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PROJECT SELECTION AND PRIORITISATION: A CASE OF POWER GENERATION IN ZIMBABWE

By

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DEDICATION

This research is dedicated to my wonderful family: My loving wife Tecla and great children Ngonidzashe Fidelis, Shoorai, Nyashadzashe Faith and Elias Richard.

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For the successful completion of this dissertation, I really thank God the Almighty who gave me strength and determination to undertake the EMBA program. This research could not have been what it is today without the support and encouragement from my family to whom I am very grateful. Many thanks go to my MSU Business Research Methods Lecturers, Dr E Mutenheri and Mr T Sibanda. Further, I am highly indebted to my supervisor, Mr T Sibanda; his guidance and advice throughout the writing of this work has been indeed invaluable. The tremendous encouragement, support and help received from members of my EMBA study team, colleagues and friends is greatly appreciated. Special mention goes to Mrs J Nyakudya, Mr M Kateketa, Mr T Kondo, Mr B Mugabe, Mr P Mhunduru and Mr P Tapfumaneyi. Last but not least, I want to sincerely thank all the respondents for their insightful contributions which led to the achievement of the objectives of this dissertation.

ABSTRACT

This study investigates the various decision methods and models used by the Government of Zimbabwe in the process of identifying and prioritising national power generation projects for capitalisation purposes. The selection and prioritisation process was considered to be central to the pooling and channelling of resources towards optimal electricity generation in the country in the context of ZIMASSET power projects. The study's main objective was to address the identified disconnection between the decision making process for approval of a power generation project as a "National Strategic Project" and its subsequent inadequate capitalisation which, in turn, inhibited timely successful execution and expected contribution to the national economy. The study combines interpretive and critical realism, supported by an inductive approach. The design was generally descriptive; although with influences of both the exploratory and explanatory researches. The study was largely qualitative and applied some quantitative aspects covered in the AHP Model. The study data was gathered using both primary and secondary data collection methods. Purposive judgmental sampling was done targeting officials in government institutions involved in the power generation projects. Twenty-six survey questionnaires were used as the main study instruments because the researcher only managed to conduct one interview out of the five that were planned. The study revealed that each government institution had its own perception of what happens in the selection and prioritisation process; resulting in fragmented rather than standard, centralised and transparent processes. It was also noted that the various methods in use were not always based on the multi-criteria ranking methodology; hence there was no standard criteria framework. In terms of policy, the study revealed that the Indigenisation and Empowerment Act (Chapter 14:33; 2007) and its associated regulations; and the National Investment Policy of Zimbabwe were being used to support the National Energy Policy (2012). However, there was need for policy awareness, clarity and consistency. Further, Zimbabwe was yet to come up with a comprehensive PPP policy framework and legislation. Sources of funding remained a major challenge; with FDI inflows subdued for various reasons. The study, therefore, recommended that the Government of Zimbabwe: uses a centrally maintained transparent system to select and prioritize public power generation projects; should develop appropriate and cohesive policies that facilitate attraction of FDI and private sector participation in power generation projects; expedite the enactment of the PPP Act on the basis of the Joint Venture Bill (aka Public-Private Partnership Bill); adopt the AHP Model in all government institutions as a common user MCDA tool for selection and prioritisation of power generation projects. The AHP method has no bias associated with the use of other MCDA methods. Further studies, as case studies, were suggested in order to allow for assessment of the AHP application in determining preference scores for actual project alternatives; subject to availability of specific rating information for each alternative, within an identified power project portfolio. The study also suggested further research into the actual contribution made by the current partners in PPP arrangements and licensed IPPs in enhancing the country's power generation capacity.

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CHAPTER 1

INTRODUCTION

1.1. Introduction

This chapter discusses the background to the study, statement of the problem, objectives of the research, research questions, significance of the study, delimitations of the study, conceptual framework, limitations of the study, and definitions of key terms and acronyms before giving a summary of the chapter.

1.2. Background to the Study

Governments throughout the world have always pursued the need for energy security as a principal policy objective and political tool for governance (Simpson, 2007 p 539). According to International Energy Agency World Energy Outlook 2013 Factsheet, world electricity demand is projected to increase by more than two-thirds over the period 2011-2035. Non-OECD countries account for the bulk of incremental electricity demand, led by China (36%), India (13%), Southeast Asia (8%) and the Middle East (6%). Global investment in the power sector is envisaged to amount to $17 trillion through to 2035, with over 40% in transmission and distribution networks. In this instance, the global prices for domestic electricity will virtually increase; following the trend of fossil fuel pricing policies. However, over time, according to www.worldenergyoutlook.org, electricity will become more affordable in most regions, as income levels are expected to increase much faster than domestic electricity bills.

The Southern African Power Pool (SAPP) committed generation projects from 2013 to 2016 (as of March 2013), are expected to provide 19 266 MW only 3 % is renewable energy – Wind and Solar (SAPP, 2013). With plans to build new short-term generation projects to add more than 21 500 MW by 2017, Southern Africa holds the key to the continent's efforts to achieve energy self-sufficiency. This means that the SADC region is poised to become a major continental source of energy if plans to boost generation capacity are implemented. The said plans are based on the fact that Southern Africa is home to the world's largest proposed hydro-power scheme, the Grand Inga, (located in western Democratic Republic of Congo) which is the centre-piece of a grand vision to develop a continent-wide power system and expected to generate 40 000 MW when completed (www.sundaymail.co.zw). SADC is also at the forefront of developing renewable, clean energy sources.

Zimbabwe's power generation faces about 1,000 MW deficit to meet current demand and $4.3 billion is needed to boost generation and other capacities in the electric power sector (Mavima, 2013). Reliable capacity is in the order of 1 240 megawatts against a demand of about 2 200 megawatts (ZPC, 2015). The perennial power shortages have crippled operations of industry and commerce while households are enduring long periods of power cuts (Business Herald, August 20, 2014). The power shortages have seen capacity utilisation in the manufacturing sector declining from an average of 57 % in 2011, 44% in 2012 and 39% in 2013 (www.corporatecounsel.co.zw). Therefore, the importance of reliable and well-developed power infrastructure for the development of Zimbabwe hardly needs to be overemphasized.

For this reason, the National Energy Policy (NEP) of Zimbabwe (MOEPD, 2012) seeks to promote the optimal supply and utilisation of energy, for socio-economic development in a safe, sustainable and environmentally friendly manner. NEP's objectives are expected to remain valid even though the social, political, environmental and economic situation changes continually. Whilst the Government recognises that "energy is a key enabler to productivity and socio-economic development" it also acknowledges that the challenges in the energy sector remain a toll order "largely due to dilapidated and obsolete generation equipment and infrastructure as well as inadequate financing and capitalisation; and other structural bottlenecks." (ZIMASSET**:** Section 2.19 p 23).

The ZIMASSET blueprint (Section 3.15) stipulates the following strategies with a view to support optimal power generation during the period 2013 to 2018 (p 92):

a. Raising the installed generation capacity of existing power stations to their optimum;
b. Expansion of existing power stations such as Hwange and Kariba;
c. Completion of new big and mini-hydro-power projects such as Batoka and Gairezi respectively;
d. Resuscitating small thermal power stations of Harare, Bulawayo and Munyati to full power generation capacity;
e. Full utilization of alternative forms of energy such as Coal Bed Methane Gas; and
f. Deliberate development of solar and wind energy initiatives.

Accordingly, it is important to note that these projects have been competing with other national demands on the fiscus for the past decade or more (Kaseke, 2013). Meanwhile, the Zimbabwe

Energy Regulatory Authority (ZERA) has licensed 22 power projects, of which 19 are IPPs and three are state owned (Sunday Mail Business, Dec 7, 2014). However, it is noted with great concern that only four IPPs have managed to feed electricity into the national grid with the rest struggling to raise the much needed capital due to high interest rates on the financial market. This clearly demonstrates the need for Zimbabwe to urgently put in place appropriate recovery strategies as this will go a long way in alleviating the electricity import bills accruing from current Power Purchase Agreements (PPA).

The major stumbling block for implementing the identified national electricity projects (see Annex 'A') is lack of the required financial capacity. Zimbabwe faces challenges in FDI inflows. According to www.financialgazette.co.zw of August, 27 2014, The Economic Development in Africa Report (2014), revealed a steady flow of FDI in economically stable and peaceful countries compared to troubled spots came as other global studies have indicated that investments into Zimbabwe stagnated at US$400 million between 2012 and 2013. This situation is buttressed by the RBZ Monetary Policy Statement of Aug 14 (Sect 105 – 107) which indicated that foreign investment inflows into Zimbabwe remained subdued due to the perceived country risk. For the first six months of 2014, the country received a paltry USD67 million compared to USD165 million during the same period in 2013.

How the available capital is used largely depends on the need to balance all the competing demands. For this reason, businesses use project management tools and techniques to realise most beneficial outcomes with limited resources under critical time constraints (Meredith and Mantel, 2009). Wheeler (2013), among other aspects, asserts that all organisations, whether public sector, private sector undertake projects to support their operations, meet strategic objectives, respond to a need, solve a problem or realise an investment opportunity. Whilst the primary objective of the private sector is to maximize profit, and its decisions are mainly based on the financial viability of projects, government decisions are based on the national policy framework on meeting socio-economic considerations. Government decisions in any strategic investment (long term) incorporate other intangible benefits such as environment and social-economic benefits. It therefore follows that strategic capital investment decisions in power generation infrastructure projects should be made based on predetermined project portfolio management decision criteria. This study investigates the various decision methods and models used by the Government of Zimbabwe in the process of identifying and prioritising national power generation projects for capitalisation purposes.

1.3. Problem Statement

The Government has initiated a number of national strategic projects with a view to build on the current power generation capacity; given the fact that the energy sector is one of the key pillars of Zimbabwe's economic turnaround roadmap (ZIMASSET, Sect 2.22). Unfortunately, implementation of these projects has not been adequately resourced due to challenges stemming from a depressed economy and inadequate financial support on the back of a highly competing fiscal space. Resultantly, the Nation is being deprived of the benefits that would otherwise accrue from these projects. Accordingly, setting up of an appropriate funding and institutional arrangement which is responsive to national power generation programs has become more imperative now than ever in the context of ZIMASSET. In this instance, there is need for those in position of authority to make informed capital investment decisions in order to contribute meaningfully to the national economy. In turn, this dictates that the Government aligns its project selection and prioritisation process to formal decision methods and policy frameworks that result in a permanent solution to the electricity crisis.

1.4. Research Objectives

1.4.1. Main Objective

The main objective of this study was to address the identified disconnection between the decision making process for approval of a power generation project as a "National Strategic Project" and its subsequent inadequate capitalisation; which inhibited timely successful execution and expected contribution to the national economy, through the introduction of the Analytic Hierarchy Process (AHP) Model for project selection and prioritisation.

1.4.2. Specific Objectives

The study sought to achieve this through the following specific objectives:

a. To analyse decision making criteria for project selection and prioritisation.
b. To establish the existing selection and decision making processes in the national power generation projects.
c. To explore government policies in attracting investment in national power generation projects.
d. To assess the financing models used to fund national power generation projects.
e. To recommend a hierarchical model for project selection and prioritization for funding purposes.

1.5. Research Questions

The study pursued the objectives by seeking answers to the following questions:

a. What are the decision making criteria for project selection and prioritisation?
b. What are the existing selection and decision making processes in the national power generation projects?
c. What are the government policies being used in attracting investment in national power generation projects?
d. What are the financing models used to fund national power generation projects?
e. How suitable is the hierarchical model for project selection and prioritization for funding purposes?

1.6. Significance of the Study

The choice of the study was premised on the understanding that, to the best of my knowledge, no similar research had been done on the subject in Zimbabwe and as such, the study was to bring new knowledge on the subject under discussion thereby contributing to the body of knowledge on the application of the AHP model for MCDA in project selection and decision making for capitalisation purposes. It is anticipated that the research will benefit the policy and decision making authorities, industry, and academia in both theory and practice.

1.6.1. To Theory

Most project selection and prioritisation literature available relates to traditional project appraisal methods using financial factors. The other literature that covers MCDA methods reveals that the AHP model has become the most widely used MCDA tool (Zaeri et al, 2007; Saaty, 2008; Mohamadali and Garibaldi, 2009; Vargas 2010; Dalalah et al, 2010; Ishizaka and Labib, 2011; Shah et al, 2013; Dalibor Stanimirovicit, 2013). Whilst, to a large extent, similar studies have been done successfully in developed countries, the researcher found no such studies covering power generation projects in Zimbabwe. It is believed that the research contributes significant project selection and prioritisation data and literature reviews that enhances the quality of information available to both government and business leaders in the country. Academia will also benefit; particularly during the period of study at the institutions of higher learning. The information will then be used to identify other areas of further research.

The research is also essential and necessary in terms of contributing to the body of knowledge the intricacies of formulation of an appropriate hierarchical model for decision making in

project capital rationing to enable successful implementation of National Strategic Projects in the energy sector. This is consistent with the requirements of the National Energy Policy of Zimbabwe (2012).

1.6.2. To Practice

Policy and decision making authorities will benefit from the use of the AHP model; which can be applied in any complex multi-attribute scenarios. It is easier to understand and it can effectively handle both qualitative and quantitative data in the multi-attribute decision making problems. The attendant practical benefits include its application as a common methodology by all government institutions on a centralised platform to ensure consistency of action and prioritised resource mobilisation/channelling. Power is a key enabler for industrial capacity utilisation, so prioritised resource allocation will enable the government to rebuild industry for economic recovery purposes. Access to electricity, especially in rural areas, will be enhanced thereby improving the quality of life in line with the government's objective to address socio-economic issues and millennium development goals.

1.7. Delimitation/Scope of the Study

1.7.1. Research Scope

The research focused on decision making processes in the power generation projects under the thermal, hydro and solar categories. Application of the AHP model was restricted to priority ranking of the selection and prioritisation criteria due to insufficient rating information specific to the alternatives for detailed case study. The study assumed that all projects granted "National Project Status" had satisfied the authorities in terms of feasibility study and techno-economic analysis.

1.7.2. Geographical Scope

The research took place in Harare where the targeted population resided.

1.7.3. Time Scope

The research was carried out within a period of six months and considered the electricity generation projects for ZIMASSET period 2013 to 2018.

1.7.4. Methodological Scope

The research philosophy adopted is interpretive, supported by an inductive approach (Saunders et al. 2009); based on the survey of the government's selection and decision making process for capitalisation of the identified and/or initiated national power generation projects. The design was generally descriptive in nature; although with influences of both the exploratory and explanatory researches in order to answer the questions regarding the; who, what, when and how (Kasongo and Moono, 2010); which are associated with the decision making process under study. The research was largely qualitative and applied some quantitative aspects covered in the Analytical Hierarchical Decision model (Saaty and Vargas, 2006). The data was gathered using both primary and secondary data collection methods. The primary instruments applied were questionnaires and interviews. Purposive judgmental sampling was used because the researcher used own judgment to select the sample (Sekaran & Bougie, 2013). The research targeted officials at the policy and decision making level in power generation services of the energy sector. These were found in MOEPD, MOFED, ZIA, ZESA, ZPC, ZERA and IDBZ. At least 5 (five) participants were identified from each institution to give a total of 40 respondents.

1.8. Conceptual Framework

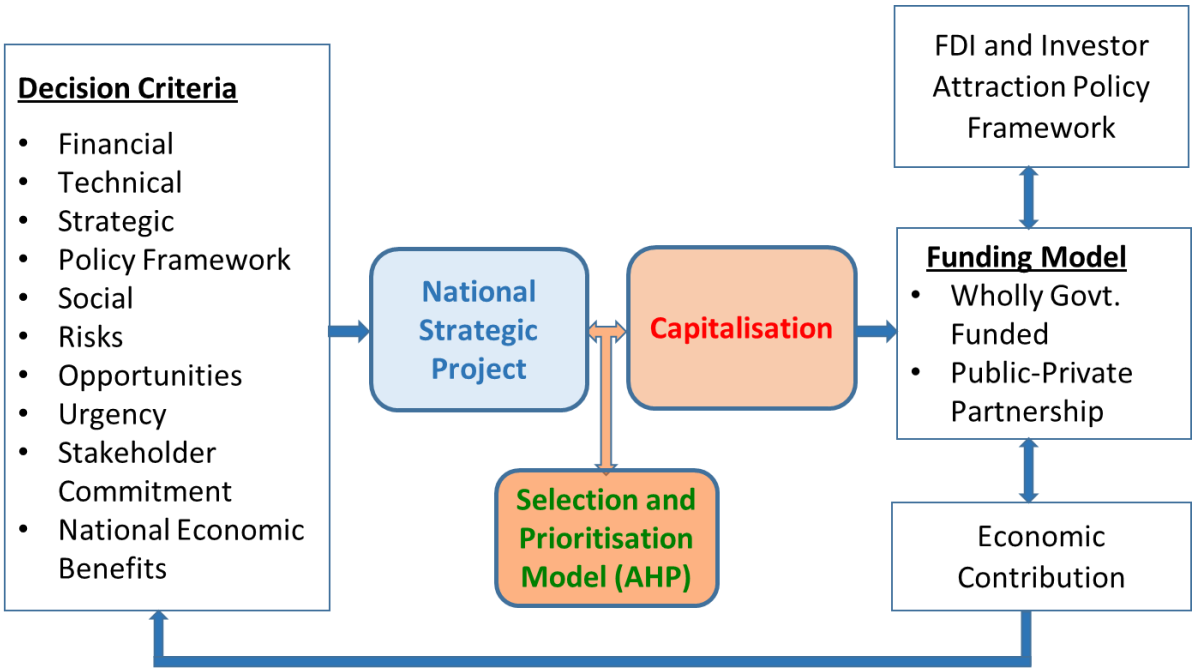
In this study, the researcher adopted the conceptual framework depicted in Figure 1.1. The framework was informed by a review of related literature.

Saaty and Vargas (2006), in their book, Decision Making with the Analytic Network Process (ANP), proffered a framework of analysing benefits, opportunities, costs and risks under economic, political, social and technological criteria categories. Meredith and Mantel (2009) suggested that project selection criteria can be grouped under five categories, viz; production, marketing, financial, personnel and administrative and miscellaneous categories. Vargas (2010 p.4), argued that financial, strategic, risks, urgency, stakeholder commitment and technical knowledge are the main criteria groups that can be used while prioritising projects and determining the real meaning of an optimal relationship between benefits and costs. Wheeler (2013) citing Jiang and Klein (1999), with reference to their generated selection criteria for information systems, indicated the following categories; financial, organisational, competing environment, technical, risk and management. Also, citing Puthamont and Charoenngam (2006), Wheeler highlighted various selection criteria for different types of projects of which

the infrastructure project selection criteria from the World Bank (2003) are relevant to this study. These are; project development objectives, strategic context, project description, project rationale, project analysis (feasibility), sustainability and risks, readiness to implement (commitment) and compliance with bank policies.

The Standard for Portfolio Management (PMI, 2013) lists a wider range of selection criteria. These include; organisational strategy alignment; goals and objectives; benefits, financial and nonfinancial; market share, market growth, or new markets; costs (lost opportunity costs); dependencies, internal and external; risks, internal and external; legal/ regulatory compliance; human resources capabilities and capacities; technology capabilities and capacities; and urgency.

Figure 1.1: Conceptual Framework



Source: Researcher 2014

1.9. Limitations of the Study

1.9.1. Respondents' Reluctance to Participate

Reluctance to participate by some respondents in the targeted population or they might not be at liberty to answer truthfully. The researcher mitigated this by adhering to business research ethics (confidentiality) and made use of triangulation technique.

1.9.2. Decision Functional Level

The policy and decision functional level of the targeted population restricted the sampling frame. This was mitigated through use of purposive-judgmental sampling and well-designed research instruments.

1.9.3. Wind Power Generation

In Zimbabwe, wind power generation has no adequate data to make meaningful comparison with the other three categories of power generation. Therefore, the research did not consider this category.

1.10. Definitions of Key Terms

1.10.1. Decision Making

In this study, decision making relates to consideration of the various decision criteria for power generation project selection and prioritisation in order to come up with the best possible choice from available alternatives.

1.10.2. Decision Support System

According to Jain and Lim (2010), and in this context, the decision support system is a software application that helps the decision maker in data analysis in order to get the right knowledge for making the right decision at the right time, in the right representations and at the right costs.

1.10.3. National Project Status

This status is granted to government funded projects with a national impact. The projects are deemed national through the massive size of capital (both financial and plant and equipment) that would be needed for that type of investment and exempted from duty payments and other tax payments requirements. Currently this incentive is restricted to Government Departments; however the current policy will extend to also cover the private sector (Industrial Development Policy, 2012-2016).

1.10.4. National Strategic Project

A project that has been granted “National Project Status” and its implementation is supervised by Government through the responsible line ministry or authority.

1.10.5. Project

A project is defined as a temporary endeavor undertaken to create a unique product, service, or result (PMBOK Guide, 2013). The temporary nature of projects implies that a project has a definite beginning and end. For example, the Kariba South Extension Project whose objective is to augment current power generation capacity is envisaged to start in 2015 and be completed by 2017 (ZESA).

1.10.6. Program

According to Turner (2009), and in this context, a program of projects is a group of projects which contribute to a common, higher order objective. Thus, all the power generation projects being undertaken by both the government and private sector are grouped together to form a national power program.

1.10.7. Project Portfolio

PMBOK Guide (2013), defines a portfolio as a collection of projects, programs or sub-portfolios and other operational activities that are grouped together to facilitate effective management of that work to meet strategic objectives. In this context, the power generation programs by government and private sector are part of the national power infrastructure development portfolio which includes transmission and distribution systems.

