants and their organizations will not be affected in any way by their participation in this study.

Right to withdraw from the study: You have the right to withdraw from the study at any time without penalty or any consequences.

How to withdraw from the study: If the participant feels for any reason, which may not necessarily have to be stated, that they want to withdraw from the study, they can freely do so by not submitting a completed form and/or notifying the researcher of their decision not to participate. If the questionnaire would have been submitted, the questionnaire will be withdrawn on notification of intention to withdraw from participation by the participant provided that the questionnaire is not anonymous enough to make identification of the submitted questionnaire difficult.

If you want to withdraw from the study, you can do so by either emailing the researcher on chghow001@gsb.uct.ac.za or phoning the researcher on +263772244917. There are no penalties or any consequences for withdrawing. If you would like to withdraw after your materials have been submitted, please contact the researcher on the same details above.

Payment: You will receive no payment for participating in the study.

If you have questions about the study, contact the Researcher:

Name: Howard Choga

Mobile phone number: +263772244917

Email address: chghow001@gsb.uct.ac.za

Agreement:
I agree to participate in the research study described above.

Signature: _____ **Date:** _____

For and on behalf of:

_____

_____

_____**(Name of Company)**

Signature:  **(Researcher) Date:** _____

You will receive a copy of this agreement for your records.

Appendix 3

Coded responses from IPPs

IPP Interviews codes						
Question	Resp IPP1	Resp IPP2	Resp IPP3	Resp IPP4	Resp IPP5	Resp IPP6
How many power stations do you own?	one	one	one	Five	one	One
What technologies do you use for power generation?	Thermal	Thermal	Thermal	Mini hydro	Thermal	Biomass
What influenced the idea?	Shortfall	Shortfall	Shortfall	Self supply	Shortfall	Shortfall
How much have you invested so far?	$12m	$8m	$20m	$40m	$6m	$1m
What is your view of the independence of the Regulator?	Not independent	Fairly independent	Not Independent	Fairly independent	Independent	Fairly independent
How do you view the PPA negotiation process?	Fair	Fair	Fair	Good	Time consuming	Not applicable
Tariff negotiation process and tariff methodology	Fair	Acceptable	Acceptable	Good	Time consuming. Metholdology is good	Not applicable
Payment for delivered power	Not operational	Not operational	Not operational	Paid on time	Not operational	Self supply
PPA securitization requirements	Escrow account, Government guarantee	Escrow account, Government guarantee	Escrow account, Government guarantee	Escrow account	Offtaker bankability	Not applicable
Challenges in the initial stages of the project.	Shareholder changes	Mining concession, Generation license	Coal mining/Dam construction approval	Load shedding of imbedded generator	PPA finalisation	Funding
What do you think the challenges of the off-taker are, and how can this be fixed?	Revenue collection	Balance sheet, revenue collection, demand growth	Revenue collection, transfer pricing	Economic environment	Balance sheet, funding and revenue collection.	Non payment for power delivered
What do you see as the greatest challenges in investing in the Zimbabwean power sector?	Ease of doing business	Country risk	Ease of doing business	Risk perception not realistic	payment risk, economic environment	Funding

How do financiers view the reformed structure of the sector in terms of attractiveness?	Not properly aligned	Attractive	Not properly aligned	Reform properly structured the sector	Sector properly structured, no rule of law.	Little attractive
What challenges do you think your competitors are facing?	Funding	Funding	Funding	Funding	Funding	Funding
What advice would you give to someone who would want to invest in the sector?	Invest	Invest	Invest	Invest	Invest	invest but carefully

Banks interviews			
Question	Resp Bank1	Resp Bank2	Resp Bank3
What is your mandate in as far as infrastructure development is concerned?	Infrastructure is core and theme	Statutory mandate	Funding infrastructure to eradicate poverty
How have you been involved in the power sector?	Corporate banking	Funded prepaid meters and repowering of power stations	Greenfield and rehabilitation projects
What structural issues of ESI do you consider when you want to invest in the ESI?	Sustainability, tariff, revenue collection, Environmental issues.	Bankability of off-taker, single buyer model not good, Regulator independence	Sustainability
How attractive do you find the reforms of 2002 to investment?	Sector always attractive as it can never go under	Structure is good but was not fully implemented	Zesa Holdings compromising attractiveness.
How independent do you find the regulator?	Compromised	Independent at law not in practice	Independent though there is political interference
How many IPPs have you funded since 2002?	One	3 who have not yet reached financial closure	Fund public sector only.
Have you been funding Zesa projects and if so how much?	Yes. Corporate loans	Yes. $110m	Only through grants

Does the structure where ZPC and ZETDC are both under Zesa Holdings compromise dispatch fairness between IPPs and ZPC?	No adverse reports. No compromise	Greatly compromised.	Compromised
How much have you invested in the ESI?	ZAR500m +$10m	$150m incl Zesa	
Is there anything you think should be done to enhance the attractiveness of the ESI?	Tariff should be cost reflective	Do away with single buyer model, cost reflective tariff, independent regulator, fully unbundle ESI	Cost reflective tariff, revenue collection

ZPC	
Question	
When were you unbundled out of the vertically integrated ZESA?	2003
How did the reforms of 2002 affect the operations of ZPC?	PPA with ZETDC
What were the objectives of the reforms?	Allow IPPs, Regulator
How did the reforms affect your access to capital?	Only ZPC balance shhet to support access to capital
How fair do you find the regulator on issues to do with the off-taker, IPPs and yourselves?	Largely independent
How many power stations have you managed to build since reforms and how many MW have you managed to add to the grid?	None built. Kariba extension commissioning 2018 adding 300MW
Are you being paid for the power delivered?	Not paid in full. Over $700m owed
Is ZETDC not paying all producers or it's selectively ZPC, and why?	IPPs paid in full. IPPs are small and ZETDC has to
What is the impact on non-payment?	Maintenance not done,frequent breakdowns.

