

# Evaluating capital project prioritisation in a national electricity provider

**Miyelani Vincent Chauke**  
(24792640)

Mini-dissertation submitted in partial fulfilment of the requirements  
for the degree *Master of Business Administration* at the  
Potchefstroom Campus of the North-West University

**Supervisor:** Mr MJ Botha

November 2015

It all starts here™

## **ACKNOWLEDGEMENTS**

I wish to thank the following persons and institutions:

- The Almighty God, for granting me the ability, wisdom and privilege to complete my MBA;
- My wife, Rirhandzu Chauke, for her love, support and patience during my studies;
- My son, Anelo Chauke, for his love, support and patience during my studies;
- My family and friends, for their understanding and support;
- My study leader, Mr MJ Botha, for his assistance, guidance and advice;
- Ms Wilma Breytenbach of the North-West University Statistical Consultation Services, for her guidance and advice;
- My colleagues and respondents who took part in the survey in support of the empirical study.

## **ABSTRACT**

Capital project prioritisation and selection of right sets of project portfolios and programmes are important in organisations archiving their corporate strategies and to remain competitive and relevant in these challenging economic times. The purpose of the study was to evaluate capital project prioritisation in a national electricity provider. Eskom Group Capital Division (GCD) is identified as an important division within the national electricity provider and as such selected for the purpose of conducting this study.

In 2013, Eskom applied for an annual increase of 16% over the MYPD3 period which translated into higher revenue as compared to the approved National Energy Regulator of South Africa 8%. The impact on capital projects is evident in that the organisation has to re-evaluate, re-prioritise and implement new measures to manage the execution of capital projects which was the bulk of capital budget expenditure under the MYPD3. This study was aimed at assessing the effectiveness and efficiency of the existing prioritisation process to deal with funding shortfall on capital projects in the GCD in order to support the organisation for effectively allocating resources to projects accordingly and maximize its benefit.

A literature study was conducted to gain a better understanding of the concept of capital project prioritisation and the selection process as well as relevant aspects. The literature study revealed that prioritising and selecting projects that are best aligned with organisation strategic priorities are essential for organisations to allocate resources and execute projects that yield the highest value to the organisation. Furthermore, prioritising of projects from project portfolios or programmes has in recent years become a focus area at many organisations seeking to optimise resources and stay competitive. This was apparent as a result of the availability of literature studies on the subject.

In order to evaluate the capital project prioritisation process at Eskom, a questionnaire was used as a main instrument to collect data from targeted employees and the semi structured interview was used as secondary instrument to collect data from identified specialist personnel who participated in the prioritisation process. The questionnaire consisted of three sections, namely: section I consisted of the respondents'

biographical information, section II assessed the effectiveness of the capital project prioritisation process under-funding constraints environment and section III consisted of the challenges associated with the prioritisation process.

The results of the analysis indicated that the current prioritisation process at Eskom is effective as it is aligned to corporate strategy. The process tend to focus more on new built projects that are related to security of electricity supply and less focus on maintenance related projects.

In general, the study did not find serious non conformances in the current application of the project prioritisation process at GCD as the division has mature structures, procedures, processes and resources to manage the prioritisation process. However, due to the fact that the announcement by the National Energy Regulator of South Africa (Nersa) regarding the MYPD 3 application has resulted in the need to apply tighter measures on selecting projects, certain changes and improvements to the current system are recommended to ensure that resources on capital projects are optimised and investment funding can be channeled to the right project portfolios and programmes.

**KEYWORDS:** Eskom; Capital projects; Project prioritisation; Project portfolio; Program portfolio; Prioritisation matrix, Prioritisation process

# TABLE OF CONTENTS

|                                                                  |           |
|------------------------------------------------------------------|-----------|
| <b>ACKNOWLEDGEMENTS .....</b>                                    | <b>I</b>  |
| <b>ABSTRACT .....</b>                                            | <b>II</b> |
| <b>TABLE OF CONTENTS .....</b>                                   | <b>IV</b> |
| <b>LIST OF ABBREVIATIONS .....</b>                               | <b>XI</b> |
| <b>CHAPTER 1: INTRODUCTION AND BACKGROUND .....</b>              | <b>1</b>  |
| <b>1.1 Introduction .....</b>                                    | <b>1</b>  |
| 1.1.1 Background of Eskom.....                                   | 1         |
| 1.1.2 GCD at Eskom.....                                          | 1         |
| 1.1.3 Background of capital projects prioritisation.....         | 2         |
| 1.1.4 Project prioritisation at Eskom .....                      | 2         |
| 1.1.5 Prioritisation of multiple projects .....                  | 3         |
| 1.1.6 Previous research about project prioritisation .....       | 4         |
| 1.1.7 Fundamental requirements for a prioritisation process..... | 4         |
| <b>1.2 Motivation of topic.....</b>                              | <b>5</b>  |
| <b>1.3 Problem statement .....</b>                               | <b>6</b>  |
| <b>1.4 Objectives .....</b>                                      | <b>7</b>  |
| 1.4.1 Main Objective.....                                        | 7         |
| 1.4.2 Secondary Objectives.....                                  | 7         |
| 1.4.3 Limitations of the study .....                             | 7         |
| <b>1.5 Research method .....</b>                                 | <b>8</b>  |

|                                          |                                                                  |           |
|------------------------------------------|------------------------------------------------------------------|-----------|
| 1.5.1                                    | Research approach .....                                          | 8         |
| 1.5.2                                    | Literature study.....                                            | 8         |
| 1.5.3                                    | Empirical research.....                                          | 8         |
| <b>1.6</b>                               | <b>Research overview .....</b>                                   | <b>9</b>  |
| <b>CHAPTER 2: LITERATURE STUDY .....</b> |                                                                  | <b>10</b> |
| <b>2.1</b>                               | <b>Introduction .....</b>                                        | <b>10</b> |
| <b>2.2</b>                               | <b>Capital projects prioritisation in Africa.....</b>            | <b>10</b> |
| <b>2.3</b>                               | <b>Capital projects prioritisation in South Africa .....</b>     | <b>11</b> |
| <b>2.4</b>                               | <b>Capital project prioritisation .....</b>                      | <b>12</b> |
| 2.4.1                                    | Strategies for project prioritisation and selection.....         | 13        |
| 2.4.2                                    | Systematic approach to project prioritisation and selection..... | 14        |
| 2.4.3                                    | Project prioritisation techniques .....                          | 15        |
| 2.4.3.1                                  | Expected commercial value technique (ECV) .....                  | 17        |
| 2.4.3.2                                  | Benefit/Cost ratio and profitability index technique.....        | 18        |
| 2.4.3.3                                  | Financial appraisal profile (FAP) technique.....                 | 18        |
| 2.4.3.4                                  | Bubble diagrams for project mapping technique .....              | 18        |
| 2.4.3.5                                  | Prioritisation matrix technique.....                             | 20        |
| <b>2.5</b>                               | <b>Project prioritisation process .....</b>                      | <b>23</b> |
| 2.5.1                                    | Prioritisation Process by Cooper.....                            | 23        |
| 2.5.2                                    | Prioritisation process by Archer and Ghasemzadeh .....           | 24        |
| <b>2.6</b>                               | <b>Challenges in project prioritisation.....</b>                 | <b>26</b> |
| <b>2.7</b>                               | <b>Background of Eskom.....</b>                                  | <b>27</b> |
| <b>2.8</b>                               | <b>Eskom organisational structure .....</b>                      | <b>27</b> |

|                                                       |                                                                 |           |
|-------------------------------------------------------|-----------------------------------------------------------------|-----------|
| <b>2.9</b>                                            | <b>Group Capital Division .....</b>                             | <b>28</b> |
| 2.9.1                                                 | GCD structure.....                                              | 29        |
| 2.9.2                                                 | GCD enabling strategies and supporting capital programmes ..... | 30        |
| 2.9.3                                                 | Capital expenditure.....                                        | 31        |
| 2.9.4                                                 | Capital expenditure per Eskom division (R million) .....        | 32        |
| <b>2.10</b>                                           | <b>Capital projects prioritisation in Eskom .....</b>           | <b>32</b> |
| 2.10.1                                                | Prioritisation matrix at Eskom .....                            | 35        |
| 2.10.1.1                                              | Business Perspective .....                                      | 35        |
| 2.10.1.2                                              | Financial Perspective.....                                      | 36        |
| 2.10.1.3                                              | Performance Perspective .....                                   | 36        |
| 2.10.1.4                                              | Non-numerical Perspective.....                                  | 37        |
| <b>2.11</b>                                           | <b>Summary.....</b>                                             | <b>38</b> |
| <b>CHAPTER 3: RESEARCH MODEL AND METHODOLOGY.....</b> |                                                                 | <b>39</b> |
| <b>3.1</b>                                            | <b>Introduction .....</b>                                       | <b>39</b> |
| <b>3.2</b>                                            | <b>Research process.....</b>                                    | <b>39</b> |
| <b>3.3</b>                                            | <b>Research design.....</b>                                     | <b>40</b> |
| <b>3.4</b>                                            | <b>Gathering of data.....</b>                                   | <b>41</b> |
| 3.4.1                                                 | Qualitative data gathering .....                                | 41        |
| 3.4.2                                                 | Quantitative data gathering.....                                | 42        |
| <b>3.5</b>                                            | <b>Target and study population.....</b>                         | <b>43</b> |
| <b>3.6</b>                                            | <b>Data analysis.....</b>                                       | <b>43</b> |
| <b>3.7</b>                                            | <b>Validity and reliability.....</b>                            | <b>44</b> |
| <b>3.8</b>                                            | <b>Research ethics .....</b>                                    | <b>44</b> |

|                                                 |                                                                                                 |           |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------|
| <b>3.9</b>                                      | <b>Summary .....</b>                                                                            | <b>45</b> |
| <br>                                            |                                                                                                 |           |
| <b>CHAPTER 4: ANALYSIS AND DISCUSSION .....</b> |                                                                                                 | <b>46</b> |
| <b>4.1</b>                                      | <b>Introduction .....</b>                                                                       | <b>46</b> |
| <b>4.2</b>                                      | <b>Confidentiality.....</b>                                                                     | <b>46</b> |
| <b>4.3</b>                                      | <b>Statistical analysis of data .....</b>                                                       | <b>46</b> |
| <b>4.4</b>                                      | <b>Responses to the survey .....</b>                                                            | <b>47</b> |
| <b>4.5</b>                                      | <b>Biographic and general information of respondents .....</b>                                  | <b>47</b> |
| 4.5.1                                           | Section I: Biographic and general information.....                                              | 47        |
| 4.5.2                                           | Gender of the respondents .....                                                                 | 48        |
| 4.5.3                                           | Age group of respondents .....                                                                  | 48        |
| 4.5.4                                           | Qualifications of respondents.....                                                              | 49        |
| 4.5.5                                           | Distribution of position/job title of the respondents (Question 2).....                         | 50        |
| 4.5.6                                           | Distribution of position domain of the respondents (Question 3) .....                           | 51        |
| 4.5.7                                           | Times participated on project prioritisation process (Question 4) .....                         | 52        |
| <b>4.6</b>                                      | <b>Reliability of the questionnaire.....</b>                                                    | <b>52</b> |
| <b>4.7</b>                                      | <b>Section II: The effectiveness of the prioritisation process .....</b>                        | <b>53</b> |
| 4.7.1                                           | The use of the prioritisation process to select capital projects (Construct 1, Question 5)..... | 54        |
| 4.7.2                                           | Knowledge of Eskom prioritisation process (Question 6) .....                                    | 55        |
| 4.7.3                                           | Alignment with corporate strategy (Construct 2, Question 7) .....                               | 55        |
| 4.7.4                                           | Transparency of prioritisation process (Construct 3, Question 8).....                           | 57        |
| 4.7.5                                           | Consistency of prioritisation process (Construct 4, Question 9) .....                           | 58        |
| <b>4.8</b>                                      | <b>Section III: The challenges associated with the prioritisation process .....</b>             | <b>59</b> |