1.10.8. Project Stakeholders

Stakeholders are the people involved in or affected by power generation project activities on the back of their different needs and expectations. In this instance, the study considers all government institutions involved in power generation project selection and prioritisation; such as MOEPD, MOFED, ZESA, ZENT, ZPC, ZERA, and ZIA; to be the key stakeholders. Additional stakeholders include financing institutions, investment groups, development partners, community groups and end-users.

1.11. Explanation of Acronyms

AHP	Analytic Hierarchy Process
ANP	Analytic Network Process
BEP	Break-Even Point
BOT	Build, Operate and Transfer

EPC	Engineering, Procurement and Construction
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
IDBZ	Infrastructure Development Bank
IEA	International Energy Agency
IPP	Independent Power Producer
IRR	Internal Rate of Return
JV	Joint Venture
MCDA	Multi Criteria Decision Analysis
MCDM	Multi Criteria Decision Method
MDG	Millennium Development Goals
MW	Megawatts
NEP	National Energy Policy
NPV	Net Present Value
NPSDP	National Power Systems Development Plan
PBP	Pay-Back Period
PESTEL	Political, Economic, Social, Technical, Environmental and Legal
PMBOK	Project Management Book of Knowledge
PPP	Public Private Partnership
PSIP	Public Sector Investment Program
OECD	Organisation for Economic Co-operation and Development
RBZ	Reserve Bank of Zimbabwe
ROI	Return on Investment
SADC	Sothern African Development Community
SAPP	Southern African Power Pool
SWOT	Strengths, Weaknesses, Opportunities, and Threats
WB	World Bank
ZIA	Zimbabwe Investment Authority
ZIMASSET	Zimbabwe Agenda for Sustainable Socio-Economic Transformation
ZETDC	Zimbabwe Electricity Transmission and Distribution Company
ZESA	Zimbabwe Electricity Supply Authority
ZPC	Zimbabwe Power Company

1.12. Chapter Summary

This introductory chapter introduced the background to the study, the research problem statement and contextualised these through clearly stated research objectives and questions. A discussion of the significance of the study was made with emphasis on the contribution of project decision making model(s) to both theory and practice. The chapter also discussed the scope of the research in terms of the study focus, time, geographical limits of the research and methodology in brief. The researcher proffered a conceptual framework that depicts the relationship of the variables covered in the study. Lastly, the chapter described the limitations that the researcher encountered in the course of the study and highlighted definitions of key terms and acronyms used herein. The next chapter focused on review of literature to establish what knowledge other scholars and researchers have contributed on decision processes for project selection and decision making for capitalisation purposes.

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction

This chapter focuses on the review of relevant studies that were done by other researchers and related theory on the subject matter. The chapter reviews the literature from source documents that include textbooks, scholarly research papers, journal articles, internet research articles and e-books. The literature review enabled formulation of the study conceptual framework and development of research questions regarding the relationship between the variables in decision making models and subsequent capitalisation of the chosen power generation strategic project(s) for successful execution thereof. Accordingly, the chapter covers the importance of project selection and prioritisation, the variables (criteria) adopted in the conceptual framework, various MCDM/MCDA models, the project financing methods, FDI attraction policies and PPP Framework.

2.2. Importance of Project Selection and Prioritisation

A lot of literature is available on project selection tools and techniques in terms of project portfolio management (Puthamont and Charoenngam, 2006; Turner, 2009; Meredith and Mantel, 2009; Vargas, 2010; Munier, 2011; Wheeler, 2013; PMI, 2013). Project selection and prioritisation is an indispensable activity in project portfolio/program management for both public and private organisations. Without well-structured selection processes, projects may be selected in an ad-hoc manner, out of the impulse of ambitious sponsors, leaders or politicians (Munier, 2011); in response to a need or public pressure (Wheeler, 2013), or as a 'sacred cow' initiated by superiors or powerful officials (Meredith and Mantel 2009).

According to Wheeler (2013 p.172), amongst other impediments of optimum project selection and prioritisation processes, there is a general reliance on quantitative methods rather than qualitative methods for justification. He argued that "qualitative analysis may be considered to be more difficult to justify if under scrutiny, so some sectors may prefer to use primarily quantitative criteria for its defendability." In the circumstances, this researcher supports his assertion that multi-criteria decision making processes should be preferred as they generally involve both qualitative and quantitative criteria. Diakoulaki et al (2005 p.882), pointed out that "selection of a particular set of criteria clearly depends on the particular type of the

problem under consideration, the stakeholders' interests and/or the analyst's abilities and preoccupations." They also noted that data availability often imposes very severe limitations to the range of criteria included in the analysis and in the way they are measured, thus affecting the reliability of the obtained results.

Turner (2009 p.328) posited that project selection and prioritisation, in terms project portfolio decision making and management thereof, should be done "through a transparent system maintained centrally". Centralisation brings about the much needed distinct advantage of assignment of limited capital resources. This position holds true in constrained developing economies similar to what Zimbabwe is experiencing.

2.3. Selection and Prioritisation Criteria

Resources are never sufficient enough to fund all the projects that an organisation or institute might want to pursue and as such, there is need to assign priorities to select projects that give the most benefits (Turner (2009 p.45). Project selection and prioritisation criteria can be quantitative (numeric) and qualitative (non-numeric); financial and non-financial; and are highly dependent on the type of industry or nature of the project (Wheeler, 2013; Vargas, 2010; Meredith and Mantel, 2009; Puthamont and Charoenngam, 2006). Traditionally, project selection and prioritization is based on a cost-benefit relationship of each project; resulting in perceived economic viability, whereby projects with higher benefits to cost ratio have a higher priority (Vargas, 2010). However, it is worth noting that the cost-benefit relationship does not restrict itself to the use of exclusive financial criteria like the widely known benefit-cost ratios, but rather a wider concept of the benefits realised from the project (Vargas, 2010 p.3). Further, evaluation criteria, which are at the centre of decision making, should consider aspects like organisational strategies, goals and objectives (Stanimirovicit, 2013 p.172).

A review of literature reveals that the criteria for successful project selection and prioritization are many and varied and are at times dependent on the type of industry under discussion (Wheeler, 2013). Meredith and Mantel (2009) suggested that project selection criteria can be grouped under five categories, viz; production, marketing, financial, personnel and administrative and miscellaneous categories. Vargas (2010 p.4), argued that financial, strategic, risks, urgency, stakeholder commitment and technical knowledge are the main criteria groups that can be used while prioritising projects and determining the real meaning of

an optimal relationship between benefits and costs. Wheeler (2013) citing Jiang and Klein (1999), with reference to their generated selection criteria for information systems, indicated that the following categories would be appropriate; financial, organisational, competing environment, technical, risk and management. Also, citing Puthamont and Charoenngam (2006), Wheeler highlighted various selection criteria for different types of projects; of which the researcher found the infrastructure project selection criteria from the World Bank (2003) to be relevant to the selection and prioritisation of power generation projects in Zimbabwe. These are; project development objectives, strategic context, project description, project rationale, project analysis (feasibility), sustainability and risks, readiness to implement (commitment) and compliance with monetary policies. The Standard for Portfolio Management (PMI, 2013) listed a wider range of selection criteria. These include; organisational strategy alignment; goals and objectives; benefits, financial and nonfinancial; market share, market growth, or new markets; costs (lost opportunity costs); dependencies, internal and external; risks, internal and external; legal/regulatory compliance; human resources capabilities and capacities; technology capabilities and capacities; and urgency.

In view of the available literature highlighted above, this study adopted financial, technical, strategic, policy framework, risks and opportunities, urgency, social, stakeholder commitment and national economic benefits as discussed hereinafter.

2.3.1. Financial

This group of criteria is used when the objective is to capture the financial benefits of the identified projects (Vargas, 2010). This study does not intend to go into the mathematical calculations of the financial criteria but to highlight the significance thereof. They are directly associated with costs, productivity and profit measures which include: Return on Investment (ROI); Profit (in currency); Net Present Value (NPV); Internal Rate of Return (IRR); Payback Period (PBP); and Financial Benefit/Cost Rate (Thumann and Woodroof, 2009; Vargas, 2010; Elahi and Najafizadeh, 2012).

These financial models have their limitations and flaws in respect of financial analysis (Zaeri et al, 2007; Elahi and Najafizadeh, 2012). Firstly, it is difficult to predict future discount rates and, therefore, it is usually assumed that the discount rate will be constant in the future. Secondly, the business environment dynamics make it difficult to predict future cash flows with certainty. Thirdly, financial models ignore other factors, outside quantifiable financials,

that are of importance to project choice such as strategic considerations and socio-responsibilities or intangible factors (Christoffels, 2010). Lastly, there is inconsistency of measurement. For example, both ROI and NPV make use of the concept of "Time Value of Money" while PBP does not. PBP does not consider all of the project's cash flows and the accept/reject criterion is arbitrary. Also, NPV does not recognise cost of capital and the associated risks of the project. A project may also have a smaller ROI but its nominal profit can be bigger. For this reason, Turner (2009 p. 45) asserted that "the project appraisal process is repeated at several stages of the project life cycle, using increasingly accurate data" which is then used to determine the "go, no-go, or go-back decision points".

It should be noted that whilst the primary objective of the private sector is to maximize profit, and its decisions are mainly based on the financial viability of projects, government decisions with regards to power generation are based on the national energy policy framework aimed at meeting socio-economic considerations (NEP, 2012). Therefore, government decisions in the energy sector investments (long term) should look comprehensively into other intangibles related to environmental impact and social-economic benefits.

Accordingly, NPV, ROI, Profitability, PBP, BEP and Low Cost (Capital Outlay), as selection and prioritisation criteria for power generation projects, will be included in this study to determine the level of importance given by the government decision makers.

2.3.2. Strategic

The strategic category includes a group of criteria directly associated with the strategic objectives (Vargas, 2010). They differ from the financial criteria because strategic criteria are meant to address specific national objectives and take precedence over any subordinate priorities. It is important that national power generation projects be aligned with the strategic objectives (Garcia-Melon et al, 2007; Turner, 2009). Accordingly, definition of the requirements for power generation projects selection and prioritisation must be underpinned by strategic fit (Wheeler, 2013). Further, Wheeler asserted that choosing the wrong projects or poorly defined requirements (or needs) can lead to project failure or costly change management to these projects during implementation. The importance of strategic alignment and defined need are also emphasised by Murray (2009) and Burger et al. (2009). They further stressed the inclusion of quality-of-life to the strategic criteria in project selection for the public sector

projects they studied based on PPP arrangements. In this approach, the socio-economic implications are also considered as part of the strategic framework.

In this study, strategic fit/alignment, creation of synergy, political acceptance, resource mobilisation and sustainability (environmental) issues will be included under this criteria category.

2.3.3. Risks and Opportunities

According to the 5th Edition of the PMBOK® Guide (2013 p.310), project risk is defined as "an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives such as scope, schedule, cost, or quality." In this definition, the PMI proffers some difference between the technical definition and the ordinary definition of the word "risk". The guide explains that in instances where the expression "reduce risks and enhance opportunities" is used, the opportunities refers to the events which have a positive effect on the project and the risks are those which affect it negatively.

Risk criteria determine the acceptable level of risk tolerance in project adoption and execution. According to Hilson (2003), as cited by Vargas (2010), the threat-based risk assessment criteria can also incorporate the assessment of opportunities. In each case the thresholds for risk tolerance must be predetermined and expressed in percentage terms (Munier, 2011). However, as rightly pointed out by Vargas (2010), many times the assessment of opportunities that a project can produce would be covered under the strategic criteria. It is important to note the other perspective for this criterion. This relates to the risk associated with the attendant consequences of not undertaking the project. For example, the risk derived from Zimbabwe's failure to rehabilitate or develop electricity generation infrastructure has been the significant incapacitation of the manufacturing and mining industries which are the dominant drivers of economic recovery.

Financial and technical risks are critical factors in electricity projects. Power generation project definition is driven by the availability of the sources of finance whereby the financiers want to minimise risk; especially in the choice of technology (Turner, 2009 p.62). In this case the completion date becomes another key parameter in the project's viability because schedule failures usually result in significant loss of revenue and increased financing charges. Therefore, it is crucial to determine the timing of the project when calculating its risks and associated

management dynamics. This is supported by Turner (2009 p. 63), who correctly argues that technical risk needs to be assessed in order to avoid technical problems which may result a massive effect on potential overrun of the project.

It is therefore important to note that the major risk factors in power generation projects, relate to their impact on environment, technological obsolescence, equipment aging, no guaranteed supply of feedstock (coal for thermal plants, unsustainable dam levels and low volumes of run-off water in rivers for hydro plants); or scheduling compromises due to weather interruptions and the associated delays in revenue collection attributable to belated operationalisation of the project. There is also potential financial risk when cost-reflective tariffs become unaffordable to end users; necessitating government subsidies.

In this study, the importance of financial, technological, project duration and environmental criteria will be considered under this category.

2.3.4. Urgency

A project, as defined in the PMBOK Guide (2013) is a temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects implies that any project has a finite life cycle; from start to finish. Accordingly, the PMBOK Guide (2013 p.34), posited that "project success should be measured in terms of completing the project within the constraints of scope, time, cost, quality, resources and risks". Turner (2009 p.5) supported this position in that, amongst the features of a project "transience" creates urgency; that is, the need to start and finish the project and realise the benefits arising from the investment made. Vargas (2010) postulated that the urgency criterion determines the urgency level of the project implementation when compared to other projects within a portfolio or program. That is to say, it defines the time horizon required to execute the project; whether it is immediate, short term, or long term. Accordingly, he argues that projects considered to be urgent require immediate decision and action; so they have a higher priority than projects that are not urgent.

Munier (2011 p.35) posited that, regardless of the reasons, there will always be certain projects that must be incorporated in the final strategic mix. He notes that, for political reasons, "if it is true that pre-electoral speeches and promises are very often forgotten or 'postponed', we must also admit that they have to be honoured." It follows, therefore, that the need to honour such

promises brings about a commensurate degree of urgency in the adoption and subsequent implementation of the affected projects. In Zimbabwe, the government has promised to tackle the energy crisis through the identified ZIMASSET power infrastructure projects, thereby creating the much needed sense of urgency.

Whilst agreeing to these submissions, the researcher believes that care must be taken to avoid instability, resulting from the potential financial and technology risks, or compromised quality in the implementation process. In this study, the importance of the urgency criteria will be assessed against political, sponsor or need (demand) influence.

2.3.5. Stakeholder Commitment

According to Vargas (2010 p.4), and in this context, this consists of a group of criteria that aims to assess the level of stakeholder commitment towards the power generation projects. Jain and Lim (2010) observed that, in any decision making process, a full commitment to put the action plan into implementation is a significant factor of ensuring success. They further argued that without commitment from all parties involved, it is unlikely to obtain any useful and beneficial results, even with the most sophisticated and comprehensive action plan in hand. Vargas (2010) and Garcia-Melon et al (2007) weighed in by indicating that the higher the commitment to the project by all stakeholders, the higher priority the project should receive. They suggested that the commitment can be evaluated using the following general stakeholder groups: customer, community, organizational, regulatory bodies, project teams and project managers. This is supported by Martland (2012, p.24) who emphasised the requirement for planners and engineers to work with other stakeholders such as financiers, business communities, politicians, community leaders, and the public in order to meet society's needs more effectively when implementing projects, operating and maintaining infrastructure.

Munier (2011 p.8) argued that public opinion is a very important aspect in project selection and "the corresponding criteria must be established". He observed that some projects may fail because of the failure to pay due attention to mass resistance. Martland (2012 p. 99) warned that large projects are politically sensitive. The reason for this is that potential and actual conflicts of interest exist within the groups which are mandated to propose, evaluate and approve the projects. Legal frameworks may also prove to be handicaps in the implementation of strategic projects. Therefore, he advises that all resulting conflicts must be considered and

balanced particularly where the decision makers need to include the public, who are likely to vote for or against the release or mobilisation of the required resources. Further, on the other hand, he indicates that the situation may involve politicians or officials, who must be seen to justify their decisions to the public in order to be re-elected or to retain their jobs. In Zimbabwe, just as in most developing countries, these observations usually manifest during the period encompassing preparation and conduct of elections; resulting in some projects being adopted for political reasons or as 'sacred cows'(Munier, 2011, Meredith and Mantel 2009).

2.3.6. Technical

According to Vargas (2010) and Munier (2011), this is a category of criteria that assesses the technical aspects of each alternative or project. They include the technical knowledge necessary to execute the project. When the required technical knowledge is readily available, it becomes easier to implement the selected project; leading to more effective and efficient use of resources. If objectives are related to learning and growth processes associated with technology transfers, the attendant criteria need to be aligned with the strategic category and not with technical knowledge influencing the selection of the project. For example, in power generation technologies, whilst it would be scientifically sound to go for 'green technology' to harness renewable energy sources, Zimbabwe's strategic objective of exploiting and beneficiating the abundant national natural resources such as coal and coal-bed methane (CBM), will inevitably lead to the pursuit of 'clean technologies' instead. This will ultimately promote projects that use CBM or coal-fired thermal power plants in place of the other alternatives.

Energy projects are complex in technical terms and require significant effort throughout the design, engineering and development stages to produce an economically convincing case for end users (Thumann and Woodroof, 2009 p. 103). Post sales and/or post commissioning aspects such as equipment age, technical support, service and maintenance need to be factored in the decision matrix. For example, a study by Ajayi and Olamide (2014) aimed at selecting the best power production technologies in Nigeria, included the availability of feedstock (fuel), electricity cost, capital cost, topography of installation site, risk, fixed operating and maintenance cost, variable operating and maintenance cost, service life and process efficiency. It is therefore important to note that a proper feasibility study is a critical tool for determination of all techno-economic considerations for project evaluation and approval; especially at the

pre-financing stage. Being cognisant of this position, the Ministry of Finance and Economic Development made budget allocations for feasibility studies in the 2015 National Budget (Section 826 – 830) to facilitate demonstration of technical and financial viability of all the proposed projects.

In this study, other criteria that will be considered in this category include technology competitiveness in terms of reliability and efficiency, complexity, compatibility with existing systems, complementarity and maintenance aspects.

2.3.7. Investment Policy Framework

Successful implementation of national power generation projects hinges on a conducive policy environment. According to Hamalainen (1988) the practical use of formal methods is most often limited to studies about technically value-independent variables. He then, rightly so, asserted that the final policy decisions should encompass informal subjective reasoning. For this reason, it has become necessary to consider explicit values in policy decisions. Investment in power generation projects requires coherent and friendly policies, tolerant rules and regulations on FDI entry and operations incorporating open trade and payment systems that attract investors (UNDP, 2007).

That notwithstanding, the UNDP report (2007 p.44) noted that, among other things, several African countries have been making significant progress in embracing economic reforms, implementing proactive investment measures, and improving their economic growth performance. It further urged African states to improve their image in order to gain investor confidence which is negatively affected by the perceived high risk of doing business there. In conclusion, the report acknowledged that reality often differs from the images conveyed in the media; making the task of investment promotion in the region's economies more challenging than for other developing regions.

According to ZIMASSET (2014 p.29), the economic blueprint for the country over five years (2013 – 2018), the economic development framework includes increased investment in energy and power development, amongst other public infrastructure, through accelerating the implementation of PPPs and other private sector driven initiatives; increased FDI; establishment of Special Economic Zones; and continued use of the multi-currency system.

Accordingly, the document focuses on outlining the Government's target of "pursuing a new trajectory of accelerated economic growth and wealth creation" (ZIMASSET p.6). To buttress this position, the Indigenisation and Empowerment Act (Chap 14:33) of 2007 requires all non-indigenous enterprises operating in Zimbabwe to dispose of at least 51 percent shareholding to indigenous entities. This Act, however, has not been fully understood by would-be-investors and remains a major inhibiting factor in attraction of FDI for Zimbabwe. According to the 2015 National Budget Statement (2014 p.216) assessment and compliance with the Indigenisation and Empowerment Policy is now decentralised to the responsible line ministry.

Zimbabwe's energy policy correctly articulated that its implementation must be underpinned by ensuring clarity, awareness, consistency and appropriate action (NEP, 2012 p. vii). In this instance, a PPP framework is paramount in governing how PPPs are identified, negotiated, awarded, managed and how risk is shared and mitigated (Udenge, 2014). Udenge stressed that, in addition to clarity and consistency, there was need for policy coherence in order to provide the private sector the much needed comfort in terms of safety of their investment in infrastructure projects. He, however, submitted that Zimbabwe was yet to come up with a comprehensive PPP policy framework and legislation.

This is supported by Chigumbura (2015) who, in his presentation at the CZI 2015 Economic Outlook Symposium in January 2015, also underscored the fact that, among other aspects, "delays in finalising the PPP legislative framework and complexity of PPP transactions undermine implementation of infrastructure projects". He posited that "unintended policy outcomes that lead to policy reversals create uncertainty, undermine business confidence and dampen investor confidence." Such a policy (on PPP) is needed to assist in clarifying issues to do with policy ambiguity and perceived inconsistencies. In this instance, it is hoped that the proposed Joint Venture Bill (aka Public-Private Partnership Bill) tabled for the 8th Parliament of Zimbabwe will result in the enactment of the relevant Act and the much needed policy framework.

2.3.8. Social

This is a group of criteria that captures the impact of the project; positively or negatively. That is social benefits or losses to be derived from the project. Munier (2011) suggested that percentages are usually used for social criteria to convey people's perception about different

aspects of the project. For example, an infrastructure project beneficial to the community may attain 85% public approval while its alternative receives 40%.

Accordingly, Munier (2011 p.8), argued that, when assessing the impact of projects, how a project will affect the lives of the community around the area of interest should be considered. He cited two examples pertaining to large hydroelectric projects, one being the Aswan Dam (Egypt) and the other being the Three Gorges on the Yantze River in China. The first entailed a wide-reaching effort to protect 22 monuments and architectural complexes that were exposed to flooding from Lake Nasser, and the second caused compulsory relocation of community.