What mechanism would you think best applies to ensuring payment?	Escrow accounts, LCs

ZETDC	
Question	
How has the reform of 2002 affected the operations of the off-taker?	power quality awareness
How active has been the development of power sources since reforms?	Just small IPPs
How are the dispatch arrangements of generation companies, and are they successful arrangements?	Economic order dispatch. Successful
How many IPPs are you dispatching now, and how many MW are they contributing?	9 IPPs giving 30MW
What aspects of the reform are supportive to the off-taker's access to capital?	Ring fenced off-taker risks
The transmission company and distribution company were initially separate. What motivated their bundling?	Economy too small to have them separate
Are the reforms conducive to investment in the generation subsector?	Conducive
Is the Regulator independent?	Legally independent but practically not
Have you been able to collect all the revenue billed? If not, how much is owed?	No. Government protects errand consumers
How has the debtors' book size affected your ability to securitize PPAs for IPPs?	Very negative effect
How do you securitize?	Gvt guarantee for investments and Escrow account for IPPs
What securitization measures have you been able to implement to ensure securitization of PPAs and how successful have they been?	Assignment of customers has been hugely successful

ZERA	
Question	
How was regulation of ESI achieved prior to formation of ZERC in 2002?	ZESA was the regulator

What motivated the ESI reforms of 2002?	Government needed investment in generation
What is your view of the structure of the reformed ESI, the companies formed and their interrelationship as a group?	It is work in progress as companies ultimately have to separate.
How independent is the regulator?	Not practically independent
What issues in the ESI do you think need to be regulated?	Licensing, Tariff, safety, operations, power quality
Have all these issues had policies put in place to regulate the ESI?	Not all yet
How easy is it for industry players to comply?	Easy
How much do you think reform has affected the investment climate?	Created interest but no significant invrestment
What was the motivation behind the formation of ZERA from ZERC?	To avoid having another regulator for petroleum
Was it a good move in your view?	Yes
Has regulation been enhanced as a result?	Yes
How many licensees are there to date?	
How much power has been added to the grid since reforms?	
How much money has been invested since the 2002 reforms?	

MoEPD	
Question	
What were the objectives of the reform of 2002?	To allow IPPs
What was the rationale of the merging of Transmission and Distribution companies in 2007?	Reduce staff costs
How independent is the regulator?	Not so independent
What is the envisaged reform process by government?	Totally separate generation, transmission and distribution.

How far has the reform process gone?	No meaningful progress
The current state of having ZESA Holdings does not take the off-taker far away enough to assure IPPs that there will not be dispatch favoritism of ZPC. What are your views on that?	Off-taker not compromised
Why was the electricity act of 2013 not implemented?	The economic environment was not yet conducive
What are the government's views on the perennial loss-making position of off-taker?	Planning to move to cost reflective tariff gradually.
What is the impact of the off-taker being owed over USD1 billion by consumers?	Compromise in service delivery
How has private capital responded to the reforms of the ESI?	There is not much in terms of implemented projects
What is the procurement process of prospective IPPs on the System Development Plan (SDP)?	Unsolicited bids
Before the reforms there were IPPs. How were IPPs regulated before the 2002 ESI reforms?	By ZESA

Appendix 4

Survey Questionnaire

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QUESTIONNAIRE

My name is Howard Choga and I am in the second and final year of a Master of Commerce degree in Development Finance with the University of Cape Town. In partial fulfilment of the requirements of this degree programme, I am required to carry out a research project. The topic of my dissertation is "**The reform of the Electricity Supply Industry in Zimbabwe and its impact on investment since 2002**."

I kindly request to share your experience and knowledge of the electricity supply industry and the impact of the 2002 and subsequent reforms on investment in the sector.

This research has been approved by the Commerce Faculty Ethics in Research Committee.

Your participation in this research is voluntary. You can choose to withdraw from the research at any time. The questionnaire will take approximately 10 minutes to complete. You will not be requested to supply any personal identifiable information, ensuring anonymity of your responses.

Due to the nature of the study you will need to provide the researcher with some form of identifiable information about the investment. However, all responses will be confidential and used for the purposes of this research only. Should you have any questions regarding the research please feel free to contact the researcher

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howardchoga@gmail.com

Mobile number: +263772244917

1.0 Introduction and background

1.1 At what stage of development is your power station.

Concept/Pre-feasibility stage	
Feasibility study/Proof of bankability	
Funding	
Construction	
Opertional	

1.2 What technology are you using for power generation.

Hydro	
Mini hydro	
Coal	
Bagasse	
Gas	
Other (Specify) …….	

2.0 Electricity Supply Industry (ESI) reforms

2.1 What is your understanding of the electricity sector with regard to the reforms, electricity pricing and system development issues?

	Excellent
	Good
	Average
	Poor
	No knowledge at all

2.2 How do you rate the level of independence of the regulator?

	Excellent
	Good
	Average
	Poor
	Very poor

2.3 How easy is it to go through the licencing process?

	Excellent
	Good
	Average
	Poor
	No knowledge at all

2.4 How easy is it to go through the power purchase agreement negotiation process?

	Excellent
	Good
	Average
	Poor
	No knowledge at all

2.5 How was the IPP awarded contract to develop the power plant?

	Unsolicited bid
	Expansion of own assets
	Won a tender