|                                                       |                                                                                                                                                |           |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 4.8.1                                                 | Main challenge of current prioritisation process (Question 10).....                                                                            | 60        |
| 4.8.2                                                 | Communication of prioritisation results (Question 11) .....                                                                                    | 61        |
| 4.8.3                                                 | Managing prioritised projects (Question 12).....                                                                                               | 62        |
| <b>4.9</b>                                            | <b>Interviews.....</b>                                                                                                                         | <b>63</b> |
| 4.9.1                                                 | Are you familiar with Eskom corporate strategy? .....                                                                                          | 63        |
| 4.9.2                                                 | Which projects from your division were selected following Nersa MYPD 3<br>announcement in February 2013? .....                                 | 64        |
| 4.9.3                                                 | How are projects prioritised? Could you describe the Eskom prioritisation<br>process?.....                                                     | 64        |
| 4.9.4                                                 | What are the criteria for selecting and prioritising new projects and existing<br>portfolio of projects? .....                                 | 64        |
| 4.9.5                                                 | Are there any constraints that hinder the performance of prioritised on-<br>going projects that you are aware off? If yes, what are they?..... | 64        |
| 4.9.6                                                 | Who are the decision-making bodies at Eskom GCD for prioritizing<br>selecting and projects? .....                                              | 65        |
| 4.9.7                                                 | Have you ever cancelled any projects which were already prioritised,<br>approved or started? What was the reason to cancel the projects? ..... | 65        |
| <b>4.10</b>                                           | <b>Summary.....</b>                                                                                                                            | <b>66</b> |
| <b>CHAPTER 5: CONCLUSION AND RECOMMENDATION .....</b> |                                                                                                                                                | <b>68</b> |
| <b>5.1.</b>                                           | <b>Introduction .....</b>                                                                                                                      | <b>68</b> |
| <b>5.2.</b>                                           | <b>Conclusions.....</b>                                                                                                                        | <b>68</b> |
| <b>5.3.</b>                                           | <b>Recommendations.....</b>                                                                                                                    | <b>72</b> |
| <b>5.4.</b>                                           | <b>Limitations and areas for further research .....</b>                                                                                        | <b>73</b> |
| <b>REFERENCE LIST .....</b>                           |                                                                                                                                                | <b>74</b> |
| <b>ANNEXURES.....</b>                                 |                                                                                                                                                | <b>78</b> |

## LIST OF TABLES

|                                                                              |    |
|------------------------------------------------------------------------------|----|
| Table 2.1: Capital project priorities by African regions. ....               | 11 |
| Table 2.2: Survey results of projects selection techniques and methods ..... | 16 |
| Table 2.3: Results of Bubble diagram popularity.....                         | 19 |
| Table 2.4: Typical prioritisation matrix for capital projects.....           | 22 |
| Table 2.5: GCD Strategies and Capital programmes.....                        | 31 |
| Table 4.1: Responses to the survey .....                                     | 47 |
| Table 5.1: Means of constructs:.....                                         | 69 |

## LIST OF FIGURES

|                                                                                      |    |
|--------------------------------------------------------------------------------------|----|
| Figure 2.1: ECV technique as decision tree.....                                      | 17 |
| Figure 2.2: Prioritisation process by Cooper .....                                   | 24 |
| Figure 2.3: Project prioritisation process by Archer and Ghasemzadeh.....            | 25 |
| Figure 2.4: Eskom organisational structure.....                                      | 28 |
| Figure 2.5: GCD Structure.....                                                       | 30 |
| Figure 2.6: Eskom capital project breakdown .....                                    | 32 |
| Figure 2.7: Eskom project selection and prioritisation process.....                  | 34 |
| Figure 2.8: Classification of high and mandatory projects at Eskom .....             | 38 |
| Figure 3.1: Research process.....                                                    | 40 |
| Figure 4.1: Gender percentage breakdown .....                                        | 48 |
| Figure 4.2: Age group breakdown .....                                                | 49 |
| Figure 4.3: Qualification breakdown .....                                            | 50 |
| Figure 4.4: Job title analysis .....                                                 | 51 |
| Figure 4.5: Position domain analysis .....                                           | 52 |
| Figure 4.6: Breakdown of challenges associated with the prioritisation process ..... | 60 |

## **LIST OF ABBREVIATIONS**

ECV - Expected commercial value technique

EPRI - Electric Power Research Institute

FAP - Financial appraisal profile

GCD - Group Capital Division

IRR - Internal Rate of return

MYPD - Multi Year Price determination

NERSA - National Energy Regulator of South Africa

NPV - Net Present Value

PICC - Presidential Infrastructure Coordinating Commission

PWC - Price Waterhouse Coopers

ROI - Return on Investment

# CHAPTER 1: INTRODUCTION AND BACKGROUND

## 1.1 INTRODUCTION

### *2.1.1.1 Background of Eskom*

Eskom is a South African National Electricity Provider, established in 1923 as the Electricity Supply Commission by the Government of South Africa in terms of the Electricity Act NO. 42 of 1922 (SA, 1922). The utility is one of the top 20 utilities in the world by generation capacity. Eskom net maximum capacity is 44,145 MW; it generates approximately 95% of the electricity used in South Africa and more than 40% of the electricity used in Africa (Eskom, 2015). It operates 27 power stations with 85% coal-fired power stations, and the remaining 15% composed of a mix of nuclear, open cycle gas turbine, hydro and pumped storage plants. Eskom also owns and operates 395,582 km of power lines (Eskom, 2015:1).

Eskom currently plays a leading role in the entire electricity value chain. It generates, transmits and distributes electricity to industrial, mining, commercial, agricultural, residential customers and to redistributors such as municipalities. Due to electricity supply falling behind the electricity demand as a result of generation capacity constraints, South Africa is currently experiencing power shortages. Additional power stations and major power lines are being built to meet the rising electricity demand in South Africa, with a total budgeted capital expenditure over R 450bn over the six-year planning period until 2017/18 (Eskom, 2015:1).

The organisation has the following divisions that ensure full operation of the utility. These are: Generation; Transmission and customer services; Distribution; Finance; Group capital; Technology and commercial; Human resources; Sustainability and corporate affairs. The focus of this study was on the Group Capital Division (GCD) of Eskom.

### *2.1.1.2 GCD at Eskom*

The division provides capital project planning and executes strategies, policies, and assurance for Eskom's capital expansion and major refurbishment projects. The projects vary in size and complexity, for example, Medupi power station, which is a

newly built project, and Duvha unit 3 which is a major refurbishment project. Stated objectives for the divisions are reviewed annually in alignment with Eskom's business planning process. This methodology is followed to ensure cohesion of the organisation's objectives. The business plan builds on current strategic direction and indicates where change is required to move the division's business forward. The divisional plan is seen as a living document and is therefore reviewed and monitored continuously. The business plan covers a four year period, for example 2014/15 to 2017/18 Eskom financial years that outlines the key forces driving the business, strategic imperatives, risks, and resource requirements. The division further creates the oversight, transparency, and control required to manage Eskom's significant spend into the future. It approaches the planning, development, and execution of capital projects in a more integrated way.

#### *2.1.1.3 Background of capital projects prioritisation*

Prioritisation in a budget constraint situation means that the company needs to determine which of its projects and programmes are the most worthy; which ones will do the most good, and funding only those with a limited budget (Lee Willis *et al.*, 2013:415). Capital projects need to be prioritised to assist the process of allocating resources and funding to well deserving projects that will support the organisation's vision and strategies.

#### *2.1.1.4 Project prioritisation at Eskom*

Eskom's commitment to compliance with international standards and best practices across the projects of the organisation is being realized through the consistent implementation of business processes. The prioritised portfolio of programmes and projects process is based on existing Eskom practices, best practices and operational experience within this area, with input from a number of business subject matter experts. This is a process providing standard building blocks that are utilized for portfolio management. The process comprises various activities which can be drawn upon to meet the requirements of updating Eskom database of projects, managing the risk portfolio, prioritizing the portfolio and balancing the portfolio of projects (Eskom, 2015:1).

The current prioritisation process at Eskom involves the ranking of the selected projects based on evaluation scores and other considerations that should provide transparency about the following:

- Project drivers;
- Understand interdependencies;
- Examine constraints;
- Optimal sequencing;
- Consider strategic projects; and
- Deal with unexpected projects.

The database support Eskom prioritisation process through the input of data that are analysed using the above criteria and resulting in a ranked prioritised project list. The prioritised project list is then forwarded to the various departments that allocate resources and funding to the projects.

Database update in terms of capital expenditures or operational expenditures is an ongoing process to ensure that the list of projects in the division is aligned to changes being made. Below are the key activities that form part of the database:

- Conduct risk evaluation;
- Run prioritisation Model;
- Influence decision on selected opportunity; and
- Group portfolio optimisation (Eskom, 2015:1).

The above process, when concluded will differentiate the benefits of the selected list of opportunities by ranking in terms of the prioritisation criteria.

#### *2.1.1.5 Prioritisation of multiple projects*

A study conducted by Van der Merwe (1995:4) on Eskom multi project prioritisation developed a methodology for gauging the criticality of a project in order to determine the priority of a project against a range of similar projects. This is done to achieve the efficient and effective use of available resources focusing mainly on the Eskom Transmission Division. The research concluded that it is possible to achieve the required level of decision-making on multi projects prioritisation by utilizing the decision

matrix that used a qualitative tool for prioritising projects. The research further concluded that the problems associated with multi project prioritisation can be solved through the qualitative methods instead of quantitative methods (Van der Merwe, 1995:69).

According to Dutra *et al.* (2013:1046), methods for selecting and prioritizing projects found in the literature can be qualitative and/or quantitative, and that procedures vary from simple screening to sophisticated mathematical algorithms. The study of Cooper *et al.* (2001:362) and Dutra *et al.* (2013:1046) pointed out which methods are most popular and which ones are dominant in the decision-making process. The study showed that financial methods are used the most, although it is not usually suitable to use them alone, Dutra *et al.* (2013:1047).

Dutra *et al.* (2013:1049) further used the model for selecting and prioritising projects that was built from both qualitative and quantitative criteria and the research concluded that the model was able to quantify investments, benefits and their possible uncertainties by providing an economic probabilistic analysis of the expected return on projects.

#### *2.1.1.6 Previous research about project prioritisation*

In December 2006, Electric Power Research Institute (EPRI) published report 1012954, Pilot Application of Enterprise Project Prioritisation Process at Nebraska Public Power District (NPPD) who is the largest electric power utility in Nebraska with generation resources comprising of Nuclear, Coal, Gas, Hydro and Wind. This project was undertaken by Nebraska Public Power District (NPPD), in collaboration with EPRI, to implement asset management tools for prioritising capital resources across the NPPD enterprise. The pilot application resulted in a methodology that can be used to rank capital and major outage and maintenance at NPPD (EPRI, 2006:9).