In economics, www.businessdictionary.com defines time-preference as the inclination of a consumer towards current consumption (expenditure) over future consumption, or vice versa. For example, Zimbabwe went through a very turbulent economic phase whereby people could not have their basic need satisfied as company closures became the order of the day. For those at work, employers failed to pay salaries months on end. The social time preference factor quickly set-in as people continued to use electricity without honouring the resultant bills opting to spend the little they got on other preferred areas of need. Such consumption, driven by the perceived more important needs, led to arrears which forced the government to write-off the debts.

As far as social benefits are concerned, these were clearly demonstrated in a case study by the World Bank on a project whose objective was to raise levels of social development and economic growth by increasing access to electricity in rural areas. According to the World Bank report (2014), for assistance in Bangladesh's energy sector project – the Rural Electrification and Renewable Energy Development (RERED) Project (2002-13), there are several socio-economic benefits that are realised through enhanced electricity access. The report highlighted the following outcomes: A notable contribution to social and economic outcomes in rural areas by extending access to electricity through off-grid Solar Home Systems (SHS), supplemented by progress on extending the electricity grid. Areas covered by off-grid SHS saw significant increases in study times and a greater number of children completing schooling. Household appliances such as fans, and television sets began to be used. Lighting contributed to a better sense of security for women, increasing their mobility. Television helped women improve their knowledge of health and environmental issues, apart from improving general awareness. An impact assessment study for the grid-based expansion found a 21

percent increase in household incomes in the project area. Overall, there was great improvement in the quality of life.

According to World Bank's Independent Evaluation Group's report on "Evaluation of World Bank Group's Support for Electricity Access" (Dec 2013) there are direct benefits derived from the relationship between access to electricity and Millennium Development Goals (MDGs). These are shown in the Table 2.1 below:

Table 2.1: The relationship of electricity access to the Millennium Development Goals (MDGs)

MDG	**Contribution of Electricity Access in Achieving MDGs**
Goal 1: **Eradicate extreme poverty and hunger**	• Provides less time-consuming and more healthful means to undertake basic household tasks. • Permits income generation beyond daylight hours through lighting.
Goal 2: **Achieve universal primary education**	• Saves time spent on gathering traditional sources of energy, thus allowing school attendance to replace child labour. • Facilitates studying at home and teacher retention in schools. • Enables access to educational media and communication. • Increases educational opportunities and allows distance learning.
Goal 3: **Promote gender equality and empower women**	• Reduces the physical burden of carrying wood. • Frees up time for women to widen their employment and education opportunities. • Allows home study and evening classes. • Improves women's safety.
Goal 4, 5, 6: **Reduce child mortality; Improve maternal health; and Combat HIV/AIDS, malaria, and other diseases**	• Enables night availability, helps retain qualified staff, and allows equipment use (for example, sterilization and medicine refrigeration), thus improving the adequacy of child and maternal treatment. • Benefits health and nutrition directly by enabling access to piped water and allowing refrigerated food storage and indirectly through knowledge (and therefore usage of health services). Estimates show that with a one percent increase in electricity coverage in a province, the child malnutrition rate declines by 1.2 percent. • Reduces women's workload and heavy manual labor that may affect women's general health and well-being. • Improves usage of health services through access to health education media via information and communication technologies (ICTs).

Goal 7: **Ensure environmental sustainability**	Societies that derive a greater portion of their energy from electricity have lower emissions of pollutants. The promotion of renewable energy sources to generate electricity access reduces GHGs emissions and it is congruent with the protection of the local and global environment.
Goal 8: **Develop a global partnership for development**	In 2012, the Sustainable Energy for All (SE4ALL) global initiative was launched by the Secretary-General of the UN in partnership with the World Bank and the International Energy Agency (IEA) to reach universal energy access, improve energy efficiency, and increase the use of renewable energy by 2030. The initiative was launched to coincide with the designation of 2012 as the International Year of Sustainable Energy for All by the UN General Assembly.

Source: WB 2011; Meisen and Akin 2008; IEA 2010 and 2013

2.3.9. National Economic Benefits

According to Martland (2012), the ideal situation is that there should be a rational and structured way of assessing public projects and, barring other considerations, only projects whose benefits exceed total costs should be taken up and prioritised for funding in view of the limited resource envelop; especially in developing countries as these are likely to stimulate/attract further investment in the national economy. In this instance, infrastructural projects such as power, communication and water, are key to attracting investment in the form of FDI. This, in turn, would be of immense benefit to the nation and provide return on investment to the sponsors/financiers.

It is important to note that public infrastructure projects are generally intended for the public good where by the benefits transcends beyond financial gain. There should be, in the various phases to completion of such projects, positive impacts on the society at various economy levels; which maybe national, regional, or international. These can be categorised as short-term and long-term benefits. For example, during the construction phase there are short-term benefits to be derived such as employment of local professionals and general labour; and revenue generation for those businesses contracted to manufacture/supply various types of materials/goods and services. Quality of life for the community is also improved as ordinary vendors benefit through brisk business. A case in point is the selling of various small items like beverages (soft drinks, water) and cigarettes to construction workers during the rehabilitation and construction of national highways in Zimbabwe.

On completion of the project, there are long term benefits which accrue during the lifespan of the project, these can be monetary or otherwise; such as revenue for the sponsors/owners, improved industrial productivity, taxes accruing to the national coffers, permanent jobs or overall improvement in the quality of life for the people nationally. For example, completion of a power generation project which feeds into the national grid would result in a multiplier effect on both social, industrial and economic benefits through which the country achieves regional competitiveness.

Martland (2012) warns that, whilst political decisions are sometimes used for or against project adoption, the conception of public infrastructure projects should not be driven by the ego to create wealth for the sponsors or support for a political scheme at the expense of the taxpayer. Where such projects are implemented/constructed, cost/benefit analysis becomes irrelevant, and they may end up not being useful to society and become 'white elephants'.

This study will assess the importance placed on the national economic benefits such as import substitution, industrial capacity utilisation, contribution to fiscus (taxes), contribution to Gross Domestic Product (GDP) and employment creation.

2.3.10. Summary of Selection and Prioritisation Criteria

In view of the foregoing discussion, Table 2.2 indicates the summary of the decision criteria adopted in this study.

Table 2.2: Summary of Selection and Prioritisation Criteria

Financial:	**Technical:**	**Stakeholder Commitment:**
• Net Present Value • Return on Investment • Profit • Payback Period • Break-Even Period • Low Cost/Capital Outlay	• Hydro-electric generation • Thermal generation • Solar energy generation • Technology competitiveness • Compatibility with existing technology • Techno-economic Feasibility Study	• Political Acceptance • Donor Funding Groups • Project Grants Bodies • Regulatory Bodies • Community Consensus • Consumer Commitment

Strategic:	**Urgency:**	**Risks and Opportunities:**
• Strategic Fit • Creation of Synergy • Political Acceptance • Sustainability Impact • Resource Capability and Capacity	• Political urgency • Sponsor urgency • Problem solving (need)	• Financial (insufficiency) • Technology (matching level) • Project Duration (overrun) • Environmental Impact
Social:	**Policy Framework:**	**Economic Benefits:**
• Quality of Life • Employment Creation • Community Pressure • Social Time Preference	• Public-Private Partnerships • FDI and Investment Attraction • Millennium Development Goals • Fiscal and Monetary Policies • Industrial Development Policy	• Import substitution • Industrial Capacity Utilisation • Contribution to Fiscus (taxes) • Contribution to Gross Domestic Product (GDP)

Source: Researcher, 2014

2.4. Models for Decision Making

Researchers, in the past decades, have developed a variety of decision models as they sought to cope with the challenges of decision making (Jain and Lim, 2010). Consequently, appropriate decision support systems (DSS) have also been developed and used for project selection and prioritisation (Ghasemzadeh & Archer, 2000; Kocaoglu & Iyigun, 1994; Badri et al, 2010). This means that the decision making process arises when there is need to select the best possible course of action from a set of alternatives. The DSS has become an indispensable tool as it is not easy to fully analyse the usually complex and multi-facet information and data and make prompt, informed and accurate decisions without the software (Jain and Lim, 2010).

There are single-criterion and multiple-criteria decision models which can be used at various levels and under different circumstances. In any case, sustainable models and DSS, are those able to combine quantitative and qualitative criteria and allow the priority preferences of potential users to be included in the decision analysis (Jain and Lim, 2010). Therefore, as they further propound, the uniqueness of the selected decision method has to be in its ability to match the various needs and specific strategic objectives of developing countries. Zimbabwe power generation projects, for example, have to take into account aspects to do with turning

around the economy, adoption of appropriate energy technologies, improvement of livelihoods and addressing topical sustainability issues.

2.5. Multi-Criteria Decision Making

According to Memarzade et al (2011), "multi-criteria decision making methods are considered as the processes of determining the appropriate solution with established criteria where these criteria usually conflict with each other and there may be no solution satisfying all criteria simultaneously." In literature, there are various Multi-Criteria Decision Making (MCDM) models; also known as Multi-Criteria Decision Analysis (MCDA) methods, which can be applied to individual, group, corporate and state decision making processes (Figueira et al, 2005; Mohamadali and Garibaldi, 2009).

According to Munier (2011) and Stein (2013), the most popular MCDM/MCDA methods include Multi Attribute Utility Theory (MAUT), Wallenius et al. (2008); Élimination Et Choix Traduisant la Réalité (ELECTRE) – (which is translated as: ELimination and Choice Expressing Reality), Roy (1968); Preference Ranking Organization Method for Enrichment Evaluations (PROMETHEE), Brans and Vincke (1985); Technique for Order Preference by Similarity to Ideal Situation (TOPSIS), Hwang and Yoon (1981); Analytic Hierarchy Process (AHP), Saaty (1980); and (Sequential Interactive Model for Urban Systems) SIMUS. These methods are based on a preference and outranking concept which screens the various alternatives available and produces the resultant dominant alternatives that outperform the others according to the criteria used. In all cases, this is done by constructing the appropriate 'Decision Matrix' through which the respective software (DSS) determines the criteria weights. As noted by Stein (2013), each method has its strengths, weaknesses and areas of best application. Munier (2011) posited that for whichever method used, decision makers must endeavour to achieve transparency of the whole process in order to dispel any doubt as to what was done and the basis of the decision. He argues that, "even with the best goodwill, knowledge and expertise, a mistaken decision can be made, but if it is known on what grounds that decision was adopted, at least there would be some possibility of finding an error and either correcting it, or avoiding it in the future" Munier (2011 p.24). I support his argument in that regard.

From the literature review done by the researcher, this study will focus on the Analytic Hierarchy Process (AHP) as the model of choice.

2.5.1. The Analytic Hierarchy Process (AHP)

Since its introduction in 1976 by Thomas L Saaty of the University of Pittsburgh, the AHP is regarded as one of the most widely used multiple criteria decision making tools (Saaty, 1980). Its numerous successful applications published in literature include strategic planning, public policy, banking, selecting the best alternatives, resource allocation, conflict resolution, process optimization, manufacturing, etc. (Zaeri et al, 2007; Saaty, 2008; Mohamadali and Garibaldi, 2009; Vargas 2010; Ishizaka and Labib, 2011; Shah et al, 2013; Stanimirovicit, 2013). The AHP has also been used by many researchers to resolve decision-making issues in project selection and prioritisation (Dey and Gupta, 2001; Zaeri et al, 2007; Dalalah et al, 2010; Stein, 2013; Sliogeriene et al, 2013; Ajayi and Olamide, 2014). In his study for the Development of a Decision-Support Model for Outsourcing of IT-Projects in the Public Sector, Dalibor Stanimirovicit (2013 p. 172), argued that the AHP is "one the most comprehensive frameworks for the analysis of economical, societal, governmental and corporate decisions, capturing the complex relations and effects of interplay in human society, especially when risk and uncertainty are involved." Citing Vargas (2010), Stanimirovicit stressed that the AHP "allows decision makers taking into account all the tangible and intangible factors and criteria affecting the decision, subsequently facilitating quality decision making and management."

According to Saaty (1994), a decision-making approach at policy level should be simple in construct, adaptable to both groups and individuals, natural to intuition and general thinking, encourage compromise and consensus building and, lastly, not require inordinate specialisation to master and communicate. For this reason, Saaty and Vargas (2006 p.2), explained that "the AHP was designed as a nonlinear framework for both deductive and inductive thinking without use of the syllogism." Several factors are taken into consideration at the same time to allow for dependence and feedback. Numerical trade-offs are then made to attain a final position. Harker and Vargas (1987) buttressed the usefulness of the AHP as a model designed to manage situations encompassing normal, sensitive, or seemingly unreasonable factors for multi-faceted decision making when given numerous alternatives. Adding their voice in support of the AHP, Dalalah et al (2010 p 568) asserted that it "helps capture both subjective and objective evaluation measures, providing a useful mechanism for checking the consistency of the evaluations thus reducing bias in decision making."

According to Saaty and Vargas (2006 p 2), "the AHP has a special concern with departure from consistency and the measurement of this departure, and with dependence within and between the groups of elements of its structure." Saaty (2005) emphasised that the AHP is a general model which is used to produce relative priorities from both distinct and continuous paired comparisons based on multilevel hierarchic structures. As Saaty explained, these comparisons may be taken from actual measurements or from a fundamental scale that reflects the relative strength of preferences of both tangible and intangible criteria based on the judgment of knowledgeable and expert people. Refer to Table 2.3 below.

Table 2.3: Fundamental Scale of Absolute Numbers

Level of Importance	**Definition**	**Explanation**
1	**Equal Importance**	The activities/criteria contribute equally to the objective.
2	Weak Importance	The criterion/activity is slightly favoured over another.
3	**Moderate Importance**	Experience and judgment moderately favour one criterion/activity over another.
4	Moderate Plus	Between moderate and strong.
5	**Strong Importance**	Experience and judgment strongly favour one criterion/activity over another.
6	Strong Plus	Between strong and very strong.
7	**Very Strong Importance Demonstrated**	A criterion/activity is favoured very strongly over another; its dominance demonstrated in practice.
8	Very, very strong importance	Between very strong and extreme.
9	**Extreme Importance**	The evidence favouring one criterion/activity over another is of the highest possible order of affirmation.
Reciprocals of the above	If activity ***i*** has one of the above nonzero numbers assigned to it when compared with activity ***j***, then ***j*** has the reciprocal value when compared with ***i***	
Rationals	Ratios arising from the scale	If consistency were to be forced by obtaining n numerical values to span the matrix

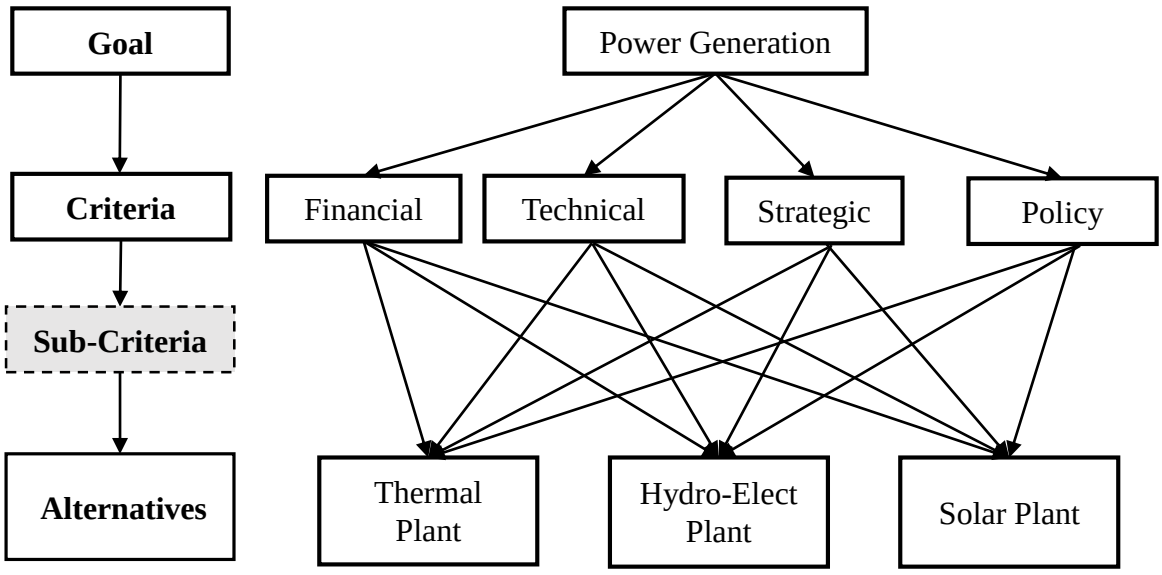
Source: Saaty (2005)

In its application, the AHP is based on four axioms: reciprocal judgments, homogeneous elements, hierarchic or feedback dependent structure, and rank order expectations (Saaty, 2005

p 348). Wheeler (2013 p.12), summed it all by indicating the three major steps involved: identifying and selecting the decision criteria; assigning weights to the criteria and building consensus about their relative importance; and evaluating the project proposals using the weighted criteria. The 'eigenvalue' method is used to estimate the relative weights of the decision criteria. This is done by the AHP/ANP "SuperDecisions" software which assigns the eigenvector for each criterion/alternative based on pairwise comparisons.

It is important to note that suitability of the AHP framework belies in its ability to assume a unidirectional hierarchical relationship at all decision levels. The top element of the hierarchy is the overall goal for the decision model. It begins with the problem being decomposed into a hierarchy of criteria so as to be more easily analysed and compared in an independent manner. In other words, the hierarchy decomposes the problem to a more specific attribute until a level of manageable decision criteria is met. The hierarchy is a type of system where one group of entities influences another set of entities (Habib et al, 2007). Each set of criteria would then be further divided into an appropriate level of detail, recognizing that the more criteria included, the less important each individual criterion may become as illustrated in Figure 2.1.

Figure 2.1: A Three Level Power Generation Project Hierarchy



Source: Adopted from Saaty (2005)

According to Zaeri et al (2007), one of the main advantages of the AHP is the relative ease with which it handles multiple criteria. Furthermore, it is easier to understand and it can

effectively handle both qualitative and quantitative data. They also noted that the use of AHP does not involve cumbersome mathematics. As alluded to earlier, the AHP involves the principles of decomposition, pairwise comparisons, and priority vector generation and synthesis (Mohamadali and Garibaldi, 2009). Zaeri et al (2007 p.235), confirm that the use of AHP instead of other multi-criteria decision making techniques has the following advantages:

a. Quantitative and qualitative criteria can be included in the decision making.
b. A large quantity of criteria can be considered.
c. A flexible hierarchy can be constructed according to the problem.

The questionnaire design for pairwise comparison of the criteria in Figure 2.1 is illustrated in Table 2.4 below; based on the Fundamental Scale of Absolute Numbers.

Table 2.4: Sample questionnaire design for criteria pairwise comparison

Decision Criteria	**Pairwise Comparison**																	**Decision Criteria**
Financial	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Technical
Financial	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Strategic
Financial	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Policy
Technical	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Strategic

Source: Researcher (2015): Adopted from Saaty (2005)

The pairwise comparison and prioritisation is achieved by using a Decision Supermatrix (which is a reciprocal square matrix) as depicted in Table 2.5; capturing the criteria included in the Hierarchy above (Figure 2.1).

Table 2.5: Reciprocal square matrix of decision criteria

	Financial	Technical	Strategic	Policy	Priorities
Financial	1	1/X	1/Y	1/Z	0.0000
Technical	X	1	1/A	B	0.0000
Strategic	Y	A	1	1/C	0.0000
Policy	Z	1/B	C	1	0.0000

Source: Researcher (2015): Adopted from Saaty (2005)

According to Munier (2011 p.77), in many applications, the AHP method ends at computing the weight vector for each criterion; giving the criteria priorities. However, the software also provides a further stage for ranking the alternatives. In this instance, the alternatives are compared with each other in terms of a specific criterion until all criteria are covered. The total weight of the resultant eigenvalues shows the dominance of the alternatives in a ranked order.

It is worth noting that AHP has received some adverse criticism from the technical point of view because of its lack of a mathematical foundation for the scale being used to convert ordinal concepts into cardinal values (Munier, 2011; Ishizaka and Labib, 2011). Munier (2011) suggests that this criticism may have motivated its author to improve the process resulting in the development of an expanded version of the model; now known as the Analytic Network Process (ANP). According to Saaty (2005), he developed the ANP to define the relationship of criteria and factors of the AHP in all aspects and to provide augmented feedback. The ANP can be used even in more complex decision processes (Göztepe et al, 2013). Both the AHP and ANP are based on the same principles and are descriptive approaches to decision-making (Saaty, 2005). This study will not go into detail regarding the application of the ANP.

Therefore, from the above discussion, the researcher believes that the Analytic Hierarchy Process (AHP) is most appropriate for the selection and prioritization of the national electricity generation projects for capitalisation purposes.

2.6. Project Funding

The WEF Report on "Strategic Infrastructure in Africa" (2013), noted that the keys to any project adoption and its successful implementation are thorough preparation and resource mobilisation. The report observes that most public budgets have remained under heavy strain due to the global financial meltdown. In this regard, it is becoming more and more difficult for developing economies to meet the ever-growing demand to finance public infrastructure in terms of maintenance, rehabilitation and development of new projects.

According to Gwata (2013), contributing on infrastructure financing in Africa, most capital markets in Africa do not have the capability to fund big infrastructure projects because of asset-liability gap. Furthermore, the bulk of the continent's economies suffer from poor credit ratings. In turn, this has limited private investment on one hand and increased cost of finance for governments on the other.

According to Chigumira and Dube (2010), constrained fiscal space resulting from Zimbabwe's economic downturn period caused the Government's inability to sustain significant budget allocations for capital projects and this led to deterioration of critical public infrastructure such as power, transport and water. The current status of infrastructure is clear testimony that the national budget allocations for projects under the Public Sector Investment Programme (PSIP) have not achieved the desired end-state.

Accordingly, the major sources of project funds remain as equity and debt. However, as submitted by Chigumira and Dube (2010 p.2), the Government of Zimbabwe is financially handicapped; with a huge public debt making borrowing highly impossible. The 2015 National Budget Statement p.41) buttressed this position by indicating an "unsustainable public and public guaranteed debt burden estimated at US$8 396million by December 2014". This means that there are limited alternatives to Public-Private Partnerships (PPP) for purposes of improving the national public infrastructure. In this instance the involvement of the private sector in the revival of the economy becomes indispensable.

According to Gwata (2013), there are other innovative financing instruments that can be used for large-scale infrastructure projects. These include long-term sovereign infrastructure bonds (SIB) and diaspora bonds. Gwata highlights the successful use of SIBs in Brazil, Chile and Malaysia. According to the study, diaspora bonds are issued by a government to its citizens in the diaspora with a view to harness their savings and invest the funds into infrastructure projects back home. The application of this instrument is justified and amply illustrated by the following extract from the study:

> *"Africa's diaspora accumulates an estimated US$ 53 billion in savings annually, and remitted approximately US$ 40 billion to their home countries in 2010, which indicates a strong saving capacity and potential for African governments to tap these resources for infrastructure development, particularly in African economies with a massive diaspora population. Diaspora bonds have been used successfully in countries such as Israel, which has raised an estimated US$ 25 billion over the last 30 years through this vehicle.*
>
> *Ethiopia, which has a sizeable diaspora population and was among the world's 10 fastest growing economies in the past decade, launched its second diaspora bond, the*

Grand Ethiopian Renaissance Dam Bond, in 2011. Capital raised is intended to fund construction of the Grand Renaissance Dam, a large-scale hydroelectric dam. The country's first diaspora bond issuance, the Millennium Corporate Bond, which was aimed at raising capital to fund the Ethiopian Electric Power Corporation, faced several challenges. The bond was perceived as a high-risk investment due to soaring inflation and a lack of trust in the government's ability to service the debt."

In view of the above, the study cautions that these two instruments are relatively new on the capital markets and they need to be used with a clear understanding of their attendant intricacies; on the back of lessons learnt by the early adopters. Therefore, apart from budget allocations, this study will focus on the importance given to attraction of FDI and PPP policy framework for capitalisation of power projects in Zimbabwe.

2.6.1. Foreign Direct Investment (FDI)

In their research titled "An Analysis of Determinants of Private Investment in Zimbabwe for the Period 2009-2011" Bayai and Nyangara (2013), identified political risk, interest rate, GDP, debt servicing and trade terms as key determinants of private investment over the study period. In a bid to foster economic growth and increase private investment, the study recommended the promotion of political stability, the attraction of FDI, enabling a structured public-private dialogue and promoting Government investment in infrastructure development among others. However, quoting Haroon and Nasr (2011), they noted that FDI is a component of private investment which is critical for economic growth and many countries rely on such investment to solve their economic problems that include poverty and unemployment. They further observe that "though foreign private investment is made up of FDI and Foreign Portfolio Investment (FPI), FDI is often preferred because it disseminates advanced technological and managerial practices …. thereby exhibiting greater positive externalities compared to FPI which may not involve transfers, just being a change of ownership." (Bayai and Nyangara, 2013 p.17).

Makuyana and Odhiambo (2014), argued that, despite the government's efforts to boost both private and public investment in Zimbabwe, the country still faces a number of challenges, as do many other African countries. These challenges include, amongst others: The high national debt overhang; low business confidence; liquidity constraints; low industrial competitiveness; and an inadequate infrastructure. The Ministry of Finance, through the 2015 National Budget

Statement (2014 p.44), whilst acknowledging the significance of FDI on market liquidity, indicated that inflows remain subdued on the back of perceived country risk.

However, according to CZI Manufacturing Industry Survey (2014 p.10), citing the World Economic Forum Global Competitiveness Report 2014/15, Zimbabwe was not doing very well in investor confidence. For 2015, the country had dropped on the rankings from 123 in 2014 to 124 out of 144 countries. The report summarised the problem areas affecting the ease of doing business in Zimbabwe as indicated in Table 2.6 below:

Table 2.6: Problematic Factors of Doing Business in Zimbabwe

Factor	**% of Response 2013**	**% of Response 2014**
Access of financing	25.4	24.6
Policy instability	21.4	19.7
Inadequate supply of infrastructure	14.3	15.0
Corruption	10.7	11.4
Inefficient government bureaucracy	11.9	7.9
Restrictive labour regulations	8.9	10.8

Source: WEF Global Competitiveness Report 2014/15

The report concluded that the solutions to the challenges that the economy is facing are to put in place credible, consistent and predictable investment polices to stimulate growth. The report further stressed that these solutions need to be complemented by dealing with the huge debt overhang or non-performing loans weighing down the economy, mobilisation of the required financial resources and instilling self-discipline, transparency and accountability amongst all stakeholders.

2.6.2. Public-Private Partnerships (PPP)

According to http://ppp.worldbank.org there is no broad international consensus on what constitutes a PPP. Broadly, PPP refers to arrangements, typically medium to long term, between the public and private sectors whereby some of the services that fall under the responsibilities of the public sector are provided by the private sector, with clear agreement on shared objectives for delivery of public infrastructure and/or public services. PPPs typically do

not include service contracts or turnkey construction contracts, which are categorized as public procurement projects, or the privatisation of utilities where there is a limited ongoing role for the public sector.

The Indian Department of Economic Affairs (DEA) defines PPPs as: An arrangement between a government or statutory entity or government owned entity on one side and a private sector entity on the other, for the provision of public assets and/ or related services for public benefit, through investments being made by and/or management undertaken by the private sector entity for a specified time period, where there is a substantial risk sharing with the private sector and the private sector receives performance linked payments that conform (or are benchmarked) to specified, pre-determined and measurable performance standards.

DEA recognises that the level of private sector participation in infrastructure can cover a spectrum from short-term service contracts at one end all the way through to full privatisation (disinvestment) at the other. However, service contracts and disinvestments are generally not considered as PPPs in India. An infrastructure PPP in India is therefore more than just a short-term contract for services with the private sector but does not go so far as to include complete private sector ownership and control.

In Zimbabwe, www.corporatecounsel.co.zw weighed in its contribution to defining PPPs as: Arrangements that can take various forms, but are generally founded on long-term contracts between a State entity and a private organisation which provides for delivery of a project. There are various types of PPP's, with varying degrees of private sector involvement, the most common type of PPP's is the Design-Build-Finance-Operate transaction (DBFO) whereby the government grants the private partner the right to develop a new power infrastructure project. The private partner takes the responsibility, the risk of delivery and operation of the project against pre-determined contractual performance standards and is then paid through the revenue generated by the project.

As alluded above, PPPs in power generation can take a various forms which are differentiated by roles, ownership arrangements, and allocations of risk between the private and public partners. The common examples of PPP structures are management contracts, lease, joint venture (JV), build-own-operate (BOO) contracts, and build-operate-transfer (BOT) contracts. In the roads sector, for example BOT is a common PPP model; with revenues for the private

operator often being from tolls (through BOT Tolls contract) or from a fixed annual/semi-annual payment (BOT Annuity contract).

Successful application of PPP arrangements in power generation projects requires a favourable investment climate. This is realised through the development of relevant and conducive rules and regulations as alluded to in paragraph 2.3.7 above in terms of policy framework. Country experiences point to several preconditions for successful financing or executing of PPP projects, such as an adequate institutional framework (e.g., political commitment and effective governance) and a transparent legislative and regulatory framework (AfDB, 2011)

As alluded to earlier, Zimbabwe is yet to come up with a comprehensive PPP policy framework and legislation. This remains a big cause for concern given the current macroeconomic situation militating against economic recovery.

2.7. Chapter Summary

Pursuant to the research objectives and conceptual framework, this chapter focussed on literature review of project selection and prioritisation criteria. The project selection and prioritisation criteria can be quantitative (numeric) and qualitative (non-numeric); financial and non-financial; and are highly dependent on the type of industry or nature of the project. From the literature review it was clear that multi-criteria decision models address criteria conflicts usually associated with complex situations where there may be no solution that satisfies all criteria simultaneously. The importance of project selection and prioritisation was briefly discussed. The chapter also gave a synoptic review of MCDM/MCDA models at the decision makers' disposal. A detailed review of the AHP, as the preferred model for this study, was done. The project financing methods were discussed in terms of fiscal funding challenges, FDI attraction and PPP framework. The literature revealed the need for comprehensive, credible and consistent policies that promote favourable investment climate for the successful implementation of national power generation projects. The next chapter looked at the research methodology, research design, the research instruments and the data collection procedure.

CHAPTER 3

RESEARCH METHODOLOGY

3.1. Introduction

This chapter covers aspects regarding how the research was conducted. These include; the research philosophy, research design, population and sample, research instruments including their validity and reliability. Ethical considerations are also discussed in this chapter.

3.2. Research Philosophy and Justification

The research philosophy adopted in this study combined interpretive and critical realism, supported by an inductive approach (Greener, 2008; Saunders et al. 2009). According to Greener (2008 p.16), "a positivist approach is usually associated with natural science research and involves empirical testing" whereas "the interpretivist argument promotes the idea that subjective thought and ideas are valid." She further stresses that an interpretivist researcher's aim is to see the world through the eyes of the people being studied by allowing them multiple perspectives of reality rather than the 'one reality' of positivism. Saunders et al (2009 p. 115), argued that the critical realist recognises the importance of multi-level study (e.g. at the level of the individual, group and organisation). Each of these levels has the capacity to change the researcher's understanding of that which is being studied on the back of "the existence of a variety structures, procedures and processes and the capacity that these structures, procedures and processes have to interact with one another". For this reason, Saunders et al (p.115) further asserted that "the critical realist's position that the social world is constantly changing is much more in line with the purpose of business and management research which is too often to understand the reason for phenomena as a precursor to recommending change".

Being desirous to understand the failure by government to adequately capitalise the initiated power generation projects, the researcher adopted this combined philosophy on the basis that there may be no standard project portfolio management decision criteria. Each situation and each portfolio has some form of uniqueness which dictate use of different set or group of decision criteria. In this regard, it becomes imperative that the decision makers and/or project sponsors appropriately discern the environment in which the projects must be prioritised and executed. In Zimbabwe, for example, at government level one may find that policy framework, political exigencies and social preferences play a pivotal role than all other considerations.

Accordingly, as suggested by Vargas (2010), there is no perfect model that covers the right criteria but these should be based on the values and preferences of the decision makers.

3.3. Research Design and Justification

The purpose of this study was to understand the selection and decision making process for capitalisation of national power generation projects in Zimbabwe. Its focus was therefore based on a sectorial case study within the energy industry; with a view to develop an in-depth analysis and understanding of the process. It was my belief that the research falls under the category of descriptive study with influences of the exploratory and explanatory studies. Accordingly, this study was descriptive in nature, based on the case study, in order to provide both qualitative and quantitative data for analysis and interpretation (Sekaran and Bougie, 2013).

According to Saunders et al (2009 p. 138-140, citing Robson 2002); Kasongo and Moono (2010); and Sekaran & Bougie (2013), the purpose of research can be categorised as exploratory, descriptive and explanatory or causal. Exploratory studies are useful when the aim of the research is to seek new insights into phenomena, to seek questions and to assess phenomena in a new light. Descriptive studies are designed to describe characteristics of a population, persons, event or a phenomenon. It seeks to determine the answer to questions asking; who, what, when, where and how. Explanatory studies are studies with the emphasis to study a situation or a problem in order to explain the cause and effect relationship between given variables. However, in order to accomplish that, well defined research problems have to be done and commensurate hypotheses need to be stated.

A case study is described as a strategy which includes an empirical investigation of a contemporary phenomenon within the real life context using numerous sources of evidence (Saunders et al, 2009). In this instance, the study of empirical evidence surrounding this case can bring about outcomes that will benefit the other sectors both in the private and public domains.

3.4. Study Population, Respondents and Data Collection Methods

3.4.1. Study Population

The target population of the study was comprised of the officials at the strategic decision making level in the power generation services of the energy sector. These were found in Harare

at such institutions as the MOEPD, MOFED, ZERA, ZIA, ZESA, ZETDC, ZPC and IDBZ. The population size was 40; targeting five participants from each of the identified institutions.

3.4.2. Sample Frame and Sampling Method

According to Sekaran & Bougie (2013 p.245), a sampling frame "is a representation of all the elements in the population from which the sample is drawn". In this research the ministry's/institutional organograms gave the researcher the required sampling frame i.e. the organic structures enabled the researcher to identify the relevant officials, preferably at Directors level and above, in the respective stakeholder ministries/institutions. Senior managers and/or expert informants from the identified institutions were co-opted based on the participant's capacity to inform the research in terms of subject the matter. Accordingly, going by the number of participants targeted from each of the entities included in this research, the sample size was 35 for questionnaires and 5 (five) earmarked for interviews. The sample size was considered sufficient for purposes of this study (Sekaran & Bougie, 2013 p.268).

According to Bhattacherjee (2012), sampling is the statistical process of selecting a subset of a population of interest for purposes of making observations and statistical inferences about that population. Sampling techniques can be grouped into two broad categories namely probability sampling and non-probability sampling (Bhattacherjee, 2012). In this study, purposive judgmental sampling, which is non-probability technique, was adopted because the researcher used own judgment to select the sample. This is propounded by Sekaran & Bougie (2013 p.252), who wrote that, "judgment sampling involves the choice of subjects who are most advantageously placed or in the best position to provide the information required." By nature of the research, at the strategic decision making level, the researcher believes that this approach best addressed the research questions in this study.

3.4.3. Ethical Considerations

According to Saunders et al (2009 p.183), ethics refers to "the appropriateness of one's behaviour in relation to the rights of those who become the subject of his/her work, or are affected by it." Cooper and Schindler (2008 p.34) define ethics as the "norms or standards of behaviour that guide moral choices about our behaviour and our relationships with others". Research ethics therefore relate to questions about how we formulate and clarify our research

topic, design our research and gain access, collect data, process and store our data, analyse data and write up our research findings in a moral and responsible way.

In order to gain access and consent, the researcher used an introductory letter which, in turn, elicited positive response and cooperation from the participants (Saunders et al 2009 p.170). Being mindful of the fact that respondents reserve the right to participate, based on personal values (Saunders et al 2009), the identity of the respondents was kept confidential throughout the study. In the case of interviews, the questions were sent in advance to enable participants to prepare themselves prior to actual interview session. Any quotations to be used by the researcher will be adopted through participants' approval. This ensures avoidance of embarrassment, harm or any other material disadvantage (Saunders 2009 p. 160). In order to generate the much needed interest on the part of the participants, the purpose of the research was outlined and potential benefits to the organisation were highlighted in the introductory letter (Saunders et al 2009).

3.4.4. Data Collection Methods

According to Sekaran and Bougie (2013 p.113), primary data refers to "the information obtained first hand by the researcher on the variables of interest for the specific purposes of the study" and secondary data is "information gathered from sources that already exists". In this study, the data was gathered using both primary and secondary data collection methods. Sekaran and Bougie (2013), quoting Yin (2009), also buttressed the use of multiple methods of data collection in a case study. The primary data instruments applied in the study were questionnaires, interviews and documentary analysis. Secondary data included management reports, government policy documents and other source documents from databases, the media, journal articles and websites.

A self-administered questionnaire was the primary data collection method on the basis that; it was cheap to administer, not time consuming, allowed respondents more confidentiality and it had standardised questions/answers that made it simple to compile data (Wiid and Diggness, 2013). The survey questionnaire was initially pre-tested through extensive discussions with peers and colleagues, most of them professionals in the field of project management; and then eventually with the research project supervisor to facilitate thoroughness and user-friendliness of the instrument. To enhance responsiveness and clarity on questions, each questionnaire was

sent to the respondent with the necessary instructions and covering notes. The questionnaire contained both quantitative (closed) and qualitative (open ended) questions (Saunders et al 2009); and the feedback thereof, scores in particular, were expected to correlate with various measurements on the hierarchical project selection and decision making model being proffered in the study.

The study used secondary data and information from secondary sources, such as official data from the Zimbabwe Energy Regulatory Authority (ZERA), Zimbabwe Investment Authority (ZIA), Zimbabwe Statistics Office (ZIMSTATS) and Reserve Bank of Zimbabwe (RBZ). Websites for organisations such as World Bank (WB), African Development Bank (AfDB) and World Energy Forum (WEF) were also included as sources for secondary data.

3.4.5. Multi-Criterion Decision Model (MCDM)

As discussed in Chapter 2: Literature Review, the Analytic Hierarchy Process (AHP) model was applied in this study to determine the most important and/or appropriate decision criteria for selection and prioritisation of national power generation projects. Use of the AHP model allows everyone to have an equal and complete voice in the ranking and selection process and minimizes the effect of personal biases (Levine, 2005).

The AHP process, originally introduced by Dr Thomas L Saaty in 1977, involves the use of paired comparisons to create weighted rankings for multiple attributes and their alternatives. It includes three major steps: (1) identifying and selecting criteria; (2) assigning weights to the criteria and building consensus about their relative importance; and (3) evaluating the project proposals using the weighted criteria (Wheeler 2013 p.12). Criteria ranking was done using the 9-point Saaty Fundamental Scale for Making Judgments as reiterated in Table 3.2.

The pair-wise comparison was based on a “ratio scale” because it expresses the preferred level of importance of one criterion against the other (Munier 2011; Katarne and Negi, 2013). For example, a respondent may indicate that A is 3 times preferable than B; therefore, B is only 1/3 of A. The resultant analysis of the decision matrix produces an ordinal scale that rank-orders the weighted importance of each category and/or criterion, as an independent variable, to denote their differences (Sekaran and Bougie, 2013). This helped the researcher to determine the percentage of variables considered by the respondents to be extremely important and those bearing equal importance for project selection and prioritisation purposes.

Table 3.2: Fundamental Scale for Making Judgments

Level of Importance	Definition	Explanation
1	**Equal Importance**	The activities/criteria contribute equally to the objective.
2	Weak Importance	The criterion/activity is slightly favoured over another.
3	**Moderate Importance**	Experience and judgment moderately favour one criterion/activity over another.
4	Moderate Plus	Between moderate and strong.
5	**Strong Importance**	Experience and judgment strongly favour one criterion/activity over another.
6	Strong Plus	Between strong and very strong.
7	**Very Strong Importance Demonstrated**	A criterion/activity is favoured very strongly over another; its dominance demonstrated in practice.
8	Very, very strong importance	Between very strong and extreme.
9	**Extreme Importance**	The evidence favouring one criterion/activity over another is of the highest possible order of affirmation.

Source: T Saaty (2005)

In this study, 10 (ten) categories of decision criteria were used, namely; Financial, Technical, Strategic, Government Policy, Social, Risks, Opportunities, Urgency, Stakeholder Commitment and National Economic Benefits. The detailed criteria used in each category were as presented in the survey questionnaire at Annex "A" for primary data collection.

3.4.6. Validity and Reliability

Triangulation was used to confirm validity and reliability of the data collected through questionnaires, interviews and documentary analysis. Saunders et al (2009 p.146) described triangulation as "the use of different data collection techniques within one study in order to ensure that the data are telling you what you think they are telling you".

Due to the interpretive and descriptive paradigms adopted, the researcher focused on interpretive and descriptive validation associated with this study. According to Thomson (2011 p.78), citing Maxwell (1992), "descriptive validity refers to the accuracy of the data. The data must accurately reflect what the participant has said or done." It means that, any omission of data brings into question the descriptive validity of a study. In this instance, the reported data

must reflect the same accuracy of the participant's responses, what was said or the transcription of the videotapes should represent the events in an accurate manner.

Thomson (2011 p.79), also citing Maxwell (1992) described interpretive validity as "how well the researcher reports the participants' meaning of events, objects and/or behaviours." He further asserts that the key is that the interpretations are based on the participant's perspective rather than the researcher. Therefore, interpretive validity is inherently a matter of inference from the words and actions of participants in the study process.

Statistical validity and reliability of the study was achieved through the application of the AHP Decision Support Software (DSS). The DSS helps capture both subjective and objective evaluation measures, providing a useful mechanism for checking the consistency of the evaluations thus reducing bias (Dalalah et al, 2010 p 568). An inconsistency index of less than 0.10 or 10% is acceptable as it renders the feedback as consistent enough (Vargas, 2010, Ishizaka and Labib, 2011).

3.5. Data Analysis

The data analysis was done using the SuperDecisions Software by Adams and Saaty (Version 2.2.6; 2013) which supports the AHP Model. AHP software tallies all of the results to derive priorities and weight factors for each criterion. The criteria group uses the pairwise comparisons to judge how well each criterion relates to the objective/goal. The result is a fairly weighted prioritisation of the criteria. Thereafter, the data will be presented in the form of tables, graphs and charts in the Findings, Data Presentation and Analysis chapter.

3.6. Chapter Summary

This chapter dealt with the research methodology which was used to seek answers to the research questions formulated in chapter one. Justifications for the research philosophy and research design were given. The study population, sample frame and sampling technique were discussed. A brief discussion of the Analytic Hierarchy Process (AHP) model which was applied in this study was done. Data collection methods, validity and reliability, data analysis plan and the ethical considerations associated with the research methods were explained. The next chapter discusses in detail the data analysis and presentation of findings derived from the study.