#### *2.1.1.7 Fundamental requirements for a prioritisation process*

According to Moisiadis (2002:1); the following requirements should be considered during the prioritisation process:

- Avoid the risk of having biased or tainted stakeholder input affects the prioritisation process;

- Reduce the risk of missing important requirements;
- Provide benefits that should outweigh the resources needed to apply the prioritisation process;
- Have access to information from many different relevant viewpoints;
- Incorporate non-functional issues and business objectives in assigning priorities to the requirements;
- Support the evolution of the requirements into appropriate specifications for the system;
- Produce priorities that can be validated. There should be a rationale behind the assigned priorities for each priority;
- Be able to handle the volatility of a set of requirements; and
- Be able to cope with the varied levels of abstraction in requirements statement.

## **1.2 MOTIVATION OF TOPIC**

The Eskom GCD has existing procedures and planning processes in place that deals with capital assets management within both short to long-term planning horizons. However, the recent capital project funding constraints, and shortage of generation capacity resulted in the implementation of load shedding across the country. Capital projects performance highlighted the gaps that exist during prioritisation of projects within the GCD. Prioritisation of capital projects takes place during the front-end planning process. The front-end planning process includes planning, resource allocation, budget allocation and feasibility studies. In order for the division to respond to current challenges of constraint funding facing the organisation; there is a need to assess, evaluate and optimise the current prioritisation process.

The research conducted and published by EPRI (2006:15) also highlighted the need for continuous improvement on projects prioritisation process in power utilities. This research study is therefore aimed at evaluating Eskom's current prioritisation process and to provide recommendations with improvement measures to enhance the efficiency and effectiveness of the prioritisation process. The need for the current research study is further highlighted below:

- Current funding constraints being experienced in the organisation calls for innovative means of planning and executing capital projects as they constitute a bulk of budget expenditures.

The research might offer the organisation the following benefits:

- Alignment between the project teams and decision makers in terms of Eskom capital projects strategies;
- Motivated project teams following understanding of how should processes be implemented under constraints environment;
- Lesson learnt and knowledge sharing that can be transferred and utilized in other Eskom divisions; and
- Cost savings benefits that are much needed under the current circumstances that will be realised through efficient resources allocation.

### **1.3 PROBLEM STATEMENT**

On 28 February 2013, the National Energy Regulator of South Africa (Nersa) announced its determination on Eskom's Multi Year Price Determination (MYPD) 3 application that stated that Eskom can only increase the electricity tariffs by an average of 8% for the next five years and allowed revenue of R906 553 million (Nersa, 2013:1).

Eskom applied for an annual increase of 16% over the MYPD3 period that translated to the higher required revenue compared to the approved Nersa's 8%. The impact on capital projects is evident in that the organisation has to re-evaluate, re-prioritise and implement new measures to manage the execution of capital projects which was a bulk of capital budget expenditure under the MYPD3. This research was therefore aimed at assessing the effectiveness and efficiency of the existing prioritisation process to deal with the above funding shortfall on capital projects in the GCD in order to support the organisation for effectively allocating resources to projects accordingly and maximise its benefit under such conditions. In order to address this problem, the following questions were raised for purposes of this study:

- Do program managers, project managers, project leaders, project office management and other stakeholders understand and embrace the current prioritisation process and guidelines for capital projects applied in GCD?

- Is there consistency in prioritising capital projects with different risk/cost/benefit characteristics from various asset categories of the organisation?
- Are resources at GCD being optimised under funding constraints environment?
- Are there support tools for a fast decision-making process that is risk-informed and supported by thorough analysis?
- What is the need for organisational flexibility and continuous improvement techniques that will support the organisation to deal with future dynamics?

## **1.4 OBJECTIVES**

### *2.1.1.8 Main Objective*

The main objective of this study was to assess how effective and efficient the Eskom capital project prioritisation process is, given the current financial constraints under which the company finds itself particularly at the GCD division.

### *2.1.1.9 Secondary Objectives*

In order to reach the primary objective, the following secondary objectives are set:

- To identify challenges associated with the current prioritisation process that Eskom is using for Capital Projects in a financial constrained environment within the GCD of Eskom.
- To establish if the prioritisation process is consistently applied to all capital projects with different risks, benefits, and resources characteristics within the division.
- To assess whether the current prioritisation process is aligned to support the current Eskom cost saving objectives under such constraint conditions.
- To establish if the existing support tools for fast decision-making process within the GCD are still relevant under the current constrained environment.
- To determine the ability of projects teams to respond to such a dynamic project environment of constrained funding.

### *2.1.1.10 Limitations of the study*

The study was based on an evaluating existing project prioritisation process in a national electricity provider (Eskom). Certain information which came to the attention of

the researcher during the process of conducting this study will not be disclosed in order to protect the reputation of the business.

Due to the nature of the selected company's business, some information considered sensitive and private will not be revealed in this study. This study is also not intended for public consumption or to be shared with the public. The study is purely for MBA mini-dissertation purposes at North-West University.

## **1.5 RESEARCH METHOD**

### ***2.1.1.11 Research approach***

The research study consisted of a literature study and an empirical study. In order to perform the empirical study, the research methods that were employed in this study were interviews, questionnaires, and archival documents.

### ***2.1.1.12 Literature study***

Various sources of literature were consulted and reviewed in this study with a view of finding sufficient information that could assist in the following set objectives:

- Academic literature searches were undertaken within various library organisations locally and internationally;
- Internal Eskom literatures, documents and records;
- Subject matter experts interviews were conducted;
- Internet and online articles and literatures; and
- Dissertations and discussion papers.

### ***2.1.1.13 Empirical research***

The identified population of 136 is within the GCD. The population included project executive managers, project managers, program managers, contract managers, project leaders, project office managers and subject matter experts. The target group of 86 is identified from the population to receive questionnaires and four subject matter experts identified for personal interviews.

The following instruments were utilised for measuring and collecting data and statistical analysis will be performed on the results:

- Questionnaires; and
- Interviews.

## **1.6 RESEARCH OVERVIEW**

Below is the chapter layout that indicates the flow of research and the reasoning processes.

Chapter 1: Introduction and background.

Chapter 2: Literature study.

Chapter 3: Research model and methodology.

Chapter 4: Analysis and discussion.

Chapter 5: Conclusion and recommendations.

## **CHAPTER 2: LITERATURE STUDY**

### **2.2 INTRODUCTION**

The aim of this chapter is to contextualise and define the applicable literature concepts covered in the study. The chapter further investigates the literature and techniques available in the field of project management, and particularly capital project prioritisation in a national electricity provider such as Eskom. Search engines for example Google Scholar and the database search facilities were used to find relevant books, theses, dissertations, academic publishers, scholarly and peer reviewed papers such as journals were used for the literature study. The literature review is aimed at improving the researcher's understanding of theoretical concepts behind the capital project prioritisation process.

The chapter starts with a broader introduction towards capital projects prioritisation in the African region with focus on South, East and Western Africa. The context of South African national electricity provider (Eskom) is discussed in detail and with specific focus on the capital prioritisation processes and techniques applicable at the company. The prioritisation process is important to the national electricity provider which is currently facing challenges such as a shortage of generation capacity and funding constraints. The effective application of these processes ensures that projects and programmes are reviewed to prioritise resource allocation, and that the management of the capital projects portfolio is consistent with and aligned to organisational strategies of supplying energy to South Africa.

Other areas that are important to the research question are identified, examined and discussed in this chapter.

### **2.3 CAPITAL PROJECTS PRIORITISATION IN AFRICA**

According to Price Waterhouse Cooper's (PWC) (2014:2) report on "Capital projects and infrastructure in East Africa, Southern Africa and West Africa", the capital projects development impact on economic growth is significant. The World Economic Forum (WEF) estimates that every dollar spent on a capital project such as utilities, energy, transport, waste management, flood defense or telecommunications generates an economic return of between 5% and 25% per annum (PWC, 2014:3).

The PWC report further suggested that the power utility, transport, water and waste sectors have identified capital project feasibility as one of the top three priority areas within African regions. The power and water utility sectors identified upfront planning as a more important priority for local government than for other sectors such as transport and waste. Respondents in the transport sector noted asset management and optimisation as one of their key priorities, whereas mining and water noted risk management, while energy and oil & gas cited project feasibility (PWC, 2014:3). Table 2.1 below indicates the priorities by African regions.

**Table 2.1: Capital project priorities by African regions.**

| <b>Region</b>   | <b>Priority</b>                                                              |
|-----------------|------------------------------------------------------------------------------|
| East Africa     | Securing finance, procurement performance, policy and regulatory environment |
| West Africa     | Contracts and procurement, project scheduling (forecasting to completion)    |
| Southern Africa | Risk management, asset management and optimisation, upfront planning         |

Source: PWC (2014:4)

## **2.4 CAPITAL PROJECTS PRIORITISATION IN SOUTH AFRICA**

According to PWC (2014:31), attention is increasingly focusing on enhancing the national economic spending of South Africa related to publically funded capital projects. This is often part of a broader industrial policy that seeks to enhance local sustainable economic growth and increased domestic employment by localising capital project expenditure.

In July 2011, the President of South Africa, Mr. Jacob Zuma, announced the formation of a Presidential Infrastructure Coordinating Commission (PICC) which role is to ensure the speedy delivery of capital and infrastructure projects around the country. The SA Economic Development Ministry suggest that economic capital priorities are related to areas of roads, ports, rail, power and communications (Department of Economic Development, 2015:1).

South Africa's focus is on capital projects that generate growth and enables society to function effectively which include transport facilities (air, sea and land), utilities (water distribution networks, gas pipelines, electricity grids and electrical power generation), flood defences, waste management and telecommunication networks. All these projects require adequate upfront planning and prioritisation.

The current condition of the infrastructure and asset need should be understood in order to determine the level of investment that might be required. For example, South Africa and the national electricity provider, Eskom, would require a full understanding of the status of infrastructure and asset base in order to determine the required level of capital projects investment. Below are prioritisation strategies suggested by PWC (2014:47):

- Formulation of a long-term vision and medium-term goals preparing a list of infrastructure deficiencies that need to be rectified and identifying potential solutions to address these deficiencies;
- Deciding which potential solutions create the greatest impact in terms of economic growth, while also considering social and environmental issues;
- Deciding how to fund the projects;
- Finalising the prioritisation of projects based on available cash resources moving from planning to action; and
- Publishing and marketing the plan, ensuring that the necessary policy changes are enacted and, for the selected projects, finalising the detailed project preparation process so that value for money “*bankable*” projects can be tendered.

## **2.5 CAPITAL PROJECT PRIORITISATION**

Prioritising of projects from projects portfolio or programmes has in recent years become a focus area by many organisations seeking to optimise resources and stay competitive and this is apparent by the availability of literature studies on the subject. The literature review in the following sections reveals that prioritising and selecting projects that are best aligned with organisation strategic priorities is essential for organisations to allocate resources and execute projects that yield the highest value to the organisation.

As explained earlier this dissertation focuses on the capital projects prioritisation process of Eskom within a portfolio of projects or programmes; it is therefore important to define the following project management terms as defined by PMI (2014:5).