CHAPTER 4

FINDINGS, DATA PRESENTATION AND ANALYSIS

4.1. Introduction

This chapter focuses on data analysis, interpretation and presentation of findings derived from the study. The information is presented in a summarised form such as tables, graphs and charts. The data was analysed using both descriptive and deductive statistics. Descriptive statistics were used to analyse the sample characteristics and qualitative part of the survey questionnaire. Quantitative data analysis was done using the Super Decisions Software which supports the AHP model. The ensuing discussion is aimed at answering the research questions formulated in chapter one; as restated below.

4.2. Restatement of Research Questions

The study pursued the research objectives by seeking answers to the following questions:

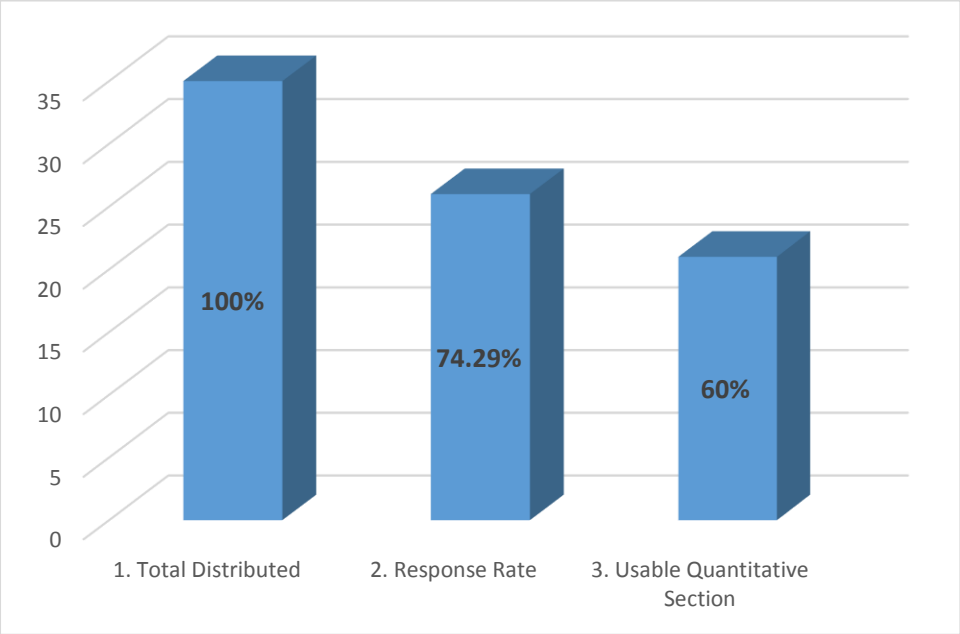
a. What are the decision making criteria for project selection and prioritisation?
b. What are the existing selection and decision making processes in the national power generation projects?
c. What are the government policies being used in attracting investment in national power generation projects?
d. What are the financing models used to fund national power generation projects?
e. How suitable is the hierarchical model for project selection and prioritization for funding purposes?

4.3. Response Rate

The researcher used purposive judgmental sampling method which targeted a population of 40 participants; whereby 35 were earmarked for self-administered questionnaires and 5 (five) were to be interviewed. The researcher managed to conduct one interview only (20% success rate). The remainder failed to take place due to various reasons; mainly pre-occupation and non-availability of the targeted respondents. The interview was thus not considered further for data analysis purposes. As per Chart 4.1 below, out of a total of 35 self-administered questionnaires distributed to the target population, 26 respondents managed to return the questionnaires. This gave a questionnaire response rate of 74.29%. The response rate was found to be adequate for this study on the basis the sampling method.

The research revealed that all the participants had no prior experience with the AHP Model and had difficulties in completing the quantitative part of the questionnaire. Whilst the researcher took time to explain the model requirements in terms of pairwise comparisons, some participants felt that it was more complicated than the Likert-scale approach they were familiar with. This led to exclusion of 5 (five) quantitative responses of the questionnaire due to incomplete information and/or irrational answers indicating respondents' failure to understand the concept. Therefore, 21 questionnaires were eventually used for the quantitative part of the study; representing 60% of the total distributed. That notwithstanding, the responses managed to bring out the desired themes, trends and pattern of selection and decision making processes in national power generation projects in the key stakeholder institutions.

Chart 4.1: Questionnaire Response Rate



Source: Research Primary Data (2015)

4.4. Demographic Characteristics of the Respondents

The demographic characteristics of the respondents assist in establishing the appropriateness of the study sample. Accordingly, the demographic characteristics used to profile the respondents in this study included; respondent's institution, job position, gender, age group, years in current post, length of service in the organisation and highest level of education attained. The resultant statistics are as shown in Table 4.1:

Table 4.1: Respondent Characteristics

CHARACTERISTIC	DISPOSITION/DIMENSION	NO. OF RESPOMDENTS	PERCENTAGE REPRESANTATION
Respondent's Institution	Ministry	4	15.38%
	Parastatal or State Enterprise	5	19.23%
	Investment/Regulatory Authority	7	26.92%
	Bank	5	19.23%
	Other	5	19.23%
	Total	**26**	**100%**
Position in Organisation	Managing Director/CEO	2	7.69%
	Director/Deputy Director	8	30.77%
	Manager	9	34.62%
	Project/Investment Analyst	7	26.92%
	Total	**26**	**100%**
Years in Current Post	Less than 2 years	2	7.69%
	2 - 4 years	7	26.92%
	4 - 6 years	5	19.23%
	More than 6 years	12	46.15%
	Total	**26**	**100%**
Length of Service in Organisation	Less than 2 years	1	3.85%
	2 - 5 years	3	11.54%
	6 - 10 years	12	46.15%
	More than 10 years	10	38.46%
	Total	**26**	**100%**
Gender	Male	23	88.46%
	Female	3	11.54%
	Total	**26**	**100%**
Age Group	Below 25	0	---
	25-40 years	9	34.62%
	40-60 years	16	61.54%
	Above 60 years	1	3.85%
	Total	**26**	**100%**
Education Level	PhD	1	3.85%
	Masters Degree	15	56.69%
	First Degree	10	38.46%
	Diploma	0	--
	Total	**26**	**100%**

Source: Research Primary Data (2015)

Analysis of Table 4.1 revealed that the respondents were in positions of authority and befitting responsibility to inform the research. In terms of years in the organisation and, more specifically, years in current posts, only 3.85% had less than 2 years with their organisations. It can be safely deducted that the majority of the respondents were knowledgeable in policies and processes associated with the subject matter. The respondents were also adjudged to be equally competent to participate in the study on the back of their level of educational attainment (3.85% PhD and 56.69% Masters Degrees) and job experience (only 7.69% had less than 2 years in current positions).

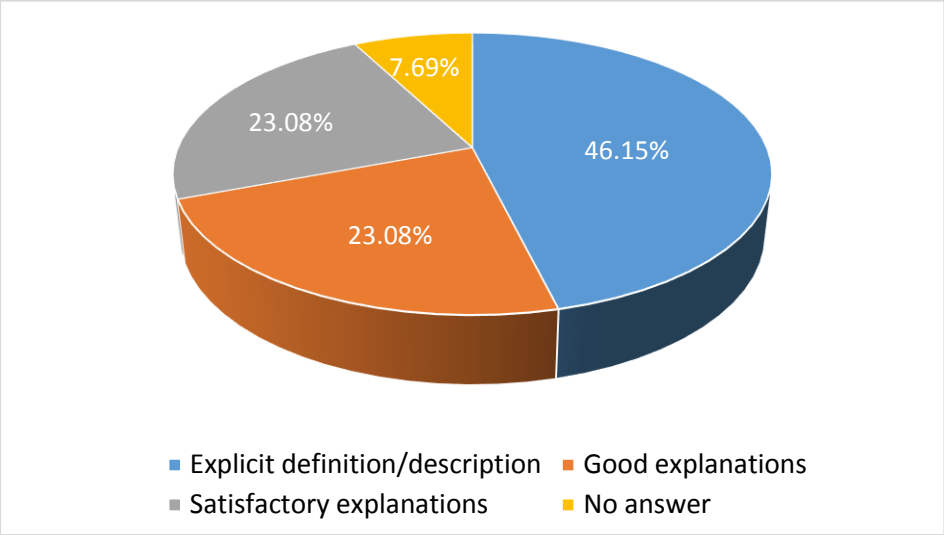
The results show that none of the respondents was below the age of 25 years. The majority of the respondents were in the 25-60 years age groups; of which 34.62% was between 25-40 years and 61.54% being in the 40-60 years age group. This supports the fact that the respondents were mature enough individuals who would appreciate the need to contribute to the study as truthfully and accurately as was expected. Overall, this means that all the respondents were appropriately selected to participate in this research.

In terms of gender, there were only 11.54% females against 88.46% males. This result shows that the policy and decision making in national power projects is predominantly being done by males.

4.5. Findings and Discussion

As a pre-test of the participant's understanding of the subject matter, the respondent was required to explain in brief his/her understanding of project selection and prioritisation process (Question 8 of the questionnaire). In this respect, 46.15% managed to explicitly define/describe project selection and prioritisation, 23.08% gave good explanations, 23.08% satisfactory explanations and 7.69% did not answer the question. These responses assisted in triangulation of data for validity and reliability purposes. This feedback is depicted in Chart 2.1.

Chart 4.2: Understanding of project selection and prioritisation process



Source: Research Primary Data (2015)

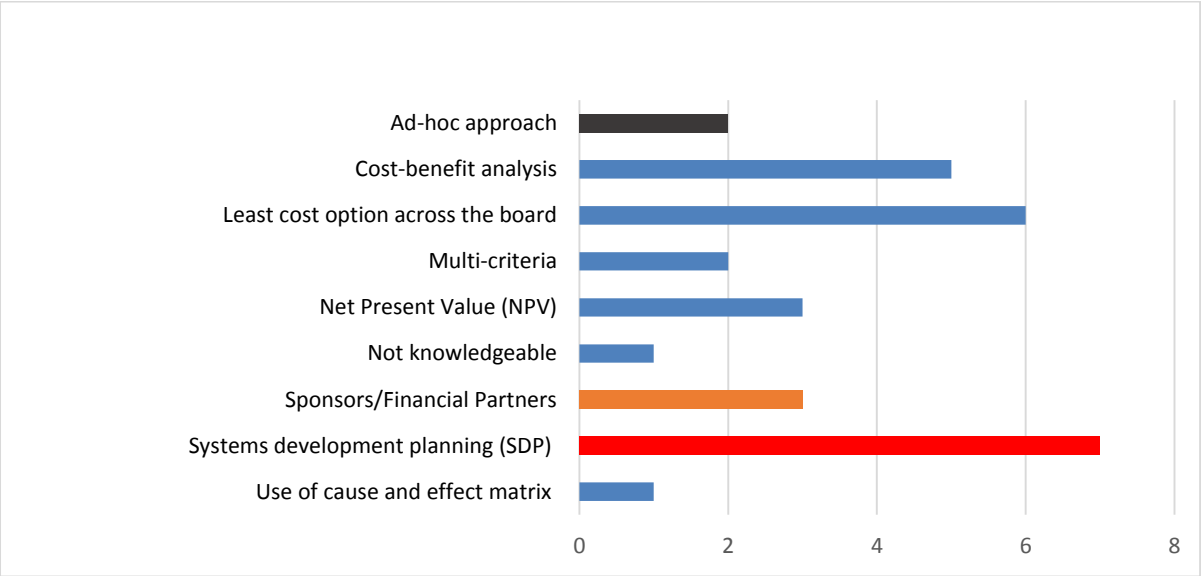
4.5.1. What are the decision making criteria for project selection and prioritisation?

The objective of this question was to analyse the current government decision making criteria for project selection and prioritisation in power generation. The study showed that almost all the respondents were aware of some of the requisite criteria for project selection and prioritisation. As depicted in Chart 4.3, most of the respondents indicated that the Government was guided by the National Power Systems Development Plan (NPSDP); which essentially provides the future power demand indicators, to execute the power generation projects. However, the main criteria highlighted by the respondents were financial underpinned by least cost and cost-benefit analysis. For example: use of NPV, entailed acceptance projects with highest NPV and a negative NPV meant rejection. IRR, was being considered where the chosen projects had positive and competitive NPVs. Some of the respondents argued that where the selection of projects was guided by cost-benefit analysis, then projects with highest social benefits were being adopted for implementation.

These responses are in line with submissions by Vargas (2010), who asserted that traditional project selection and prioritisation is based on a cost-benefit relationship of each project; resulting in perceived economic viability, whereby projects with higher benefits to cost ratio have a higher priority. Turner (2009 p.45) supported this position by highlighting that there is always need to assign priorities to select projects that are most beneficial because resources to cater for all projects are usually insufficient. What has come out clearly in all responses is that

there are no standard criteria being used in the power generation projects. This finding is inconsistent with researchers who postulate that decision criteria are highly dependent on the type of industry or nature of the project (Wheeler, 2013; Vargas, 2010; Meredith and Mantel, 2009; Puthamont and Charoenngam, 2006). Jain & Lim (2010) argued that the uniqueness of any selected decision method has to be in its ability to match the various needs and specific strategic objectives of developing countries. In this respect, the researcher opines that government decisions on power generation projects should be based on the national strategic intent and policy framework on meeting both national economic growth and socio-economic considerations.

Chart 4.3: Summary of Selection and Prioritisation methods and processes currently in use



Source: Research Primary Data (2015)

4.5.2. What are the existing selection and decision making processes in the national power generation projects?

The question sought to establish the existing selection and decision making processes in the national power generation projects. The survey revealed that there was no clear selection and decision making method used in the national power generation projects initiated by government. Each institution, as deducted from the proffered answers, has its own perception of what happens in the process. This pointed to the fact that the processes are fragmented rather than being standard, centralized and transparent. Such a situation is inconsistent with best practices as

advocated by Turner (2009 p.328). He posited that project selection and prioritisation, in terms project portfolio decision making and management thereof, should be done "through a transparent system maintained centrally". Centralisation brings about the much needed distinct advantage of assignment of limited capital resources.

From the responses, as per Chart 4.3 above, it was observed that the main processes being used are based on three approaches. Firstly, the rolling over of the National Power Systems Development Plan (NPSDP) that was put in place by government in the mid-1990s on the back of future energy demand. Secondly, use of sponsor urgency or direction by financial partners. Thirdly, there was a seemingly ad-hoc approach which often resulted in spreading the available resources instead of proper capital budgeting. From secondary data, the researcher observed this as the reason why the PSIP budget allocations by the Ministry of Finance and Economic Development have failed to make much impact on power generation projects, resulting in the need for private sector involvement by way of PPP arrangements or IPPs (2015 Budget Statement). However, the extent to which PPPs and/or IPPs have contributed to the rebuilding and development of the national power infrastructure needs separate studies.

It is the researcher's fervent opinion that the ad-hoc approach should be avoided as it leads to unsustainable development. Equal caution must be given to projects that are done at the whim of a sponsor or donor. Further, the use of the NPSDP should take into account both internal and external environmental factors. Power generation systems are complex and require huge investment whereby the associated risks must also be considered. Therefore, periodic revision and/or update of the said plan is necessary on the back of SWOT and PESTEL analyses, respectively.

The study also revealed that the various methods adopted in the current selection and prioritisation processes are not always based on the multi-criteria ranking methodology. It is important to note that infrastructure projects are often executed under complex and uncertain conditions which call for sound decision making, thorough preparation and adequate resource mobilisation (WEF, 2013). Where various criteria conflict with each other, multi-criteria decision making methods should be used to determine the most appropriate solution because it is not easy to find one solution that satisfies all criteria simultaneously (Memarzade et al, 2011). In this context, there is a real need for all institutions involved in power generation

projects to be given a standardised selection and prioritisation methodology to apply; although the actual number of criteria will then depend on project specifications.

4.5.3. What are the government policies being used in attracting investment in national power generation projects?

The objective of this question was to explore government policies in attracting investment in national power generation projects. One believes that there should not be any disconnection between the decision to implement the national strategic project and its execution on the back of inadequate funding. The study revealed that the activities being used to attract investment are mainly derived from the Indigenisation and Empowerment Act and the National Investment Policy of Zimbabwe. These include: cost-reflective tariffs, tax holiday for greenfield projects, exemption from with-holding tax, national project status, debt or sovereign guarantees by government, power off-take guarantees by government for IPP and JV projects. The government is also said to be moving towards strengthening PPP arrangements. A regulatory framework was put in place through establishment of ZERA. The respondents' answers are summarised in Table 4.2 below.

Table 4.2: Summary of policy mechanisms being used to attract FDI and investment in power generation projects.

Policy Mechanism		**No. of Respondents**	**Percentage of Total (26)**
National Project Status		9	34.62%
Cost-reflective tariffs		3	11.54%
Investment incentives	IPP	8	30.77%
	PPP	7	27%
	JV	2	7.69%
Regulatory framework (ZERA)		2	7.69%
Bilateral arrangements/Alliances		1	3.85%
Regional integration		1	3.85%
Government sovereign guarantees for EPC contract loans and PPAs		1	3.85%
No policy on FDI and PPP		1	3.85%

Source: Research Primary Data (2015)

The finding is consistent with government strategies in the ZIMASSET economic blue print. From secondary data, the researcher noted that the Government of Zimbabwe has taken a

decision to foster economic growth by increasing private investment and/or private sector participation in infrastructure development programs (ZIMASSET p. 29). However, a study conducted by Makuyana and Odhiambo (2014) regarding private sector investment and FDI inflows, showed that despite the government's efforts to boost both private and public investment in Zimbabwe, the country still faces a number of challenges. These challenges include, the high national debt overhang; low business confidence; liquidity constraints; low industrial competitiveness; and an inadequate infrastructure. For example, in terms of debt overhang, the Ministry of Finance, through the 2015 National Budget Statement (2014 p.156) acknowledged the facilitation by the Government of Zambia in securing concessionary loans from the World Bank and AfDB for Kariba Dam Rehabilitation project on the back of Zimbabwe's "ineligibility to access loans from these institutions". Furthermore, through the Budget Statement (2014 p.44); the Ministry, whilst recognising the significance of FDI on market liquidity, indicated that inflows remained subdued on the back of perceived country risk. The statement gave empirical evidence showing that the country received US$146.6 million end of October 2014 compared to US$311.3 million during the same period in 2013. Further, the researcher observed that Zimbabwe was not doing very well in investor confidence (CZI Survey, 2014 p.10). For 2015, the country had dropped on the rankings from 123 in 2014 to 124 out of 144 countries according to WEF Global Competitiveness Report 2014/15.

In terms of PPP arrangements, the researcher noted that Zimbabwe is yet to come up with a comprehensive PPP policy framework and legislation (Udenge, 2014). Therefore, the government needs to seriously consider putting in place an appropriate PPP policy that will complement the Indigenisation and Empowerment Act. Such a move will also assist in clarifying issues to do with policy ambiguity and perceived inconsistencies. In this instance, it is hoped that the proposed Joint Venture Bill (aka Public-Private Partnership Bill) tabled for the 8th Parliament of Zimbabwe will result in the enactment of the Act and the much needed policy framework.

4.5.4. What are the financing models used to fund national power generation projects?

The question sought to assess the financing models used to fund national power generation projects. The study revealed that power generation projects are being funded through various methods which include: Public Sector Investment Program (PSIP) budget allocation; PPPs in the form of BOT and JV; approval of IPPs; bilateral agreements; pure debt; concessionary

loans for EPC contracts; structured finance models; infrastructure development bonds; project grants, prepayment of electricity by major consumers and electricity levies.

The researcher observed that the given responses are corroborated in the 2015 National Budget Statement (p.148) in that PSIP financing has failed to make an impact on infrastructure development, including power generation projects, and require complementary funding from other sources. The sources of funds highlighted encompass; tax revenue, statutory funds, public enterprises retained earnings, development partners, joint-venture schemes and loan financing. As empirical evidence, the sources of funding for ZIM ASSET Energy Infrastructure are reflected in Table 4.3.

Table 4.3: ZIM ASSET Energy Infrastructure Funding

Cluster	**Funding Sources (US$ million)**					
	Budget Support	**Statutory Funds**	**Own Resources**	**Development Partners**	**Loan Financing**	**Total**
Energy	8.95	--	79.15	5.8	273.50	367.40

Source: Ministry of Finance and Economic Development (2014)

Analysis of Table 4.3 reveals that the major sources of power generation project funds remains as equity and debt. This position is consistent with the argument by Chigumira and Dube (2010 p.2), who submitted that the Government of Zimbabwe has a huge public debt which makes borrowing potentially impossible. The 2015 National Budget Statement p.41) confirmed this situation by indicating an "unsustainable public and public guaranteed debt burden estimated at US$8 396million by December 2014".

In terms of infrastructure bonds, empirical evidence reflecting that Zimbabwe is an early adopter of infrastructure bond issuance is found in the 2015 National Budget Statement of 27 November 2014 (329, p. 79) as shown in Table 4.4.

Table 4.4: Infrastructure Development Bonds

Institution	Project Name	Amount US$ m
Zimbabwe Electricity Transmission Distribution Company	Prepaid Metering System	15
Zimbabwe Power Company	Refurbishment of current generating assets	50
Zimbabwe National Water Authority	Tokwe Mukorsi Dam construction	50
National Railways of Zimbabwe	Refurbishment of locomotives, wagons & cabooses	25
Total		140

Source: Ministry of Finance and Economic Development (2014)

From secondary data, the researcher noted that the 2014 National Budget Statement of 19 December 2013 (p.104) mooted the intention of government to harness diaspora funds through issuance of diaspora bonds but this did not see the light of day. This thinking is consistent with a recommendation by Gwata (2013), whereby diaspora bonds are issued by a government to its citizens in the diaspora with a view to harness their savings and invest the funds into infrastructure projects back home. For example, Ethiopia successfully raised capital intended to fund the construction of the Grand Renaissance Dam, a large-scale hydroelectric dam through its "Grand Ethiopian Renaissance Dam Bond", in 2011 (Gwata, 2013). However, as observed by Gwata, there is need for caution in adoption of such instruments because of the associated risks. In Zimbabwe, for instance, adoption of diaspora bonds entails high level vetting of the diasporan participants on the back of how some of them got settled there; lest the bonds will end-up just being a conduit for dubious and nefarious activities.

4.5.5. How suitable is the hierarchical model for project selection and prioritisation for funding purposes?

The objective of this question was to recommend a hierarchical model for project selection and prioritisation for funding purposes. The literature review revealed that, since its introduction in 1976 by Thomas L Saaty of the University of Pittsburgh, the AHP is regarded as one of the most widely used MCDM tools. Its numerous successful applications published in literature include

strategic planning, public policy, banking, selecting the best alternatives, resource allocation, conflict resolution, process optimization, project selection, manufacturing, etc. (Zaeri et al, 2007; Saaty, 2008; Mohamadali and Garibaldi, 2009; Vargas 2010; Ishizaka and Labib, 2011; Shah et al, 2013). The AHP has equally been used by many researchers to resolve decision-making issues in project selection (Dey and Gupta, 2001; Zaeri et al, 2007; Dalalah et al, 2010; etc.). The AHP has become one of the most inclusive method for the analysis of economical, societal, governmental and corporate decisions, capturing the complex relations and effects of interaction in human society, especially when risk and uncertainty are involved (Stanimirovicit, 2013 p. 172). It allows decision makers to take into account all the tangible and intangible factors affecting the decision; thereby facilitating quality decision making and management processes (Vargas, 2010).

The AHP's distinct advantages are that it is easy to use; provides for both quantitative and qualitative criteria; a large quantity of criteria can be considered; and a flexible hierarchy can be constructed according to the problem. It also assists the decision makers to make both subjective and objective evaluations; and provides for automatic checking of preference consistency by the respondents in order to reduce any bias in decision making (Dalalah et al, 2010 p 568).

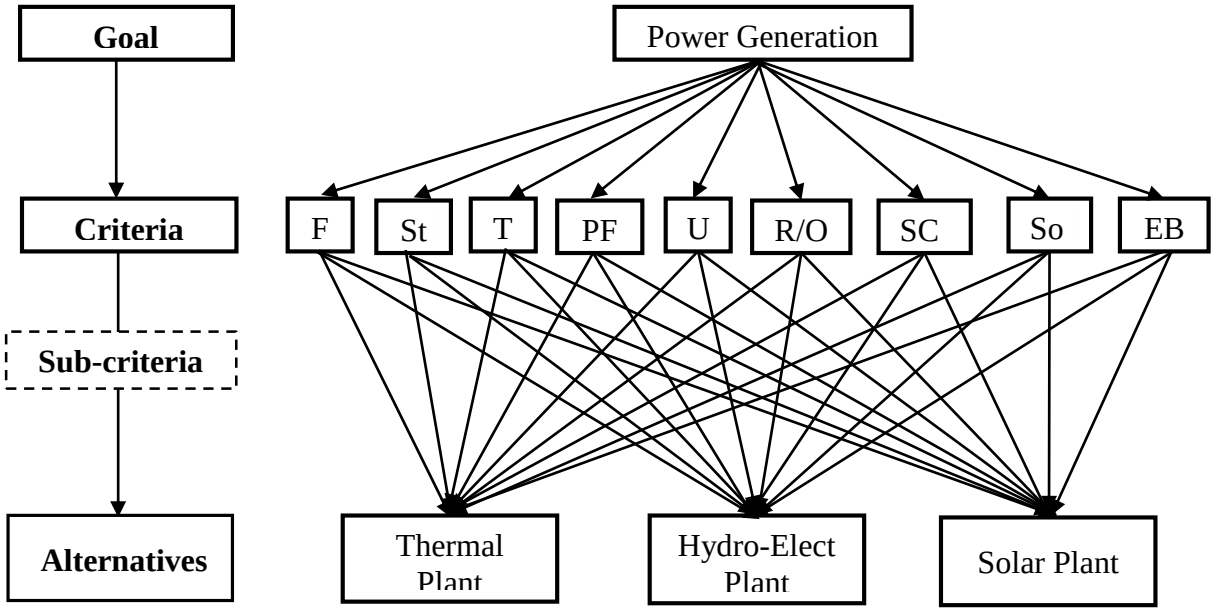
4.5.6. Application of the Analytical Hierarchy Process (AHP)

In order to assess its suitability, the AHP was applied to determine the most preferred criteria amongst the identified research criteria for the selection and prioritisation of government power generation projects in Zimbabwe. This study is not intended to analyse any specific project portfolio in currently planned power generation projects, so no rating information on alternatives has been gathered for purposes of a case study. Such information usually includes specific number of jobs to be created by each alternative, cost of the project, project duration, productions costs, NPVs, Profit margins, environmental issues, etc. For this reason, the Ratings Window for any pairwise comparison of the Alternatives was not used. Accordingly, a generic AHP model was used to limit the analysis to the prioritisation of criteria. Data analysis was done using SuperDecisions software for Windows, Version 2.2.6 (April 2013) available at www.superdecisions.com downloaded on 26 March 2015.

The first stage in building the generic hierarchy was determination of the criteria to be used and, thereafter, construction of the hierarchy. In this instance, the researcher used the adopted

criteria categories before unpacking the sub-criteria. As alluded to in Chapter 2, these are Financial (**F**), Strategic (**St**), Technology (**T**), Policy Framework (**PF**), Urgency (**U**), Risks/Opportunities (**R/O**), Stakeholder Commitment (**SC**), Social (**So**) and Economic Benefits (**EB**); to make a decision on the power generation project to be undertaken from three alternatives (Hydro, Thermal and Solar). The constructed hierarchy is as shown in Figure 4.1.

Figure 4.1: AHP Generic Model for Power Generation Projects



Source: Researcher (2015)

Relevant sub-criteria clusters were included in the hierarchy to evaluate their level importance in relation to the criteria categories. The resultant computer generated hierarchy is depicted in Figure 4.2.

The second stage was to determine the pairwise comparison through the reciprocal matrix in order to establish the relative priorities for each criteria category and their respective weights to the goal accomplishment. In this instance, all the questionnaire data was captured and simulated in the formulated matrices; as illustrated in Figures 4.3 and 4.4 respectively.

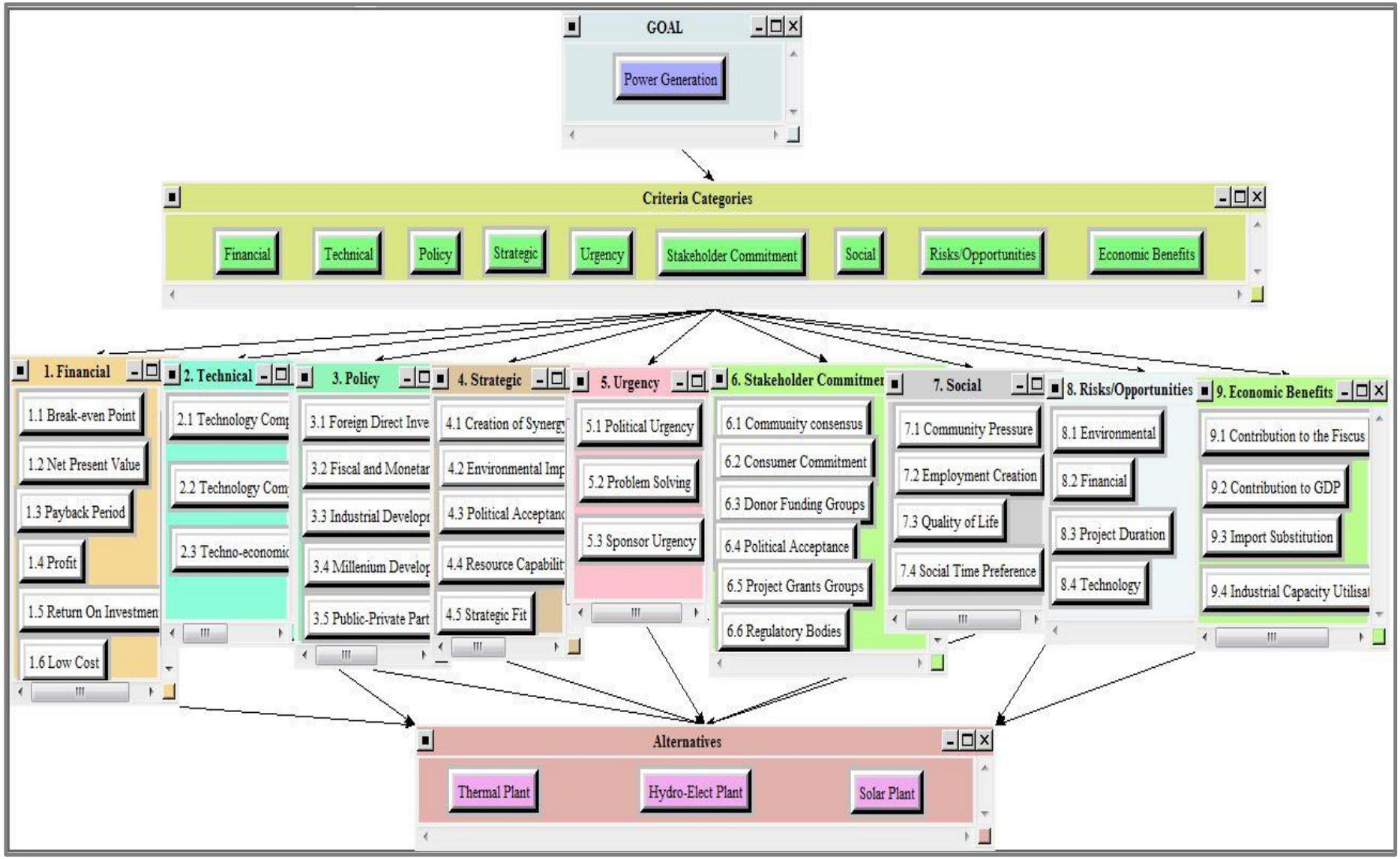
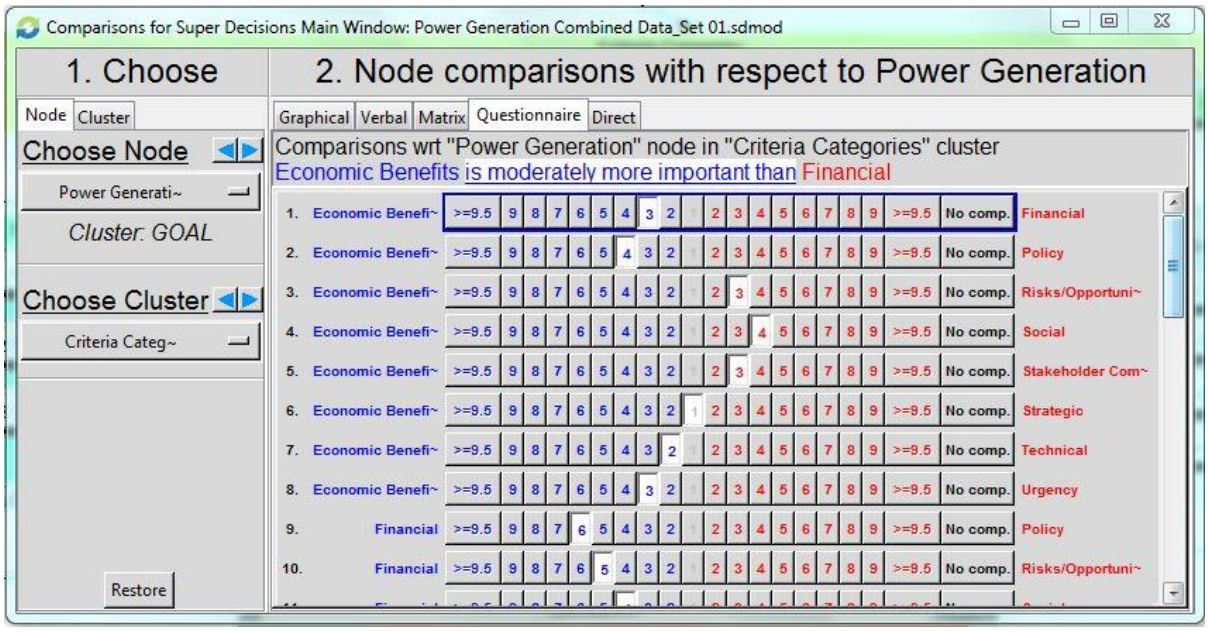


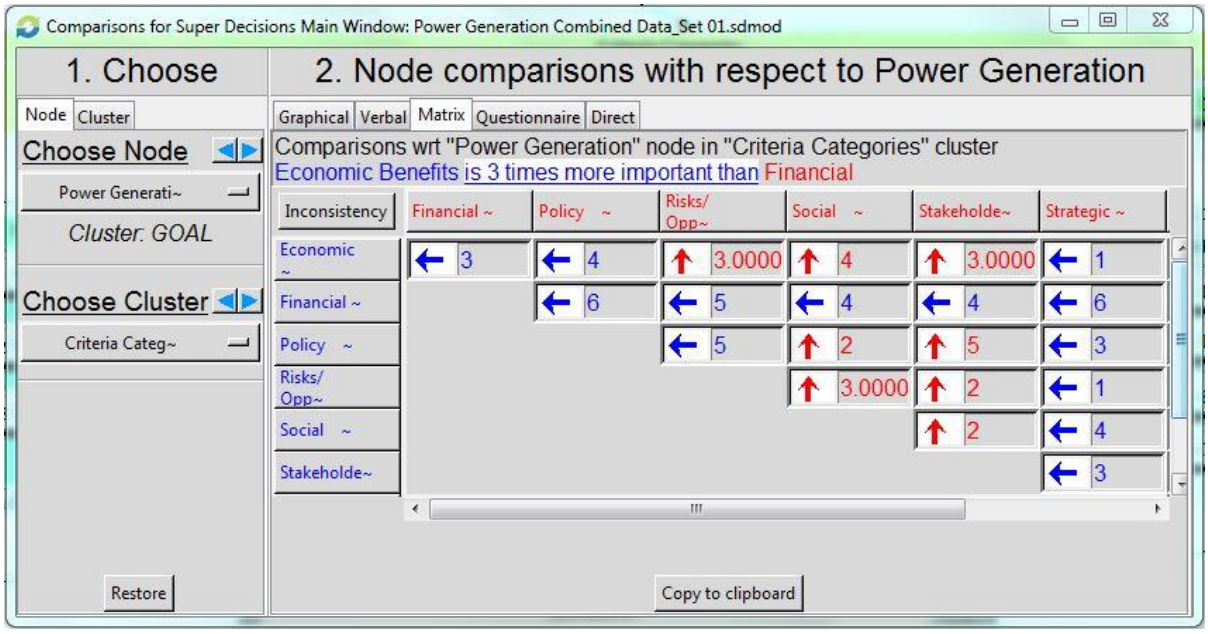
Figure 4.2: Computer Generated AHP Model for Power Generation Projects

Figures 4.3: Questionnaire Window



Source: Research Survey (2015)

Figures 4.4: Matrix Window



Source: Research Survey (2015)

The preferences by individual respondents were calculated; resulting in 21 sets of matrices and respective priority vectors (eigenvalues) for each criteria category and related sub-criteria. Thereafter, in order to consolidate the group results, the data was exported to excel spreadsheets to determine the geometric mean values for each criterion (Ishizaka and Labib, 2011). The resultant averages were then evaluated in the AHP structure outlined in Table 4.5 below:

Table 4.5: Outline for Power Generation Combined Data_Final Set

Alternative(s) in it:	• Hydro-Elect Plant • Solar Plant • Thermal Plant
Network Type:	Bottom level
Formula:	`Not applicable`
Clusters/Nodes	**1. Financial:** *AF.1* **1.1 Break-even Point:** *F.1* **1.2 Net Present Value:** *F.2* **1.3 Payback Period:** *F.3* **1.4 Profit:** *F.4* **1.5 Return On Investment:** *F.5* **1.6 Low Cost:** *F.1.6* **2. Technical:** *T.1* **2.1 Technology Competitiveness:** *T.1.1* **2.2 Technology Compatibility:** *T.1.2* **2.3 Techno-economic Feasibility Study:** *T.1.3* **3. Policy:** *P.1* **3.1 Foreign Direct Investment:** *P.1.1* **3.2 Fiscal and Monetary Policy:** *P.1.2* **3.3 Industrial Development Policy:** *P.1.3* **3.4 Millenium Development Goals:** *P.1.4* **3.5 Public-Private Partnerships:** *P.1.5* **4. Strategic:** *St.1* **4.1 Creation of Synergy:** *St.1.1* **4.2 Environmental Impact:** *St.1.2* **4.3 Political Acceptance:** *St.1.3* **4.4 Resource Capability and Capacity:** *St.1.4* **4.5 Strategic Fit:** *St.1.5* **5. Urgency:** *U.1* **5.1 Political Urgency:** *U.1.1* **5.2 Problem Solving:** *U.1.2* **5.3 Sponsor Urgency:** *U.1.2* **6. Stakeholder Commitment:** *SC.1* **6.1 Community consensus:** *SC.1.1* **6.2 Consumer Commitment:** *SC.1.2* **6.3 Donor Funding Groups:** *SC.1.3* **6.4 Political Acceptance:** *SC.1.4* **6.5 Project Grants Groups:** *SC.1.5* **6.6 Regulatory Bodies:** *SC.1.6* **7. Social:** *S.1* **7.1 Community Pressure:** *S.1.1* **7.2 Employment Creation:** *S.1.2* **7.3 Quality of Life:** *S.1.3*

	7.4 Social Time Preference: *S.1.4* **8. Risks/Opportunities:** *R/O.1* **8.1 Environmental:** *R/O 1.1* **8.2 Financial:** *R/O 1.2* **8.3 Project Duration:** *R/O 1.3* **8.4 Technology:** *R/O 1.4* **9. Economic Benefits:** *EB.1* **9.1 Contribution to the Fiscus:** *EB.1.1* **9.2 Contribution to GDP:** *EB.1.2* **9.3 Import Substitution:** *EB.1.3* **9.4 Industrial Capacity Utilisation:** *EB.1.4* • **Alternatives:** *Power Generation Options* ○ **Hydro-Elect Plant:** *2* ○ **Solar Plant:** *3* ○ **Thermal Plant:** *1* • **Criteria Categories:** *Criteria* ○ **Economic Benefits:** *9* ○ **Financial:** *1* ○ **Policy:** *4* ○ **Risks/Opportunities:** *8* ○ **Social:** *7* ○ **Stakeholder Commitment:** *6* ○ **Strategic:** *3* ○ **Technical:** *2* ○ **Urgency:** *5* • **GOAL:** *Power Generation* ○ **Power Generation:** *1*

Source: Research Survey (2015)

The following tables show the final results as calculated for each criterion. The criteria matrix must have an inconsistency value of less than 0.10 or 10%. Where the value is above 10%, there is need to revisit the preferences in order to review the paired comparisons (Vargas, 2010, Ishizaka and Labib, 2011). It is worth noting that the decision support software provides for assistance by recommending the best values for adjustment and the decision maker is free to adopt the same or any other value that he/she deems appropriate.

On the basis of primary data, the evaluation was made on a cluster-by-cluster basis before the global priorities were analysed.

Table 4.6: Criteria Categories Final Matrix: Unadjusted inconsistency - 0.23472

	Economic Benefits	Financial	Policy	Risks or Opportunities	Social	Stakeholder Commitment	Strategic	Technical	Urgency
Economic Benefits	1	2.8286	2.2659	3.3005	3.1405	2.9248	0.5392	2.5215	2.7439
Financial	0.3535	1	0.3890	3.7637	0.3765	2.1311	0.3158	2.3439	2.6473
Policy	0.4413	2.5704	1	3.0112	0.4690	1.9985	2.1874	3.1715	2.8843
Risks/Opportunities	0.3030	0.2657	0.3321	1	0.4257	0.5456	0.3665	2.1222	2.2756
Social	0.3184	2.6560	2.1320	2.3492	1	2.4835	0.3673	0.4067	0.3553
Stakeholder Commitment	0.3419	0.4692	0.5004	1.8327	0.4027	1	2.5728	0.3323	0.3437
Strategic	1.8545	3.1669	0.4572	2.7288	2.7224	0.3887	1	0.4348	0.4010
Technical	0.3966	0.4266	0.3153	0.4712	2.4590	3.0089	2.2997	1	2.4692
Urgency	0.3644	0.3777	0.3467	0.4394	2.8143	2.9094	2.4934	0.4050	1

Source: Research Survey (2015)

The inconsistency value (0.23472) was more than 0.1 or 10%. Therefore, the matrix could not be considered to be consistent for decision making purposes. An adjustment was then made resulting in achievement of 0.08346 or 08.34% inconsistency in Table 4.7.