- **Project** is defined as a temporary endeavour undertaken to create a unique product, service, or product.
- **Process** is defined as a set of interrelated resources and activities which transforms inputs into outputs.
- **Portfolio** is defined as a collection of projects or programmes (whether interdependent or not) and work that are grouped together to facilitate the effective management to meet strategic objectives.

Cooper *et al.* (2001:381), defined project prioritisation and selection as a dynamic decision process whereby a business's list of active projects is constantly updated and revised. Adding that the process involves new projects being evaluated, selected and prioritised while existing projects may be accelerated, discontinued or de-prioritised and resources allocated and reallocated to active projects (Coa Le *et al.*, 2007:10).

A prioritisation process ensures that projects and programmes are reviewed to prioritise resource allocation, and that the management of projects or portfolios are consistent with and aligned to organisational strategies (PMI, 2006). There are different types of criteria as discussed by Frame (1994:169) which are used to evaluate and prioritise projects' portfolio components. Various strategies for project prioritisation and selection will now be discussed.

### **2.5.1 Strategies for project prioritisation and selection**

Coa Le *et al.* (2007:10) discussed the importance of addressing the question 'which projects are suitable of time, cost and investment performance?' PMI (2006:15) makes the argument that it is strategic for any organisation to ask this question in their prioritisation, selection and management of projects. This argument means that organisations must consider many strategic plans when prioritising and selecting projects.

In addition, the literature by Coale *et al.* (2007:11) and Cooper *et al.* (2001b:376) suggest that the following are key requirements that projects' portfolio must meet in order to achieve the organisation's corporate strategies:

- Alignment with corporate strategy: This criterion will ensure that organisation resources are spent on projects that support corporate plans.
- Maximizing the value: most organisations are having challenges of funding constraint and it is therefore imperative that projects that are prioritised and executed add value to organisations.
- Balancing is seen as crucial to projects selection because the risks and return, long and short-term benefits and time to completion need to be balanced (Cooper *et al.*, 2000:18).

### **2.5.2 Systematic approach to project prioritisation and selection**

A systematic approach should be considered during the prioritisation of projects as it supports and sustains the organisation's competitive advantage. This systematic approach involves three main factors, namely: decision-makers, selection tools, techniques and selection process (Archer & Ghasemzhadeh, 1999:208) and (Cooper *et al.*, 2001:367).

Projects often compete for resources and in most cases, organisations consider risks and strategic benefits for individual projects to be effectively prioritised and select the correct projects. A systematic decision-making process is then required to support the prioritisation and selection of these projects (Cooper *et al.*, 2000:26) and (Coale *et al.*, 2007:15).

Ullman (2006:1) argued that the decision-making process entails consciously or unconsciously addressing the following five key questions:

- Which is the best alternative?
- What is the risk that our decision will not turn out as expected?
- Do we know enough to make a good decision yet?
- Is there enough support for the decision?
- What is the next step following the decision?

Cao Le and Nguyen (2007:15) argued that decision agents inclusive of individuals or teams should be empowered when they participate in the process of decision-making to select projects. Levine (2005:496) suggests that a decision-making governance for project selection should be composed of executive leadership and managers such as Chief Executive Officer (CEO), Chief Financial Officer (CFO), Chief Operating Officer (COO), General and Senior managers. Governance committees are constituted to bridge the gap between operating management and project management teams.

### **2.5.3 Project prioritisation techniques**

Cooper *et al.* (2001a:364) argued that selection tools and techniques are used to facilitate evaluating qualitative and quantitative indicators of projects whose results are used by the selection team to make decisions on prioritised projects. Techniques such as financial methods or approaches, for example, Net Present Value (NPV), Internal Rate of return (IRR), strategic approaches such as strategic buckets of projects, integrated approaches, for example, matrix or checklists are the most commonly used techniques and tools.

According to Taylor (2006:147), the technique whether qualitative or quantitative method should have the following characteristics:

- Realism;
- Capability;
- Flexibility;
- Ease of use;
- Cost effectiveness; and
- Ease of computerisation.

Coa Le and Nguyen (2007:34) discussed the preference for weighted scoring models stating that the models enable selection teams to make key decisions on supporting or rejecting prioritised projects and that the models are easily adapted to changes in the environment.

Cooper *et al.* (2001b:377) discussed how popularity and dominance are various techniques and models used for projects prioritisation and selection. Their discussion was supported by the survey that was carried out in various organisations. The results

of the survey suggested that organisations tend to use different combinations of techniques to prioritise and select projects, for example, what is the combination of strategic approach and weighted scoring model or matrix. In addition, they suggested that though financial models are popularly used, they produce poor performing project portfolios and those organisations with the best performance portfolios rely on a strategic approach rather than financial methods. Table 2.2 below represents the survey results as conducted by Cooper *et al.* (2001b:366) of popularity, dominance, and the purpose for the use of the model/technique.

**Table 2.2: Survey results of projects selection techniques and methods**

| Techniques/Models                                                                     | Popularity | Dominance | Use                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------|------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Financial techniques/methods such as NPV, ROI and EV                                  | 77.3       | 40.4      | <ul style="list-style-type: none"> <li>• To rank projects against each other</li> <li>• To compare the financial results against a hurdle rate to make a decision on individual projects</li> </ul> |
| Strategic approach as strategic buckets and product road map                          | 40         | 26.6      | <ul style="list-style-type: none"> <li>• To allocate resources based on business strategy and strategic priorities</li> </ul>                                                                       |
| Bubble diagrams or portfolio maps                                                     | 37.9       | 8.3       | <ul style="list-style-type: none"> <li>• To support the decision-making process</li> </ul>                                                                                                          |
| Weighted scoring techniques/ matrix, for example, scale ratings and attractive scores | 20.9       | 2.7       | <ul style="list-style-type: none"> <li>• To make a decision on individual projects</li> </ul>                                                                                                       |

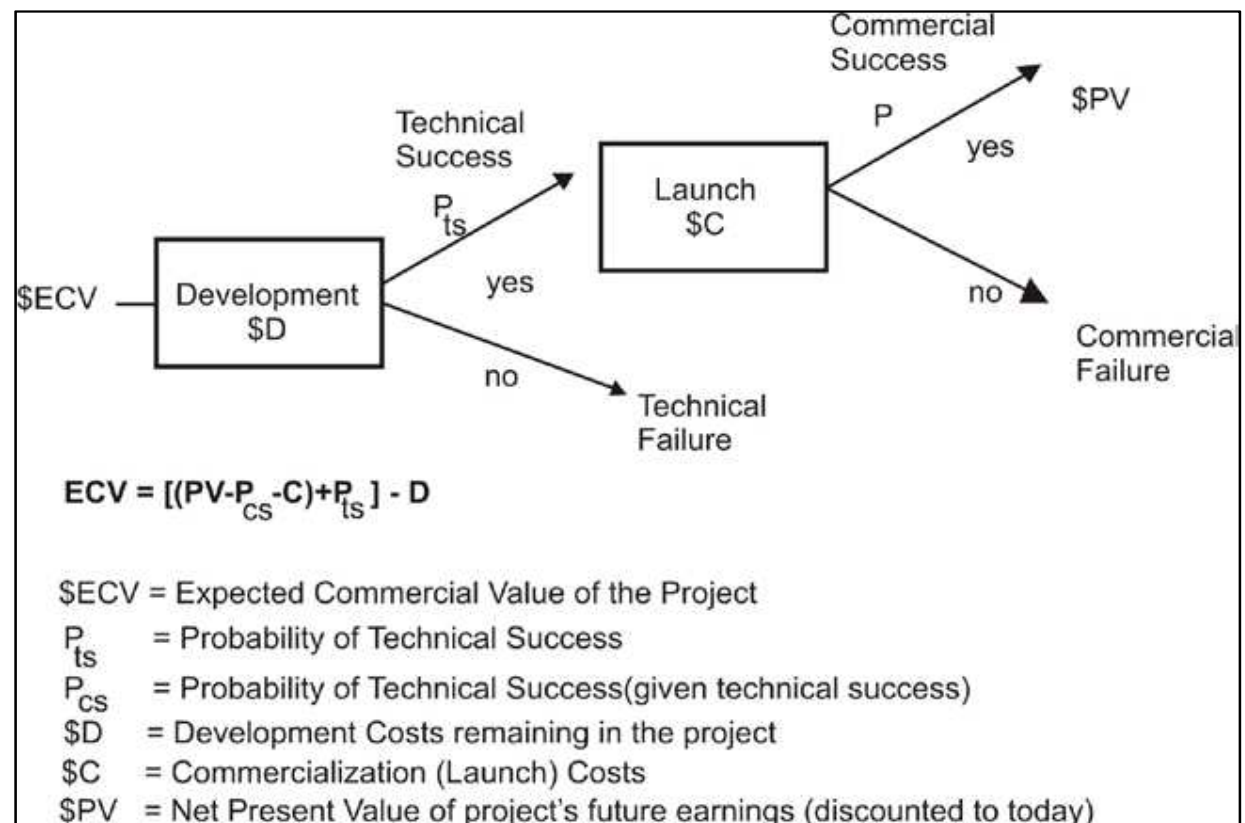
Source: Adapted from Cooper *et al.* (2001b:366)

It is therefore important to consider availability, accuracy reliability and use recent data for analysis when adapting the prioritisation techniques. In addition, the techniques are mostly concerned with financial analysis; strategic fit analysis and risk analysis to ensure the investment made on prioritised projects have value.

### 2.5.3.1 Expected commercial value technique (ECV)

Coa Le and Nguyen (2007:27) discussed that ECV is also known as a decision tree technique and is used for expected value maximization on projects portfolios. They added that ECV also prevails over the weakness of the net present value (NPV) which fails to consider risks, probability of the technical and commercial success as illustrated in Figure 2.1 below.

**Figure 2.1: ECV technique as decision tree**



Source: Coa Le and Nguyen (2007:28)

### 2.5.3.2 *Benefit/Cost ratio and profitability index technique*

Frame (1994) and Coa Le and Nguyen (2007:32) defined the benefit/cost (B/C) analysis as the weighted benefits of an option against its costs. The ratio is calculated as shown in the formula below:

$$\text{B/C} = \frac{\text{Estimated sales} \times \text{Estimated Profit Rate} \times \text{Probability of success}}{\text{Estimated cost}}$$

This formula takes into account the risk factor, for example success rate and the strategic factor in terms of profit rate as a financial analysis. It is therefore noted that the cost/benefit ratio analysis or profitability index is a quantitative technique which is very useful for ranking and prioritising projects (Coa Le & Nguyen, 2007:32).

According to Riahi-Belkaoui (2001:18), Cost-Benefit analysis of capital projects assists in the evaluation of different projects and assessing their priority and decision-making process on which projects can be selected for investment. The Net Present Value (NPV) and the Profitability Index (PI) method or technique of evaluating projects can give different rankings for mutually exclusive projects (Riahi-Belkaoui, 2001:25).

### 2.5.3.3 *Financial appraisal profile (FAP) technique*

This model was refined by Lefley (2000:29) using a case study and also discussed by Coa Le and Nguyen (2007:34) as another project prioritisation technique. According to Lefley (2000:29), the FAP consists of three sub-models that can be adopted by the management appraisal team responsible for prioritising and selecting projects. Using the three sub-models namely the Net Present Value Profile (NPVP), the Project Risk Profile (PRP), and the Strategic Index (SI); FAP is capable of evaluating the three main attributes of capital projects, which is finance, risks and strategic benefits.