Table 4.7: Criteria Categories Adjusted Final Matrix: Inconsistency - 0.08346

	Economic Benefits	Financial	Policy	Risks or Opportunities	Social	Stakeholder Commitment	Strategic	Technical	Urgency
Economic Benefits	1	2.8286	2.2659	3.3005	3.1405	2.9248	1.9524	2.5215	2.7439
Financial	0.3535	1	0.3890	3.7637	1.8477	2.1311	0.3158	2.3439	2.6473
Policy	0.4413	2.5704	1	3.0112	1.9866	1.9985	2.1874	3.1715	2.8843
Risks/Opportunities	0.3030	0.2657	0.3321	1	0.4257	0.5456	0.3665	0.4544	0.5021
Social	0.3184	0.5412	0.5034	2.3492	1	2.4835	0.3673	0.4067	0.3553
Stakeholder Commitment	0.3419	0.4692	0.5004	1.8327	0.4027	1	0.3286	0.3323	0.3437
Strategic	0.5122	3.1669	0.4572	2.7288	2.7224	3.0436	1	0.4348	1.7911
Technical	0.3966	0.4266	0.3153	2.2009	2.4590	3.0089	2.2997	1	2.4692
Urgency	0.3644	0.3777	0.3467	1.9915	2.8143	2.9094	0.5583	0.4050	1

Source: Research Survey (2015)

Table 4.8: Priorities for Criteria Categories

(A). Unadjusted Inconsistency - 0.23472

Name	Normalized	Idealized	Rank
Economic Benefits	0.1840	1	**1**
Financial	0.1027	0.5585	**5**
Policy	0.1506	0.8186	**2**
Risks or Opportunities	0.0659	0.3582	**9**
Social	0.1025	0.5574	**6**
Stakeholder Commitment	0.0682	0.3705	**8**
Strategic	0.1218	0.6623	**3**
Technical	0.1089	0.5922	**4**
Urgency	0.0953	0.5180	**7**

(B). Adjusted Inconsistency - 0.08346

Name	Normalized	Idealized	Rank
Economic Benefits	0.2212	1	**1**
Financial	0.1166	0.5271	**5**
Policy	0.1819	0.8223	**2**
Risks or Opportunities	0.0394	0.1781	**9**
Social	0.0626	0.2831	**7**
Stakeholder Commitment	0.0478	0.2162	**8**
Strategic	0.1318	0.5958	**3**
Technical	0.1200	0.5426	**4**
Urgency	0.0785	0.3548	**6**

Source: Research Survey (2015)

Both tables reflect an almost similar rank-order for the criteria categories. The difference is in the Social and Urgency which interchanged the 6th and 7th positions. Analysis of the values in Table 4.8(B) shows that Economic Benefits (22.12%), Policy (18.19%) and Strategic (13.18%) criteria are considered to have significant contribution to the goal. Risks/Opportunities criteria come last with 3.94% contribution.

This was found to be consistent with previous studies by various researchers who asserted the importance of these criteria categories. Martland (2012), argued that the ideal situation is that there should be a rational and structured way of assessing public projects and, barring other considerations, only projects whose benefits exceed total costs should be taken up and prioritised for funding in view of the limited resource envelop; especially in developing countries as these are likely to stimulate/attract further investment in the national economy. Chigumbura (2015) observed that delays in finalizing legislative frameworks result in unintended policy outcomes that lead to policy reversals thereby creating uncertainty, undermining business confidence and dampening investor confidence. Others stressed the importance of strategic alignment and defined need for project choices (Müller, Martinsuo et al, 2008; Turner, 2009; Murray, 2009; and Burger et al, 2009).

Table 4.9: Financial Criteria Final Matrix: Inconsistency - 0.04457 **Priorities**

	1.1 Break-even Point	1.2 Net Present Value	1.3 Payback Period	1.4 Profit	1.5 Return On Investment	1.6 Low Cost	Normalized by cluster	Idealized by cluster	Rank
1.1 Break-even Point	1	0.3432	0.5442	0.3727	0.3270	0.3077	0.0617	0.1712	**6**
1.2 Net Present Value	2.9139	1	2.946	2.2433	0.6686	0.3367	0.1788	0.4961	**3**
1.3 Payback Period	1.8375	0.3394	1	0.4559	0.4040	0.3165	0.0802	0.2225	**5**
1.4 Profit	2.6833	0.4458	2.1933	1	0.4711	0.3716	0.1227	0.3404	**4**
1.5 Return on Investment	3.0583	1.4958	2.4755	2.1225	1	0.3339	0.1962	0.5443	**2**
1.6 Low Cost	3.2500	2.9697	3.1600	2.6908	2.9947	1	0.3604	1	**1**

Source: Research Survey (2015)

The inconsistency value in Table 4.9 is 0.04457 or 4.57% which is below 10%; so the matrix is accepted as consistent decision purposes. The results indicate that Low-Cost is considered to be the most important criterion in the financial category as it contributes 36.04% to the decision on the goal. Break-Even Point contributes the lowest at 6.17%. This corroborates the fact that public infrastructure investment is not about financial gain but a service for social benefit (Munier, 2011). Low cost can translate to affordable tariffs, thereby facilitating and/or enhancing access to electricity. It should be noted, however, that the least cost approach cannot be synonymous with poor or low service quality.

Table 4.10: Policy Criteria Final Matrix: Inconsistency - 0.02257 **Priorities**

	3.1 Foreign Direct Investment	3.2 Fiscal and Monetary Policy	3.3 Industrial Development Policy	3.4 Millennium Development Goals	3.5 Public-Private Partnerships	Normalized by cluster	Idealized by cluster	Rank
3.1 Foreign Direct Investment	1	2.0392	1.9808	3.96	1.9708	0.3496	1	**1**
3.2 Fiscal and Monetary Policy	0.4904	1	1.6627	3.2597	1.8492	0.2411	0.6896	**2**
3.3 Industrial Development Policy	0.5048	0.6014	1	2.835	1.5475	0.1844	0.5273	**3**
3.4 Millennium Development Goals	0.2525	0.3068	0.3527	1	0.3046	0.0671	0.1920	**5**
3.5 Public-Private Partnerships	0.5074	0.5408	0.6462	3.2833	1	0.1578	0.4515	**4**

Source: Research Survey (2015)

Table 4.10 is considered to be the most consistent matrix at 2.25% inconsistency value. The results show that FDI Policy and Fiscal and Monetary Policy, contributing 34.96% and 24.11% respectively, play critical roles in attraction of investment and achievement of the goal. This indeed calls for favourable policy environment in order to harness FDI and private investment in the power generation projects; encompassing open trade and payment systems that attract investors (UNDP, 2007).

Table 4.11: Risks/Opportunities Criteria Final Matrix: Inconsistency - 0.03093 **Priorities**

	8.1 Environmental	8.2 Financial	8.3 Project Duration	8.4 Technology	Normalized by cluster	Idealized by cluster	Rank
8.1 Environmental	1	0.3849	1.9167	0.4126	0.1608	0.3932	**3**
8.2 Financial	2.5980	1	3.3367	0.5701	0.3251	0.7949	**2**
8.3 Project Duration	0.5217	0.2997	1	0.3502	0.1053	0.2574	**4**
8.4 Technology	2.4239	1.7542	2.8556	1	0.4089	1	**1**

Source: Research Survey (2015)

The results in Table 4.11 indicate that Technological and Financial risks, contributing 40.89% and 32.51%, are considered critical in power generation project selection and prioritisation. This finding is consistent with arguments by Turner (2009); who submits that much of the project definition should be driven by the available sources of finance whereby the financiers want to minimise risk; especially in the choice of technology. He further posits that technical risk needs to be assessed in order to avoid technical problems which can have a huge impact on potential of project overrun.

In terms of Social Criteria, Table 4.12 reveals that Employment Creation is considered as the most important criterion contributing 46.63% to the goal. Social Time Preference is least considered thereby contributing 7.86%. This is major socio-economic benefit which if considered for project approval leads to enhancement of quality of life. The finding resonates well with the argument by Munier (2011) who submitted that when assessing the impact of projects, how a project will affect the lives of the community should be considered.

Table 4.12: Social Criteria Final Matrix: Inconsistency - 0.06439 **Priorities**

	7.1 Community Pressure	7.2 Employment Creation	7.3 Quality of Life	7.4 Social Time Preference	Normalized by cluster	Idealized by cluster	Rank
7.1 Community Pressure	1	0.3651	2.2753	3.4171	0.2707	0.5804	**2**
7.2 Employment Creation	2.7392	1	2.2625	4.075	0.4663	1	**1**
7.3 Quality of Life	0.4395	0.4411	1	3.3042	0.1844	0.3955	**3**
7.4 Social Time Preference	0.2926	0.2454	0.3026	1	0.0786	0.1687	**4**

Source: Research Survey (2015)

Table 4.13: Stakeholder Criteria Final Matrix: Inconsistency - 0.03933 **Priorities**

	6.1 Community consensus	6.2 Consumer Commitment	6.3 Donor Funding Groups	6.4 Political Acceptance	6.5 Project Grants Groups	6.6 Regulatory Bodies	Normalized by cluster	Idealized by cluster	Rank
6.1 Community consensus	1	0.5911	0.3856	0.3077	0.4167	0.2691	0.0629	0.1938	**6**
6.2 Consumer Commitment	1.6917	1	0.4387	0.3567	2.0071	0.3604	0.1078	0.3321	**4**
6.3 Donor Funding Groups	2.5933	2.2796	1	0.3495	1.65	0.3649	0.1468	0.4522	**3**
6.4 Political Acceptance	3.2500	2.8042	2.8611	1	3.3127	1.778	0.3246	1	**1**
6.5 Project Grants Groups	2.40	0.4982	0.6061	0.3019	1	0.3224	0.0911	0.2805	**5**
6.6 Regulatory Bodies	3.7167	2.7750	2.7405	0.5624	3.1017	1	0.2669	0.8222	**2**

Source: Research Survey (2015)

Table 4.13 indicates that Political Acceptance and Regulatory Bodies, contributing 32.46% and 26.69% respectively, are critical to the realisation of the goal. This result is supported by Martland (2012) who warns that large projects are politically sensitive. The reason for this is that, on one hand, potential and actual conflicts of interest exist within the groups which are mandated to propose, evaluate and approve the projects. On other, legal frameworks may also

prove to be handicaps in the implementation of strategic projects. Therefore, the two criteria are considered as key success factors in the adoption and implementation of any power generation project.

Table 4.14: Strategic Criteria Final Matrix: Inconsistency - 0.04554 **Priorities**

	4.1 Creation of Synergy	4.2 Environmental Impact	4.3 Political Acceptance	4.4 Resource Capability and Capacity	4.5 Strategic Fit	Normalized by cluster	Idealized by cluster	Rank
4.1 Creation of Synergy	1	0.3125	0.3708	0.2899	0.4511	0.0732	0.1955	**5**
4.2 Environmental Impact	3.2	1	2.6913	0.4982	2.0542	0.2656	0.7097	**2**
4.3 Political Acceptance	2.6967	0.3716	1	0.3569	2.2558	0.1667	0.4455	**3**
4.4 Resource Capability and Capacity	3.4500	2.0072	2.8023	1	2.6639	0.3742	1	**1**
4.5 Strategic Fit	2.2167	0.4868	0.4433	0.3754	1	0.1203	0.3215	**4**

Source: Research Survey (2015)

In terms of Strategic Criteria, Table 4.14 reveals that consideration for Resource Capability and Capacity contributes 37.42% to the goal. This is followed by consideration for Environmental Impact which contributes 26.56%. This finding is in line with the WEF Report on "Strategic Infrastructure in Africa" (2013), which notes that the keys to any project adoption and its successful implementation are thorough preparation and resource mobilisation. By implication, everything else comes second to assessment of resource capability and capacity to implement the chosen project.

Table 4.15: Technical Criteria Final Matrix: Inconsistency - 0.03963 **Priorities**

	2.1 Technology Competitiveness	2.2 Technology Compatibility	2.3 Techno-economic Feasibility Study	Normalized by cluster	Idealized by cluster	Rank
2.1 Technology Competitiveness	1	0.4510	0.3207	0.1508	0.2619	3
2.2 Technology Compatibility	2.2174	1	0.3872	0.2731	0.4741	2
2.3 Techno-economic Feasibility Study	3.1181	2.5829	1	0.5760	1	1

It is evident from the results in Table 4.15 that Techno-economic Feasibility Study is the most important criterion; contributing 57.60% to the goal. This gives credence to the fact that energy projects are complex in technical terms and require significant effort throughout the design, engineering and development stages to produce an economically convincing case for end users (Thumann and Woodroof, 2009 p 103). The feasibility study is a critical tool for determination of all techno-economic considerations for project evaluation and approval; especially at the pre-financing stage. This is also in tandem with the 2015 National Budget allocations towards feasibility studies for all proposed infrastructure projects to demonstrate technical and financial viability.

Table 4.16: Urgency Criteria Final Matrix: Inconsistency - 0.08147 **Priorities**

	5.1 Political Urgency	5.2 Problem Solving	5.3 Sponsor Urgency	Normalized by cluster	Idealized by cluster	Rank
5.1 Political Urgency	1	0.3593	2.2194	0.2714	0.4803	**2**
5.2 Problem Solving	2.7829	1	2.5871	0.5651	1	**1**
5.3 Sponsor Urgency	0.4506	0.3865	1	0.1634	0.2892	**3**

Source: Research Survey (2015)

Table 4.16 results clearly show that Problem Solving (need), contributing 56.51%, is the most important criterion in terms of the urgency to achieve the goal. This finding is consistent with the argument by Turner (2009) in that the need to start and finish the project is created by the urgency of realising the benefits arising from the investment made. In this case the need for power creates the urgency whose benefit is only realised when the problem is solved i.e. when electricity is available and accessible.

In Table 4.17, it is clear that Industrial Capacity Utilisation, contributing 36.71%, is the most important criterion for consideration in goal achievement. This is followed by Contribution to the Gross Domestic Product at 24.64%. This finding is in sync with the need to prop the manufacturing and mining industries' performance through provision of power, among other enablers. Once industry is enabled, its contribution to both the fiscus and GDP will lead to national economic recovery.

Table 4.17: National Economic Benefits Matrix: Inconsistency - 0.07071 **Priorities**

	9.1 Contribution to the Fiscus	9.2 Contribution to GDP	9.3 Import Substitution	9.4 Industrial Capacity Utilisation	Normalized by cluster	Idealized by cluster	Rank
9.1 Contribution to the Fiscus	1	0.5379	2.27	0.5608	0.2227	0.6067	**3**
9.2 Contribution to GDP	1.8592	1	1	0.5660	0.2464	0.6712	**2**
9.3 Import Substitution	0.4405	1	1	0.4845	0.1638	0.4462	**4**
9.4 Industrial Capacity Utilisation	1.7833	1.7667	2.0639	1	0.3671	1	**1**

Source: Research Survey (2015)

Table 4.18: Alternatives Final Matrix: Inconsistency - 0.07514 **Priorities**

	Hydro-Elect Plant	Solar Plant	Thermal Plant	Normalized by cluster	Idealized by cluster	Rank
Hydro-Elect Plant	1	5.2375	3.7583	0.6684	1	**1**
Solar Plant	0.1909	1	0.3111	0.0966	0.1445	**3**
Thermal Plant	0.2661	3.2149	1	0.2350	0.3516	**2**

Source: Research Survey (2015)

Hydro-electric power generation projects were found to be most preferred, contributing 66.84%. This was followed by thermal plants at 23.50%. This result reflects respondents' preferences only and not evaluation of rating information for each alternative.

The third stage was to determine the global priorities for each criterion. These priorities are used in conjunction with the idealised priorities to determine the scores for the alternatives when assessing for the best alternative in the Ratings Window. The score of the alternative is calculated by multiplying the idealised priority of the selected category times the limiting priority for the criterion obtained in the network for each cell and summing across the row (Adams and Saaty, 2003). As alluded earlier, rating of alternatives is beyond the scope of this study. It is considered to be an area of further research targeting a specific project portfolio; whereby the necessary empirical data should be availed. That notwithstanding, the results of the global (limiting) priorities are indicated in Table 4.19.

Table 4.19: Global priorities in relation to the main goal

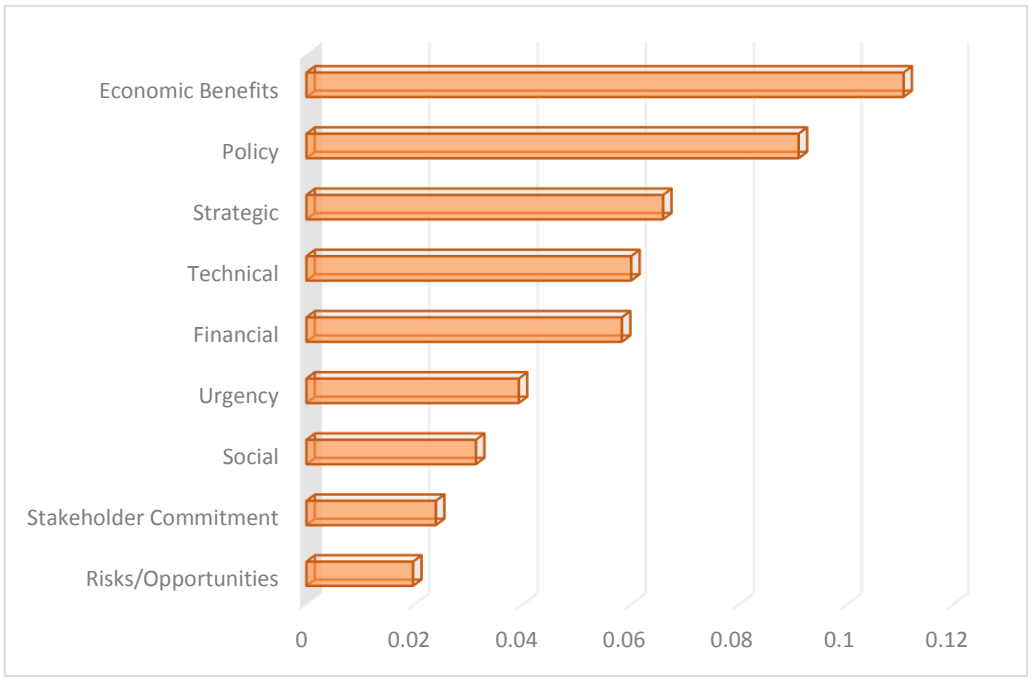
Name	Normalized by Cluster	Limiting
1.1 Break-even Point	0.06171	0.003598
1.2 Net Present Value	0.1788	0.010425
1.3 Payback Period	0.0802	0.004676
1.4 Profit	0.12268	0.007153
1.5 Return On Investment	0.19616	0.011437
1.6 Low Cost	0.36044	**0.021015**
2.1 Technology Competitiveness	0.15085	0.009054
2.2 Technology Compatibility	0.27312	**0.016392**
2.3 Techno-economic Feasibility Study	0.57603	**0.034572**
3.1 Foreign Direct Investment	0.34959	**0.031799**
3.2 Fiscal and Monetary Policy	0.24108	**0.021929**
3.3 Industrial Development Policy	0.18435	**0.016769**
3.4 Millennium Development Goals	0.06714	0.006107
3.5 Public-Private Partnerships	0.15784	**0.014357**
4.1 Creation of Synergy	0.07316	0.004822
4.2 Environmental Impact	0.26557	**0.017504**
4.3 Political Acceptance	0.16672	0.010989
4.4 Resource Capability and Capacity	0.37422	**0.024665**
4.5 Strategic Fit	0.12033	0.007931
5.1 Political Urgency	0.27141	0.010651
5.2 Problem Solving	0.56515	**0.022178**
5.3 Sponsor Urgency	0.16344	0.006414
6.1 Community consensus	0.06288	0.001504
6.2 Consumer Commitment	0.10778	0.002578
6.3 Donor Funding Groups	0.14679	0.003511

Name	Normalized By Cluster	Limiting
6.4 Political Acceptance	0.3246	0.007764
6.5 Project Grants Groups	0.09106	0.002178
6.6 Regulatory Bodies	0.2669	0.006384
7.1 Community Pressure	0.27065	0.008475
7.2 Employment Creation	0.46631	**0.014602**
7.3 Quality of Life	0.18439	0.005774
7.4 Social Time Preference	0.07865	0.002463
8.1 Environmental	0.16076	0.003168
8.2 Financial	0.32508	0.006406
8.3 Project Duration	0.10525	0.002074
8.4 Technology	0.40891	0.008058
9.1 Contribution to the Fiscus	0.22272	**0.024638**
9.2 Contribution to GDP	0.24639	**0.027256**
9.3 Import Substitution	0.16381	**0.018121**
9.4 Industrial Capacity Utilisation	0.36708	**0.040607**
Economic Benefits	0.22124	**0.110622**
Financial	0.11661	**0.058304**
Policy	0.18192	**0.090961**
Risks/Opportunities	0.03941	0.019706
Social	0.06263	0.031314
Stakeholder Commitment	0.04784	0.023919
Strategic	0.13182	**0.065911**
Technical	0.12004	**0.060018**
Urgency	0.07849	0.039244

Source: Research Survey (2015)

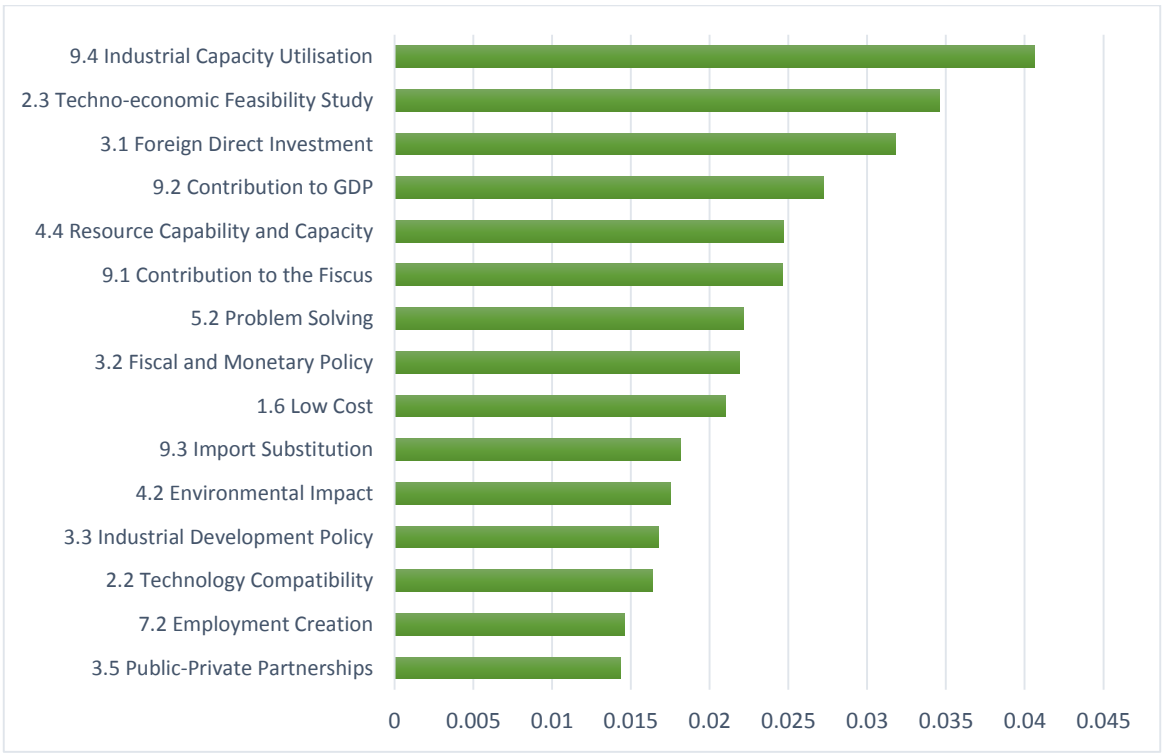
In Table 4.19, the limiting column shows the priority weights for each criterion in terms of its contribution to the main goal. The results confirm the criteria rank order as obtained under the cluster-by-cluster analysis in Tables 4.7 to 4.17. This is shown in Charts 4.4 and 4.5 below:

Chart 4.4: Rank order for Criteria Categories



Source: Research Survey (2015)

Chart 4.5: Rank order for the top 15 Sub-Criteria



Source: Research Primary Data (2015)

4.6. Chapter Summary

This chapter focused on data analysis, interpretation and presentation of findings derived from the study. All the information gathered was analysed against the variables incorporated in the conceptual framework and theory cited in the literature review. The discussions sought to establish gaps, determine corroboration and proffer empirical evidence from both the primary and secondary data sources. The appropriate deductions and inferences were made. The next chapter presents the conclusions and recommendations.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter focuses on the conclusions and recommendations arising from the study. The objectives of the research are restated with a view to determine achievement of the same. The contribution of the research to the body of knowledge is highlighted. Lastly, suggested areas for further research are submitted.

5.1.1. Statement of the Objectives

This study sought to achieve the following objectives:

a. To analyse decision making criteria for project selection and prioritisation.
b. To establish the existing selection and decision making processes in the national power generation projects.
c. To explore government policies in attracting investment in national power generation projects.
d. To assess the financing models used to fund national power generation projects.
e. To recommend a hierarchical model for project selection and prioritization for funding purposes.

5.1.2. Achievement of Research Objectives

The main objective of the study was to address the identified disconnection between the decision making process for approval of a power generation project as a "National Strategic Project" and its subsequent inadequate capitalisation which, in turn, inhibited timely successful execution and expected contribution to the national economy. This was achieved mainly through the use of a self-administered survey questionnaire targeting officials the government institutions involved in power generation projects selection and decision making. These included MOEPD, MOFED, ZESA Holdings, ZENT, ZPC, ZERA, ZIA, SERA and IDBZ. Purposive judgmental sampling was done resulting in a sample size of 40 participants; whereby 35 were earmarked for the self-administered questionnaires and 5 (five) were to be interviewed. Only one interview (20% success rate) was conducted but discarded for want of reliability and validity. The remainder failed to take place due to various reasons; mainly pre-occupation and

non-availability of the targeted respondents. Twenty-six (26) questionnaires were returned; giving response rate of 74.29%.

The research revealed that all the participants had no prior experience with the AHP Model and had difficulties in completing the quantitative part of the questionnaire. Whilst the researcher took time to explain the model requirements in terms of pairwise comparisons, some participants felt that it was more complicated than the Likert-scale approach they were familiar with. This led to exclusion of 5 (five) quantitative responses of the questionnaire due to incomplete information and/or irrational answers indicating respondents' failure to understand the concept; resulting in 60% success rate on quantitative data. That notwithstanding, the responses managed to bring out the desired themes, trends and pattern of selection and decision making processes in national power generation projects in the key stakeholder institutions. Accordingly, the conclusions of the specific research objectives are highlighted hereinafter.

5.2. Conclusions

5.1.1. The current government decision making criteria for project selection and prioritisation in power generation. The study showed that almost all the respondents were aware of some of the requisite criteria for project selection and prioritisation. Most of the respondents indicated that the Government was guided by the National Power Systems Development Plan (NPSDP); which essentially provides the future power demand indicators, to execute the power generation projects. However, the main criteria highlighted by the respondents were financial underpinned by least cost and cost-benefit analysis. What has come out clearly in all responses is that there are no standard criteria being used in the power generation projects. The researcher opines that government decisions on power generation projects should be based on a common understanding of the national strategic intent and policy framework on meeting both national economic growth and socio-economic considerations **(Paragraph 4.5.1)**.

5.1.2. Existing selection and decision making processes in the national power generation projects. The survey revealed that there was no clearly formalised selection and decision making method used in the national power generation projects initiated by government. Each government institution has its own perception of what happens in the process; resulting in fragmented rather than standard, centralized and transparent processes. Such a situation is inconsistent with best practices as advocated by Turner (2009 p.328). The study also revealed

that the various methods adopted in the current selection and prioritisation processes were not always based on the multi-criteria ranking methodology; hence there was no standard criteria framework **(Paragraph 4.5.2)**.

5.1.3. Government policies being used in attracting investment in national power generation projects. The study revealed that the activities being used to attract investment are mainly derived from the Indigenisation and Empowerment Act and the National Investment Policy of Zimbabwe. These include: cost-reflective tariffs, tax holiday for greenfield projects, exemption from with-holding tax, national project status, debt or sovereign guarantees by government, power off-take guarantees by government for IPP and JV projects. The government is also seeking to strengthen PPP arrangements. A regulatory framework was put in place through the establishment of ZERA. However, FDI inflows into the country remained subdued on the back of high national debt overhang; low business confidence; liquidity constraints; low industrial competitiveness; and an inadequate infrastructure. Meanwhile, Zimbabwe is yet to come up with a comprehensive PPP policy framework and legislation that will complement the Indigenisation and Empowerment Act, thereby assisting in clarifying issues to do with policy ambiguity and perceived inconsistencies **(Paragraph 4.5.3)**.

5.1.4. The financing models used to fund national power generation projects. The study revealed that power generation projects are being funded through various methods which include: Public Sector Investment Program (PSIP) budget allocation; PPPs in the form of BOT and JV; bilateral agreements; pure debt; concessionary loans for EPC contracts; structured finance models; infrastructure development bonds; project grants, prepayment of electricity by major consumers and electricity levies **(Paragraph 4.5.4)**.

5.1.5. Suitably of the AHP model for power project selection and prioritisation for funding purposes. The application of the AHP was successfully demonstrated to the extent of determining the most preferred criteria amongst the identified research criteria for the selection and prioritisation of government initiated power generation projects in Zimbabwe. The model's suitability was shown by way of the results in Tables 4.6 to 4.19 and the summarised criteria ranking in Figures 4.5 and 4.6. Accordingly, the AHP is being proffered for adoption as a ranking system for prioritisation by all government institutions involved in selection and approval of power projects. This will result in consistency of action on prioritisation of all power generation projects **(Paragraphs 4.5.5 and 4.5.6)**.

5.3. Contribution to the Body of Knowledge

The choice of the study was premised on the understanding that, to the best of the researcher's knowledge, no similar research has been done on the subject matter in Zimbabwe and as such, the study will bring new knowledge on the subject; thereby contributing to the body of knowledge on the local application of the AHP model in power project selection and decision making for capitalisation purposes. Therefore, the research will benefit self, the academia, policy and decision making authorities in both government and private sector **(Paragraph 1.6)**.

5.4. Recommendations

In view of the findings and conclusions in this study, it is recommended that:

a. The Government is urged to prioritize and select public power generation projects through a transparent system that is centrally maintained.
b. The Government of Zimbabwe should develop appropriate and cohesive policies that facilitate attraction of FDI and private sector participation in power generation projects.
c. The enactment of the PPP Act on the basis of the Joint Venture Bill (aka Public-Private Partnership Bill) be expedited.
d. The AHP Model be adopted in all government institutions as a common user MCDA tool for selection and prioritisation of power generation projects.

5.5. Suggestions for Further Research

In this study, the demonstration of the application of the AHP Model was restricted to determining the cluster and global priorities of criteria categories and related criteria. This is because, in order to determine scores for project alternatives, there is need for specific rating information or empirical data for each alternative. Therefore, rating of alternatives in a specific project portfolio is considered to be an area of further research.

The realisation that there is need for private sector participation in power generation projects, in the form of PPPs and IPPs, gives rise to further research on the contribution actually made by the current partners in this regard. In strategic terms this will enable synchronised identification, selection and prioritisation of all national power projects; with a view to pooling resources, especially financial, and channelling them accordingly.

ANNEX 'A'

Ser.	Project Name	National Project Status	Description	Generation Classification	New Capacity	Estimated Construction Period	Estimated Project Cost	Transmission Works	Cost of Transmission Works
1.	Batoka Gorge Hydro Electric Scheme	Not yet applied for	Greenfield	Hydro	800MW	6years	USD1.4bn EPC Plant Cost excluding civil cost estimated at USD1.5bn to be jointly shared with Zambia (excl. consultancy, owners, EIA and financing costs)	Significant	Included
2.	Devil's Gorge Hydro Electric Scheme	Not yet applied for	Greenfield	Hydro	620MW	TBA	TBA	Significant	TBA
3.	Gairezi Hydro Electric Scheme	Not yet applied for	Greenfield	Hydro	30MW	30months	USD110million	Significant	Included
4.	Hwange Power Station Expansion	Granted	Brownfield	Coal fired	600MW	42months	USD1.5billion	Significant	Included
5.	Hwange Power Station Plant Improvement and Life Extension	Not yet applied for	Brownfield	Coal fired	920MW (Installed)	3months per unit (6 Units)	TBA	Not significant	Included
6.	Kariba South Extension	Granted	Brownfield	Hydro	300MW	42months	USD533million; comprising USD355m total EPC cost, USD178m for associated project development costs	Not significant	Included
7.	Lupane Coalbed Methane	Not yet applied for	Greenfield	Gas fired	300MW	36months; excluding gas exploration and development	USD580million	Significant	Included
8.	Western Area Power Station	Applied for	Greenfield	Coal fired	1200MW	TBA	TBA	Significant	TBA
9.	ZPC Solar (Gwanda, Insukamini, Munyati)	Not yet applied for	Greenfield	Solar	3x100MW	24months	USD635million	Significant	TBA

Table A-1: Current Power Generation Projects in Zimbabwe **Source:** Zimbabwe Power Company (Dec 4, 2014)

ANNEX 'B': Survey Questionnaire

QUESTIONNAIRE SURVEY ON THE SELECTION AND DECISION MAKING PROCESS FOR CAPITALISATION OF NATIONAL STRATEGIC POWER GENERATION PROJECTS

INTRODUCTION

The purpose of this study is to explore the government's selection and decision making process for capitalisation of national power generation projects in Zimbabwe. The researcher seeks to understand the reasons for failure by government to adequately capitalise the initiated power generation projects which would otherwise benefit the national economic turnaround programs. The results will be used for academic research purposes only and no attempt will be made to identify any individual or organisations in any publication thereafter. The questionnaire is targeted at officials at the policy and decision making level; hence should preferably be completed by the Directors and above in the identified key stakeholder ministries/institutions.

SECTION A: GENERAL INFORMATION

This section establishes the participants' profiles. Further, we are trying to determine, in general, the government's approach to national project selection and prioritisation for power generation capitalisation purposes. Please complete this section by inserting an X against your appropriate response and give descriptive answers for the open-ended questions. Where the space provided is inadequate, you may use extra paper as required.

1. Which institution do you work for? e.g. ZESA, MOEPD, MOF, ZIA. ……

2. What is your position in the Ministry/Institution (or equivalent)? ……....

3. Please indicate your gender: Male [ ] Female [ ]

4. What is your age group?

   Less than 25 years [ ] 25 to 40 years [ ] 40 to 60 years [ ] 60 years and above [ ]

5. For how long have you held your current post?

   Less than 2 years [ ] 2 to 4 years [ ] 4 to 6 years [ ] 6 years and above [ ]

6. For how long have you been employed by the organisation?

   Less than 2 years [ ] 2 to 5 years [ ] 6 to 10 years [ ] 10 years and above [ ]

7. What is the highest level of education you attained?

   PhD [ ] Masters Degree [ ] First Degree [ ] Diploma [ ]

8. Please explain in brief, what is your understanding of project selection and prioritisation?

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9. From your knowledge and experience, what is the project selection and prioritisation method used in national power generation projects initiated by government (National Strategic Projects) and how suitable is it?

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10. What are the government policies being used in attracting FDI and investment in national power generation projects?

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11. What are the financing models used to fund national power generation projects?

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SECTION B: PROJECT SELECTION DECISION CRITERIA CATEGORIES

In this section, we are trying to determine the most preferred project decision criteria category for power generation capitalisation purposes using the 9-point Saaty Fundamental Scale for Making Judgments as described in Table 1 below:

Level of Importance	Definition	Explanation
1	**Equal Importance**	The activities/criteria contribute equally to the objective
2	Weak Importance	The criterion/activity is slightly favoured over another
3	**Moderate Importance**	Experience and judgment moderately favour one criterion/activity over another
4	Moderate Plus	Between moderate and strong
5	**Strong Importance**	Experience and judgment strongly favour one criterion/activity over another
6	Strong Plus	Between strong and very strong
7	**Very Strong Importance Demonstrated**	A criterion/activity is favoured very strongly over another; its dominance demonstrated in practice
8	Very, very strong importance	Between very strong and extreme
9	**Extreme Importance**	The evidence favouring one criterion/activity over another is of the highest possible order of affirmation

Table 1: Fundamental Scale for Making Judgments **Source:** Saaty L T and Vargas G L (2006)

For purposes of common understanding of the decision criteria categories, the following definitions are used:

Decision Criteria Category	Definition
Financial	A group of criteria with the objective of capturing the financial benefits of projects. Usually associated with costs, productivity and profit measurements.
Technical	Assesses the technical criteria necessary to execute the project on the basis of technological developments.
Strategic	A group of criteria directly associated with the specific strategic objectives of the organisation (state).
Government Policy	The current policy framework(s) promoting or militating against project undertaking.
Social	A group of criteria with the objective of capturing the social benefits of projects.
Risks	The level of negative risk appetite or tolerance acceptable for undertaking a project.
Opportunities	The level of positive uncertainties derived from execution of a project.
Urgency	Determination of the urgency level required to execute the project; in terms of its time horizon. e.g immediate, short term, long term.
Stakeholder Commitment	A group of criteria that aims to assess the level of stakeholder commitment towards the project.
National Economic Benefits	The aggregate/net benefits accruing to the state

Source: Researcher, 2014 (Adopted from Vargas 2010, Wheeler 2013, PMI 2013)

12. Based on your knowledge and experience how would you rate the following decision making categories in terms of importance? NB: Please choose your rating by placing an X over the score expressing your preferred category's level of importance against its paired comparison.

Decision Criteria Category	Pairwise Comparison																	Decision Criteria Category
Financial	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Technical**
Financial	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Strategic**
Financial	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Government Policy**
Financial	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Social**
Financial	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Risks/Opportunities**
Financial	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Urgency**
Financial	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Stakeholder Commitment**
Financial	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**National Economic Benefits**
Technical	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Strategic**
Technical	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Government Policy**
Technical	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Social**
Technical	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Risks/Opportunities**
Technical	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Urgency**
Technical	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Stakeholder Commitment**
Technical	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**National Economic Benefits**
Strategic	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Government Policy**
Strategic	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Social**
Strategic	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Risks/Opportunities**
Strategic	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Urgency**
Strategic	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Stakeholder Commitment**
Strategic	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**National Economic Benefits**
Government Policy	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Social**
Government Policy	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Risks/Opportunities**
Government Policy	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Urgency**
Government Policy	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Stakeholder Commitment**
Government Policy	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**National Economic Benefits**
Stakeholder Commitment	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Social**
Stakeholder Commitment	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Risks/Opportunities**
Stakeholder Commitment	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Urgency**
Stakeholder Commitment	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**National Economic Benefits**
Social	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Risks/Opportunities**
Social	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Urgency**
Social	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**National Economic Benefits**
Risks/Opportunities	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Urgency**

Risks/Opportunities	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**National Economic Benefits**
National Economic Benefits	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Urgency**

SECTION C: PROJECT PRIORITISATION DECISION CRITERIA PREFERENCES

In this section, we are trying to determine the most preferred project selection and prioritisation criteria for capitalisation purposes using the 9-point Saaty Fundamental Scale for Making Judgments as described in Section B above; whereby 1 = Equal Importance and 9 = Extreme Importance.

13. Based on your knowledge and experience how would you rate the following prioritisation criteria in terms of importance? NB: Please choose your rating by placing an X against the score expressing your preferred level of importance for the paired comparisons.

Decision Criteria	**Paired Comparisons**																	**Decision Criteria**
Financial																		
Net Present Value	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Return on Investment
Net Present Value	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Profit
Net Present Value	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Payback Period
Net Present Value	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Break-Even Period
Net Present Value	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Low Cost/Capital Outlay
Return on Investment	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Profit
Return on Investment	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Payback Period
Return on Investment	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Break-Even Period
Return on Investment	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Low Cost/Capital Outlay
Profit	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Payback Period
Profit	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Break-Even Period
Profit	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Low Cost/Capital Outlay
Payback Period	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Break-Even Period
Payback Period	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Low Cost/Capital Outlay
Break-Even Period	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Low Cost/Capital Outlay
Technical																		
Hydro-electric generation	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Thermal generation
Hydro-electric generation	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Solar energy generation
Thermal generation	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Solar energy generation
Technology competitiveness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Compatibility with existing technology
Technology competitiveness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Techno-economic Feasibility Study
Compatibility with existing technology	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Techno-economic Feasibility Study
Strategic																		
Strategic Fit	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Creation of Synergy
Strategic Fit	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Political Acceptance

Strategic Fit	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Environmental Impact
Strategic Fit	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Resource Capability and Capacity
Creation of Synergy	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Political Acceptance
Creation of Synergy	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Environmental Impact
Creation of Synergy	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Resource Capability and Capacity
Political Acceptance	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Environmental Impact
Political Acceptance	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Resource Capability and Capacity
Environmental Impact	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Resource Capability and Capacity
Social																		
Social Time Preference	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Quality of Life
Social Time Preference	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Employment Creation
Social Time Preference	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Community Pressure
Quality of Life	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Employment Creation
Quality of Life	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Community Pressure
Employment Creation	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Community Pressure
Government Policy																		
Public-Private Partnerships	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	FDI and Investment Attraction
Public-Private Partnerships	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Millennium Development Goals
Public-Private Partnerships	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Fiscal and Monetary Policies
Public-Private Partnerships	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Industrial Development Policy
FDI and Investment Attraction	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Millennium Development Goals
FDI and Investment Attraction	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Fiscal and Monetary Policies
FDI and Investment Attraction	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Industrial Development Policy
Millennium Development Goals	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Fiscal and Monetary Policies
Millennium Development Goals	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Industrial Development Policy
Fiscal and Monetary Policies	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Industrial Development Policy
Urgency																		
Political urgency	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Sponsor urgency
Sponsor urgency	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Problem solving (need)
Problem solving (need)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Political urgency
Risks and Opportunities																		
Financial (insufficiency/sufficiency)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Technology (matching level)
Financial (insufficiency/sufficiency)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Project Duration (overrun)
Financial (insufficiency/sufficiency)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Environmental (sustainability)
Technology (matching level)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Project Duration (overrun)

Technology (matching level)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Environmental (sustainability)
Project Duration (overrun)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Environmental (sustainability)
Stakeholder Commitment																		
Political Acceptance	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Donor Funding Groups
Political Acceptance	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Project Grants Bodies
Political Acceptance	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Regulatory Bodies
Political Acceptance	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Community Consensus
Political Acceptance	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Consumer Commitment
Donor Funding Groups	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Project Grants Bodies
Donor Funding Groups	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Regulatory Bodies
Donor Funding Groups	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Community Consensus
Donor Funding Groups	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Consumer Commitment
Project Grants Bodies	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Regulatory Bodies
Project Grants Bodies	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Community Consensus
Project Grants Bodies	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Consumer Commitment
Regulatory Bodies	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Community Consensus
Regulatory Bodies	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Consumer Commitment
Community Consensus	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Consumer Commitment
National Economic Benefits																		
Import substitution	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Industrial capacity utilisation
Import substitution	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Contribution to the Fiscus (taxes)
Import substitution	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Contribution to Gross Domestic Product (GDP)
Industrial capacity utilisation	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Contribution to the Fiscus (taxes)
Industrial capacity utilisation	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Contribution to Gross Domestic Product (GDP)
Contribution to the Fiscus (taxes)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Contribution to Gross Domestic Product (GDP)

14. Are there any other criteria that you believe are important in project selection and prioritisation that should be included in the proposed list and explain why?

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THANK YOU FOR YOUR TIME AND INVALUABLE SUPPORT

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