### 2.5.3.4 *Bubble diagrams for project mapping technique*

Cooper *et al.* (2001b:361) suggested that the bubble diagrams for project mapping are mainly based on the concepts of the Boston Consulting Group (BCG) matrix and McKinsey matrix as projects portfolio analysis and resource allocation. Cooper *et al.* (2001:365) conducted a survey on the popularity of the diagrams. The typical diagram has two dimensions of interests and four segments that visually locate projects for

creation of balance. Table 2.3 below shows the results of the survey on popularity of the diagrams ranked from the highest to the lowest popularity.

**Table 2.3: Results of Bubble diagram popularity**

| Rank | Type of diagram                             | Dimension                                |                                                                                  |
|------|---------------------------------------------|------------------------------------------|----------------------------------------------------------------------------------|
|      |                                             | Axis 1                                   | Axis 2                                                                           |
| 1    | Risks versus Reward                         | Reward: NPV, IRR, market value           | Probability of success (technical, commercial)                                   |
| 2    | Newness                                     | Newness                                  | Market newness                                                                   |
| 3    | Ease versus Attractiveness                  | Technical Feasibility                    | Market attractiveness (growth prospect, consumer appeal, overall attractiveness) |
| 4    | Team strength versus project attractiveness | Competitive position (relative strength) | Project attractiveness (market growth, technical maturity, years to implement)   |
| 5    | Cost versus Timing                          | Cost to implement                        | Time to impact                                                                   |
| 6    | Strategic versus Benefit                    | Strategic focus or fit                   | Business intent, NPV, Financial fit, attractiveness                              |
| 7    | Cost versus Benefit                         | Cumulative rewards (\$)                  | Cumulative development cost (\$)                                                 |

Source: Adapted from Cooper *et al.* (2001b:366)

The above Table (Table 2.3) shows that the risk-reward bubble diagram is the most popular one. One dimension of this bubble diagram is the interest in qualitative and quantitative analysis of project earnings and benefits as future rewards whereas another dimension is associated with consideration of uncertainty and risks (Cao Le & Nguyen, 2007:30).

#### 2.5.3.5 *Prioritisation matrix technique*

Eskom uses the prioritisation matrix for projects prioritisation and selection process. A prioritisation matrix can be used as a decision support tool after key actions, criteria or Critical-To-Quality (CTQ) characteristics have been identified. Prioritisation matrices are especially useful where problem-solving resources, such as people, time or money, are limited, or if the identified problem-solving actions or CTQs are strongly interrelated. The matrix uses weighted rankings of all the possible actions that are considered (Bonacorsi, 2011:1).

Gosenheimer (2012:1) defines the prioritisation matrix as a simple tool that provides a way to sort a diverse set of items into an order of importance. It also identifies their relative importance by deriving a numerical value for the priority of each item. In addition, the matrix provides a means for ranking projects based on criteria that are determined to be important.

According to Gosenheimer (2012:1), a prioritisation matrix plays a key role in supporting structured decision-making process in the following ways:

- Helps prioritise complex or unclear projects issues when there are multiple criteria for determining the importance of initiatives;
- Provides a quick and easy, yet consistent, method for evaluating projects;
- Takes some of the emotion out of the prioritisation process;
- Quantifies the decision with numeric rankings;
- Adaptable for other priority-setting needs such as services; and
- Facilitates reaching agreement on prioritised projects at ease thus facilitating fast decision-making processes.

Van der Merwe (1995:34) developed a prioritisation matrix technique for the purpose of addressing Eskom transmission group projects' prioritisation challenges in order to ensure effective resource allocation for the division. The prioritisation matrix was developed to consider various project parameters and that the parameters have pre-defined ranges that allow projects to be prioritised at right levels. The following are a list of parameters used:

- Electrical importance

- o Actual load
- o Availability of interconnected system
- o Importance of customers
- o Replacement value
- Security importance
  - o National importance
  - o Geographical layout
  - o Threat analysis
  - o Political analysis

Ranges of values were developed, coded alphabetically and used to quantify the above parameters, for example, actual load ranged from 100MW to 600MW (Van der Merwe, 1995:35). In addition, Van der Merwe (1995) further discussed the range of values represented by **A-** (very important), **B-** (Middle ground) and **C-** (least important) for the parameters as an important element in the prioritisation matrix of transmission projects, for example:

- **Load range of values includes,**

B: If station demand is 100 MW to 250 MW and/or a through load of more than 600MW

A: If substation demand is more than 250 MW and/or a through load of more than 600 MW

- **Range of values for availability of interconnected system,**

A: Where total load can bypass the substation or where alternative routes are available for the full load

B: Where bypass or alternative load is available for the full load

C: Where no bypass or alternative route is available

- **Range of national importance of the substation includes,**

C: When a substation does not appear on any list of national important places

B: When a substation appears on the list of national important places

A: When a substation appears on the list of national key points

- **Range for Geographical layout of the area surrounding the substation,**

C: When the substation is situated in an inaccessible rural area and its position is not well known

B: When a substation is situated in an accessible rural area and its position is relatively well known

A: When a substation is situated in or close to an urban area, is easily accessible and its position well known

Table 2.4 below illustrates a typical prioritisation matrix for projects as discussed by Van der Merwe (1995:48).

**Table 2.4: Typical prioritisation matrix for capital projects**

| Substation<br>Project<br>Name | Parameters |              |                    |           |              |                  |            |               | Range |
|-------------------------------|------------|--------------|--------------------|-----------|--------------|------------------|------------|---------------|-------|
|                               | Load       | Consu<br>mer | Interconn<br>ected | Valu<br>e | Key<br>point | Geograp<br>hical | Thre<br>at | Politic<br>al |       |
| Project 111                   | C          | C            | C                  | B         | C            | C                | C          | C             |       |
| Project 112                   | A          | A            | A                  | A         | A            | B                | B          | B             |       |
| Project 112                   | B          | B            | B                  | B         | C            | C                | C          | C             |       |
| Project 112                   | B          | B            | B                  | B         | A            | C                | C          | C             |       |
| Project 112                   | C          | C            | C                  | B         | C            | C                | C          | C             |       |
|                               |            |              |                    |           |              | C                |            |               |       |
| Project 112                   | B          | B            | B                  | B         | A            | C                | C          | C             |       |
| Project 112                   | C          | C            | C                  | C         | B            | C                | C          | C             |       |
| Project 112                   | B          | B            | B                  | B         | A            | C                | C          | C             |       |
| Project 112                   | B          | B            | B                  | B         | C            | C                | C          | C             |       |
| Project 112                   | B          | B            | B                  | B         | C            | B                | B          | B             |       |

Source: Adapted from Van der Merwe (1995:48)

As seen from Table 2.4 above, the prioritisation matrix used three levels for the range which means that decision-makers have to ask the following questions: what is the most

important? What is the least important? And what would constitute the middle ground? (Van der Merwe, 1995:47).

## **2.6 PROJECT PRIORITISATION PROCESS**

The project prioritisation process is vital in the power utility environment where most of the capital expenditure is spent on executing multiple capital projects. Van der Merwe (1995:1) investigated the multi-project prioritisation process in the project environment of Eskom. The study investigated challenges and difficulties with multiple project prioritisations. The study further developed the methodology that allows multiple projects to be prioritised in a quantitative manner and allows the effective use of available resources.

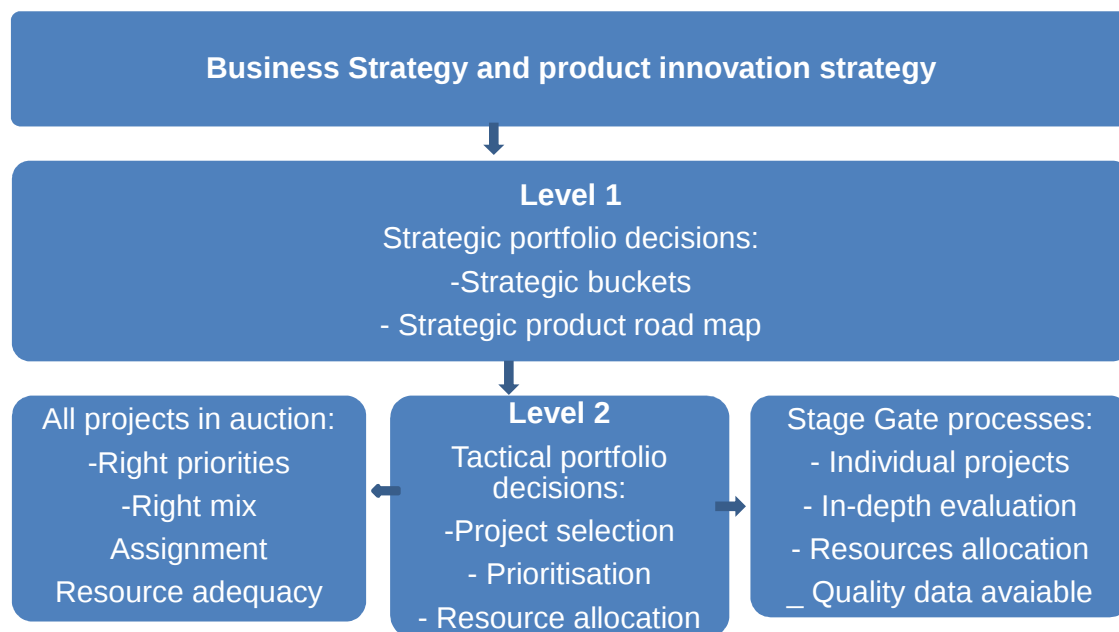
The project's prioritisation process is effective and efficient in an organisation when the prioritisation process has the following principles: outcome-focused, sound governance, stakeholder communication, robust and consistent inputs data, analytical and judgemental decision-making, established processes and documented outcomes.

Cao Le and Nguyen (2007:31) argue that organisations have various techniques and tools that can be used for prioritising projects, and that it is important for organisations to adapt or develop appropriate framework to evaluate and select projects that align with corporate strategies (Cao Le & Nguyen, 2007:31). Various prioritisation processes will be discussed next.

### **2.6.1 Prioritisation Process by Cooper**

According to Cooper *et al.* (2005: 321), a prioritisation and selection process consists of two hierarchical levels. The first level is strategic projects' portfolio decision which is very important for the organisation thus dividing projects into subsets or categories. Cooper (2005) further suggested that each strategic bucket will be resource allocated to one project subset, and this process will assist the organisation to have a balanced project portfolio that is aligned with corporate strategy. The second level called tactical portfolio decision is the prioritisation and selection process. Different techniques and tools are used to select the right projects in the subset. The stage/gate process can also be carried out in parallel. The prioritisation process as discussed by Cooper is illustrated in the following figure:

**Figure 2.2: Prioritisation process by Cooper**



Source: Adapted from Cooper (2005:323)

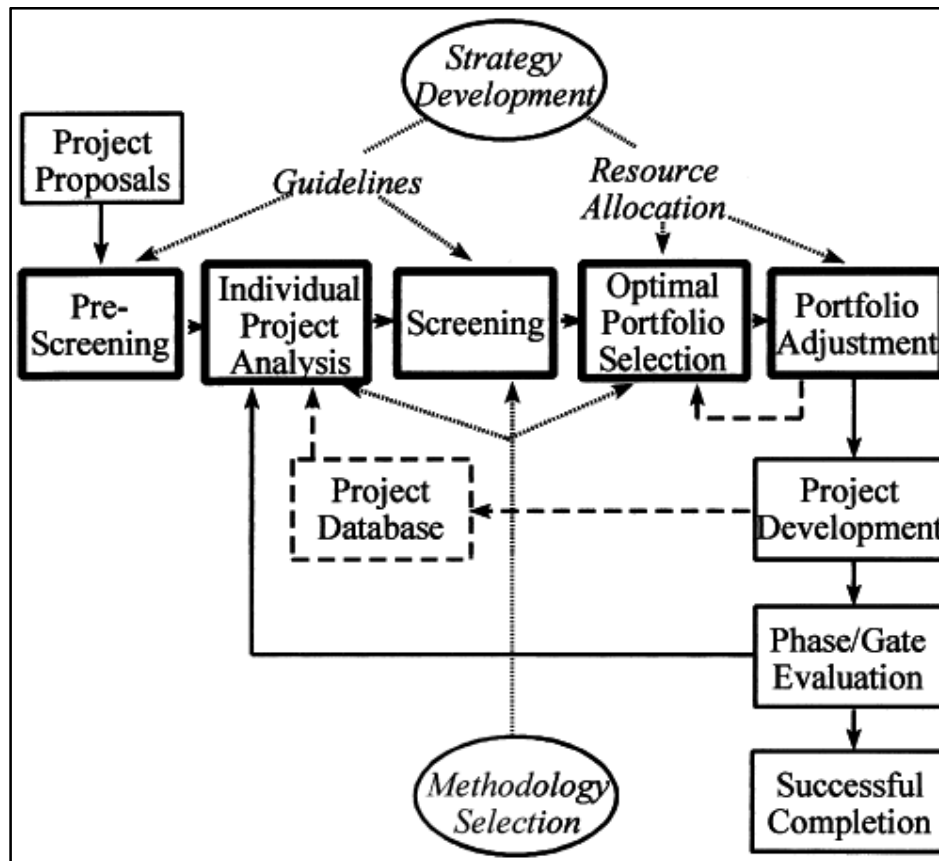
According to Cooper *et al.* (2005:324), prioritisation and selection processes consist of two hierarchical levels. The first level is strategic projects portfolio decision which is very important for the organisation thus dividing projects into subsets or categories. Cooper (2005:324) further suggested that each strategic bucket will be resource allocated to one project subset, and this process will assist the organisation to have a balanced project portfolio that is aligned with corporate strategy. The second level called tactical portfolio decision is the prioritisation and selection process. Different techniques and tools are used to select the right projects in the subset. The stage/gate process can also be carried out in parallel.

## **2.6.2 Prioritisation process by Archer and Ghasemzadeh**

Cao Le and Nguyen (2007:35), Archer and Ghasemzadeh (1999:208) proposed that projects should have a pre-qualification process and should be evaluated separately as the screening phase. After passing the first stage the projects can go through the next steps. The authors suggested that this will reduce bad proposals and effort made by selection committees during the selection process, Cao Le & Nguyen (2007:35). Figure

2.3 below, which is suggested by Archer and Ghasemzadeh (1999:211), shows different stages for project prioritisation and selection process.

**Figure 2.3: Project prioritisation process by Archer and Ghasemzadeh**



Source: Archer and Ghasemzadeh, (1999:211); and Cao Le and Nguyen (2007:35)

The focus of the prioritisation process by Archer and Ghasemzadeh (1999:212) is on procedures and utilisation of tools and techniques. Below are three main phases for decision making process as discussed by Archer and Ghasemzadeh (1999:212):

- **Strategic considerations-** this phase refers to the consideration of Strengths, Weakness, opportunities and threat (SWOT) analysis of the organisation to create competitive advantage in strategy development.
- **Individual project evaluation-** This phase refers to measurement of projects values and benefit that each project contribute to the project objectives.

- **Project portfolio selection-** This phase involves simultaneous comparison of a number of projects to rank and select projects for the portfolio based on certain criteria and availability of resources.

The above three process stages support the argument of *Cooper et al.* (2005:318) about considering three critical factors in project portfolio selection, namely alignment of portfolio with strategy through pre-process, portfolio value maximisation through selection and right balance and mix of projects through post process.

## 2.7 CHALLENGES IN PROJECT PRIORITISATION

This section discusses challenges which most have already been covered in the literature study and likely possible challenges that the national electricity provider such as Eskom would experience. In order to prioritise and select the correct project portfolios, organisations need to properly assess these challenges and put in place mitigations or solutions to these challenges. The following challenges that are common during the prioritisation process are discussed below as follows:

- Correctness of data - Most prioritisation techniques and tools make use of databases and require data input. *Cooper et al.* (2001a:5) argue that in the process of prioritisation, organisations face challenges such as unreliable data for costing, scheduling and resourcing.
- Cao Le and Nguyen (2007:37) added that most organisations often review their strategic plans on an annual basis which may result in new project opportunities being missed.
- Efficient financial resource allocation - Van der Merwe (1995:42) suggest that one of the challenges that Eskom face was that capital allocation was spent to projects addressing security of supply rather than other strategic considerations.
- Cao Le and Nguyen (2007:37) argue that most large organisation apply change strategies to survive and outperform competitors during the era of uncertainty, rapid change and increasingly competitive pressure. The lack of change management process during project prioritisation and selection process often create a challenge to most organisations.

- According to Sommer (1999:55), large organisations with many business units have challenges with each business unit having its own priorities and preference of project portfolios.

## **2.8 BACKGROUND OF ESKOM**

Eskom is a South African National Electricity Provider, established in 1923 as the Electricity Supply Commission by the Government of South Africa in terms of the Electricity Act of 1922. The utility is one of the top 20 utilities in the world by generation capacity. Eskom net maximum capacity is 44,145 MW; it generates approximately 95% of the electricity used in South Africa and more than 40% of the electricity used in Africa (Eskom, 2015). It operates 27 power stations with 85% coal-fired power stations, and the remaining 15% composed of a mix of nuclear, open cycle gas turbine, hydro and pumped storage plants. Eskom also owns and operates 395,582 km of power lines (Eskom, 2015:1).

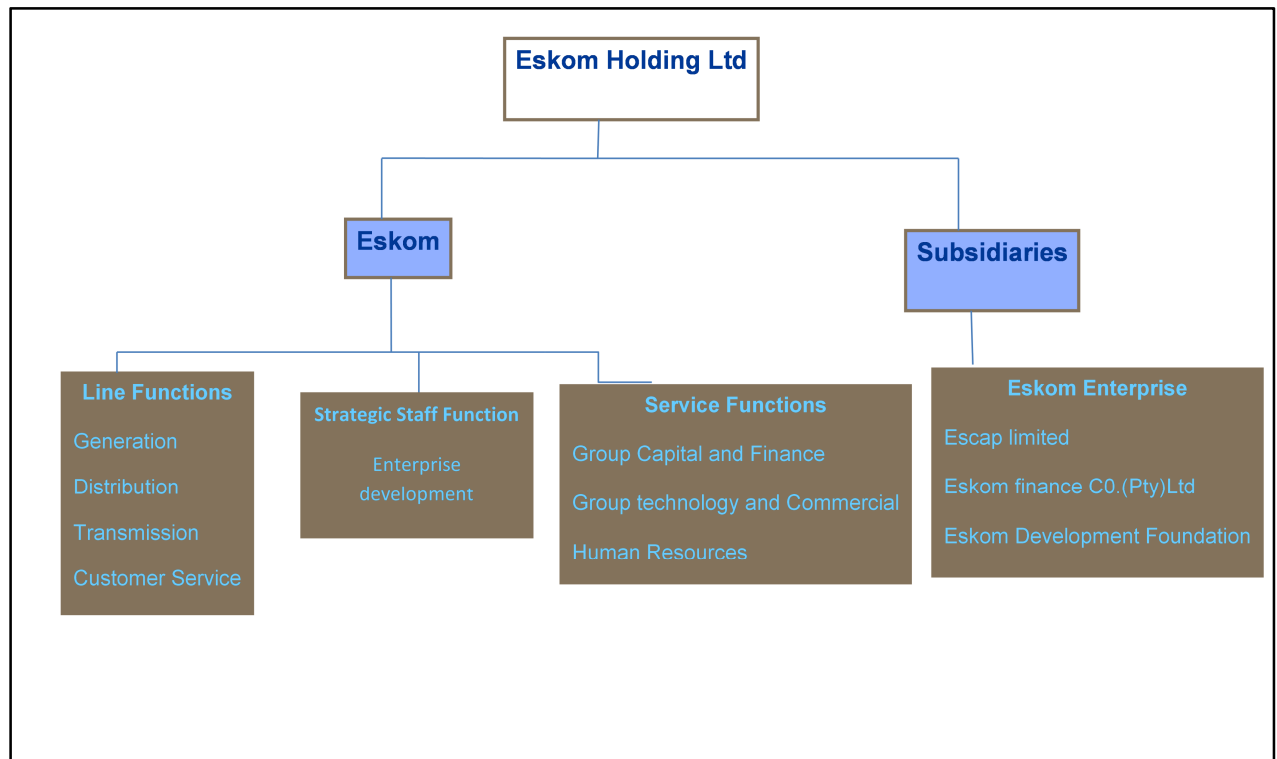
Eskom currently operates along the entire electricity value chain. It generates, transmits and distributes electricity to industrial, mining, commercial, agricultural, residential customers and redistributors, for example, municipalities.

## **2.9 ESKOM ORGANISATIONAL STRUCTURE**

Eskom's structure supports the organisational strategy and mandate. The structure clarifies the role and main mandate of each entity within Eskom and the elements have been brought together into the structure, where there are line functions that operate the business, service functions to service the operations and strategic staff functions to develop the enterprise.

The governance in this structure is a combination of a more targeted executive committee (EXCO), and a broader management committee, which includes line leaders and functional leaders. Figure 2.4 below illustrates the Eskom organisational structure.

**Figure 2.4: Eskom organisational structure**



Source: Eskom (2015:1)

Service functions are the functions that support the organisation with relevant services such as capex and asset management services by GCD and human resource services by the human resource department. The GCD falls under the service functions of the organisation and is important within the context of this study.

## 2.10 GROUP CAPITAL DIVISION

GCD is responsible for capital project planning, development and execution strategy, policies, and assurance for Eskom's capital expansion programmes and existing assets. In order to sustain and grow within this dimension, it is critical for the division to prioritise the current new build portfolio for accelerated delivery and allocate capital budget at group level (or other viable funding mechanisms) accordingly.

Stated objectives are reviewed annually in alignment with the Eskom business planning process. This methodology is followed to ensure cohesion of the organisation's objectives. The GCD business plan builds on current strategic direction and indicates where change is required to move the division's business forward. The divisional plan is

seen as a living document and is therefore reviewed and monitored continuously and it also outlines the key forces driving the business, strategic imperatives, risks, and resource requirements (Eskom, 2015:1).

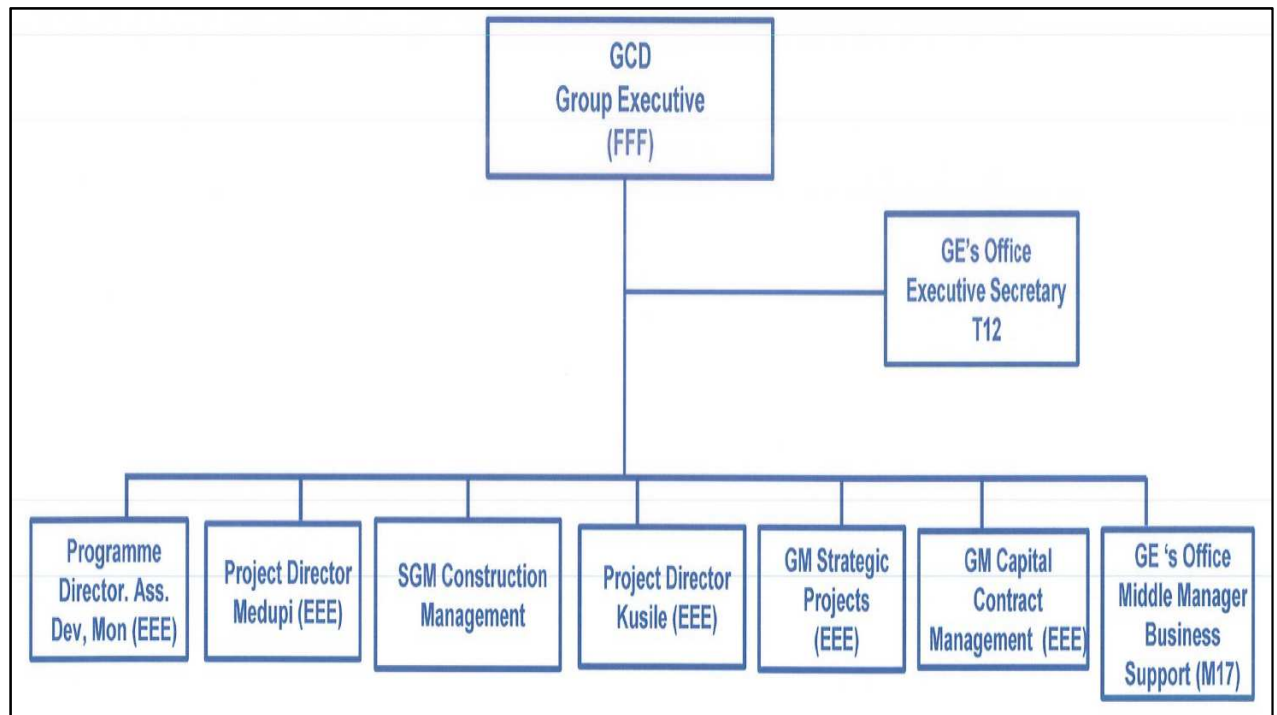
The GCD contributes to the delivery of Eskom's strategies through the following:

- The division creates the oversight, transparency, and control required to manage Eskom's significant spend into the future;
- It approaches the planning, development, and execution of capital projects in a more integrated way (project development and execution pipeline); and
- Ensuring the capital portfolio of projects to be executed are aligned, optimised and allocated according to the Eskom strategy (Eskom 2015:1).

#### **2.10.1 GCD structure**

The GCD structure supports the divisional strategy and mandate. The structure clarifies the role and main mandate of each department within the Division and the elements have been brought together into the structure, where there are line functions that operate the department. The figure below illustrates the GCD structure and its core departments.

**Figure 2.5: GCD Structure**



Source: Eskom (2015:1)

The prioritisation process of all Eskom Capital projects is performed in GCD by the Capital efficiency section within the assurance, development and monitoring department.

### **2.10.2 GCD enabling strategies and supporting capital programmes**

In order for GCD to meet its objectives and mandate of providing capital project planning, development and execution strategy, policies, and assurance for Eskom's capital programmes, there are strategies that have been developed. The table below indicates GCD strategies and supporting programmes which fall within short, medium and long-term window. The prioritisation and allocation of resources is vital to support these strategies and to ensure that resources are allocated where they are mostly needed and the organisation will receive most benefit.

**Table 2.5: GCD Strategies and Capital programmes**

| <b>Strategic objectives</b> | <b>Enabling strategies</b>                                                                                                           | <b>Supporting initiatives</b>                                                                                                                                     |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Asset creation              | <ul style="list-style-type: none"> <li>Existing new build programmes</li> <li>Major refurbishment and recovery</li> </ul>            | <ul style="list-style-type: none"> <li>Medupi</li> <li>Kusile</li> <li>Ingula</li> <li>Majuba silo recovery</li> <li>Duvha 3 recovery</li> </ul>                  |
| Asset creation              | <ul style="list-style-type: none"> <li>Future nuclear</li> <li>Future gas</li> <li>Future coal</li> <li>Future renewables</li> </ul> | <ul style="list-style-type: none"> <li>Front end planning</li> <li>Project development</li> <li>Project execution</li> </ul>                                      |
| Asset creation              | <ul style="list-style-type: none"> <li>Transmission development plan</li> </ul>                                                      | <ul style="list-style-type: none"> <li>Front end planning</li> </ul> <p>Project development</p>                                                                   |
| Asset creation              | <ul style="list-style-type: none"> <li>Capital efficiency</li> </ul>                                                                 | <ul style="list-style-type: none"> <li>Alignment of projects with strategies</li> <li>Prioritisation and allocation of capital across the organisation</li> </ul> |

### **2.10.3 Capital expenditure**

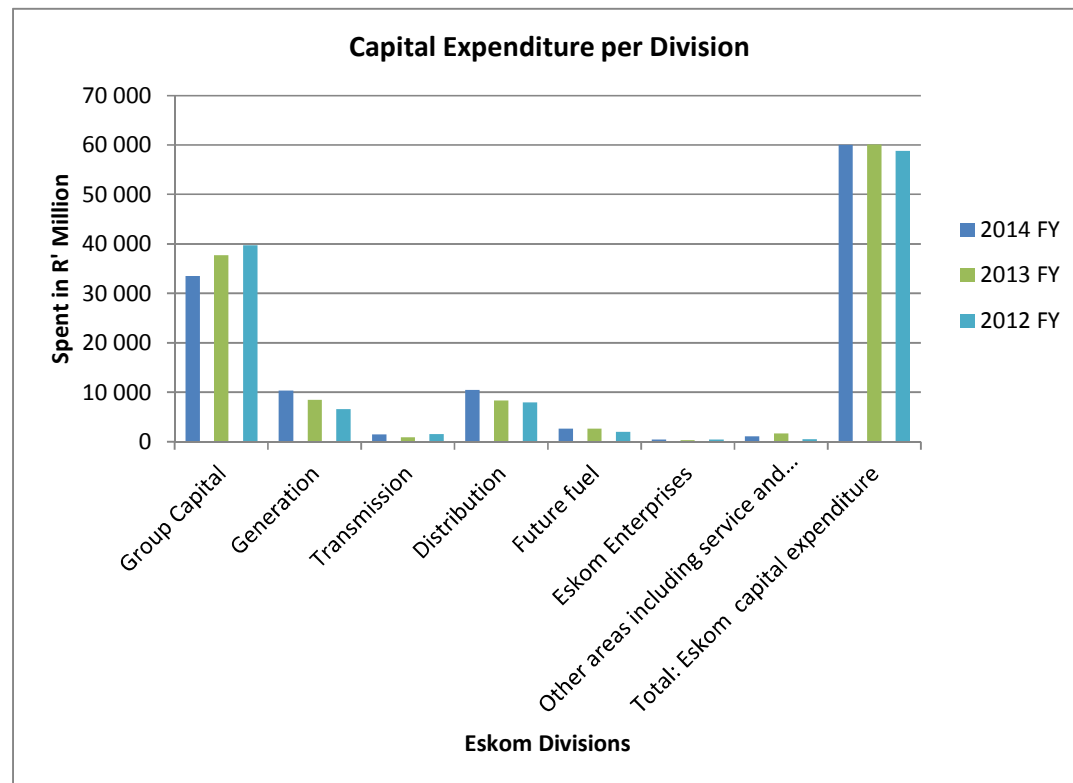
Eskom spent R60 billion on capital expenditures in the 2014 financial year. The capital expenditure supports the need to have an efficient and effective project prioritisation process. GCD provides capital asset management service and project management of mega capital projects to the organisation including the accountability to prioritise capital projects for the entire organisation such as generation, distribution and transmission projects.

Given the current financial constraints, it is critically important that the approved MYPD 3 capex budget is well spent and realised through projects that are aligned to organisation business strategies and the prioritisation process is aimed at ensuring that this objective is met (Eskom, 2014).

#### 2.10.4 Capital expenditure per Eskom division (R million)

The graph below shows the breakdown of capital expenditures per Eskom division for the past three years. It is observed that GCD accounted for most capital expenditures for a three (3) year period covering financial year 2012, 2013 and 2014 compared to other divisions at Eskom. Over the past three financial years, GCD had the highest Capex spend with 62%, followed by the distribution division with 15%, and generation division with 14% of capex respectively. The GCD capital budget is for the capital projects that support Eskom strategies and business plans. It is therefore imperative that the prioritisation process of capital projects within GCD is effective, efficient and should be able to support business strategies under a financially constrained environment (Eskom, 2014:1).

**Figure 2.6: Eskom capital project breakdown**



Source: Eskom (2014:1)

#### 2.11 Capital projects prioritisation in Eskom

The prioritisation process of capital projects at Eskom is based on existing Eskom practices, best industry practices and operational experience within power utility area,

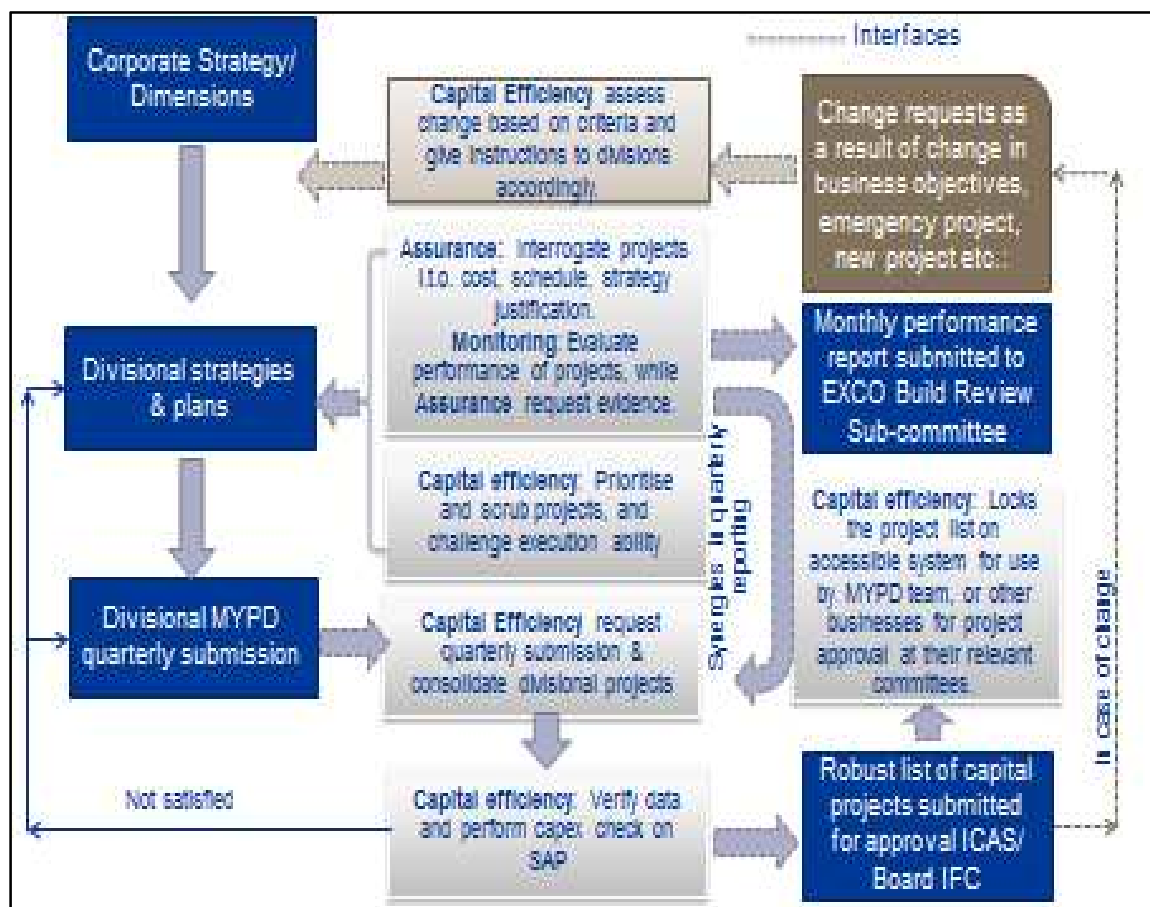
with the input from a number of business subject matter experts. The process comprises various activities which can be drawn upon to meet the requirements of the Eskom database of projects. The project database requirement include: managing projects risks, prioritising the projects and balancing the portfolio of projects. The project's prioritisation process in Eskom ensures the following:

- Support elaboration of a medium and long-term investment strategy;
- Encourage the realization of projects that have good chances of implementation;
- Furthers the organisation's strategic priorities/objectives;
- Provides a "level playing field" for projects with different risk/cost/benefit characteristics from various asset categories;
- Ensures decision-making is risk-informed and supported by thorough analysis;
- Provides transparency both internally and externally; and
- Enables efficient, timely decision-making (Eskom, 2015).

The capital efficiency section in GCD is responsible for management of the prioritisation of capital projects at Eskom including allocation of funds on prioritised projects. The section falls under project development department that is responsible for project opportunity screening, front end planning and development of all Eskom's capital projects. The capital efficiency section coordinates all activities involving prioritisation of projects among all Eskom divisions including relevant governance approvals for the list of prioritised projects. Database management of the prioritised projects list is also the responsibility of capital efficiency.

The diagram below illustrates the process from when the opportunities for projects are identified for evaluation, prioritisation and project approval at Eskom.

**Figure 2.7: Eskom project selection and prioritisation process**



Source: Eskom (2015:1)

As seen from the above diagram, the project prioritisation and selection process at Eskom is linked to the Eskom corporate strategy which provides strategic guidance and planning for the organisation. Corporate strategy provides strategic direction to the organisation to ensure that the organisation is able to adapt to challenges and take care of opportunities while remaining competitive and adding value to its stakeholders and customers. Capital projects form part of the strategic focus area, for example, the execution of Medupi and Kusile new building projects support the strategic objective of keeping the lights on by increasing generation capacity.

Prioritised projects are developed following the project management process at Eskom called project life cycle model (PLCM) and each project must be submitted for investment decisions to various Eskom governance committees depending on the value of the project. Examples are: Group Capital Monitoring and Investment Committee

(GCMIC), Exco Investment and Capital Assurance Subcommittee (ICAS) and board Investment and Finance Committee (IFC) make decisions on which projects should receive investment.

### **2.11.1 Prioritisation matrix at Eskom**

The process of project prioritisation and selection involve deciding which project initiatives, the organisation can invest capital on and the ones that will not receive investment decisions. The literature reviewed in the sections above suggests that the alignment of projects with the organisation's business strategy usually makes it a candidate for selection, but it does not guarantee its selection. Eskom uses the prioritisation matrix technique for project selection criteria in order to provide guidance that supports project selection decisions.

The prioritisation and ranking of capital projects at Eskom is particularly important, because projects initiated within one Eskom division usually require adjustments relative to other projects in other divisions across the whole organisation. The position of all projects within the portfolio database is re-evaluated periodically and with every new project addition or project termination.

The Eskom prioritisation matrix provides a guide to the governance committees of the organisation about the intent and the means to achieve strategic business objectives. Below are key elements of the Eskom prioritisation matrix that uses the scoring system to establish its ranking within the project database.

#### **2.11.1.1 Business Perspective**

Project selection criteria should be able to support business strategies and be aligned accordingly. Business alignment strategies will have factors such as the following:

- **Estimated project costs:** Projects are selected based on criteria for achievement of project cost reduction initiatives and electricity pricing strategies that cover specific incurred project costs.
- **Business advantage:** Projects are selected based on criteria for achievement of increased revenue objectives, increased reliability of the power system and security of supply of electricity to customers.

- **New technology:** Projects are selected based on criteria for achievement of new development opportunities and objectives such as introduction of renewable energy and gas generation technology in the power system.

#### *2.11.1.2 Financial Perspective*

Eskom has different requirements for the financial returns that are necessary for a project to be considered or approved for investment. These requirements normally are based on the perceived risk and rewards inherent to the power utility industry.

Project selection criteria for this strategy alignment perspective are relative to the following factors which show that a project has the capability to achieve the specified financial objectives of the business strategy:

- **Investment commitment:** Projects are selected based on criteria for achieving the specified limit of the investment amount allowed by type of project.
- **Investment returns:** Projects are selected based on criteria for achieving the specified acceptable range of investment return or objectives for increased investor value.
- **Investment period:** Projects are selected based on criteria for achieving the desired returns within specific acceptable time frames per Eskom standards and constraints.

#### *2.11.1.3 Performance Perspective*

Capital Projects at Eskom are selected when general project performance indicators reflect the likelihood of successful outcomes and improve the performance of the power system. Criteria for this strategy alignment perspective can be developed relative to the following factors:

- **Extent and nature of work (capability and competency):** Projects are selected based on criteria that confirm the organisation's capability to fulfil project performance requirements as well as criteria that support the application of existing competencies within the organisation to achieve project objectives.
- **Extent of risk:** Considering that Eskom is in the business of generating electricity, security of supply and reliability of the system is a key consideration to ensure that there are no interruptions with the supply of

Electricity to customers. The risk criteria have the highest weighting on the matrix, and may affect the objectives of the organisation of keeping the lights on. Risk may include safety, environmental, security of supply, production losses, production capacity, utilities, fuel availability, and generation plant health amongst others.

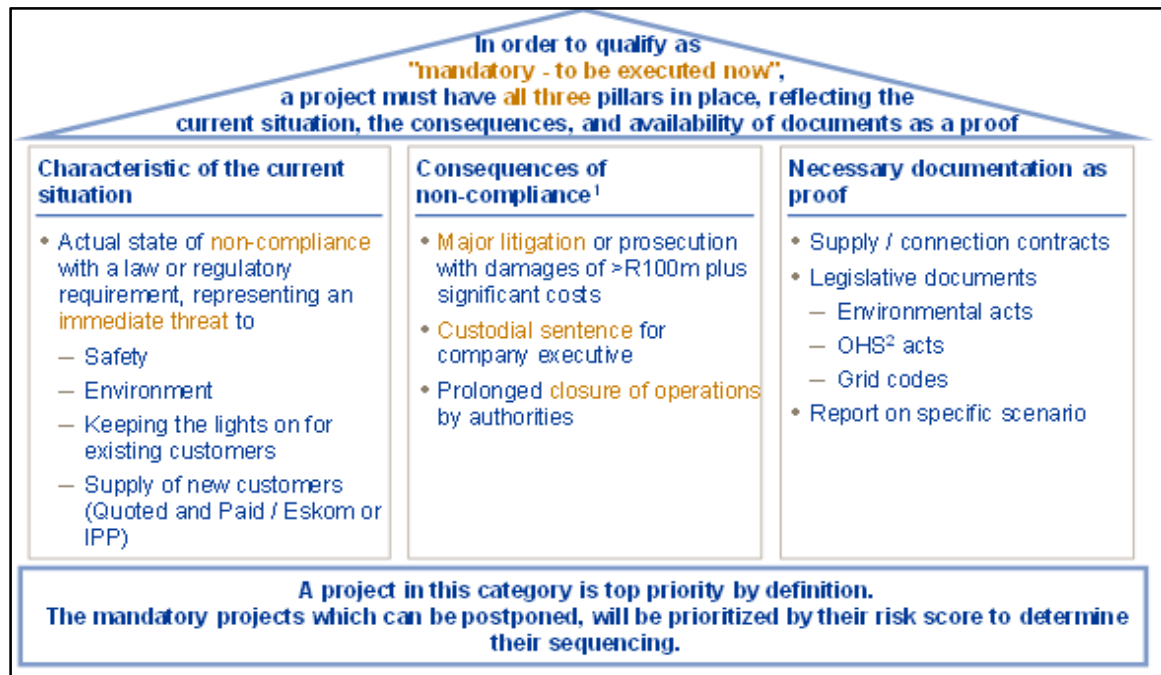
- **Resource availability:** Projects are selected based on the organisation's ability to perform the specified work through the assignment of qualified resources. Criteria are formulated to ensure that resource availability in terms of numbers and necessary skills are addressed and confirmed prior to project selection.

#### *2.11.1.4 Non-numerical Perspective*

Projects are also selected when business needs warrant such projects to be considered for implementation. These criteria are often characterized not by using numerical thresholds but by business decisions. Criteria for this strategy alignment perspective at Eskom are relative to the following factors:

- **Executive mandate or directive:** Projects are selected based on the executive's mandate or directives that require projects to be implemented for example is projects that results in reduction of Eskom carbon foot print while supporting government initiatives and commitment that South Africa will reduce carbon foot print through less emission from its production facilities.
- **Operating necessity/infrastructure:** Projects are selected to maintain or achieve certain levels of operational efficiency or effectiveness for example is the capital projects such as Duvha unit 3 recovery projects which will result in the restoration of lost generation capacity to the Eskom system.
- **Regulatory requirement:** Projects are selected based on the need to fulfil external mandates and regulatory compliance that facilitate business performance and enable the organisation to continue as a viable business entity. All projects that have high safety, environmental and legislative requirements are considered high priority because the consequences of such risks will have a major impact to the organisation. The figure below illustrates the example of categorizing and classifying of projects that have safety, environment and regulatory impacts as high priority projects.

**Figure 2.8: Classification of high and mandatory projects at Eskom**



Source: Eskom (2015:1)

## 2.12 SUMMARY

The aim of this chapter was to discuss the concepts of capital projects prioritisation with various prioritisation processes and prioritisation techniques having been discussed. In the context of Eskom, prioritisation procedures, systems and processes are in place to support the business requirement. The prioritisation technique that Eskom is currently applying for the process of prioritisation was also discussed. The Eskom prioritisation matrix mainly uses the risk element to rank the project and influence the level of priority. This is because reliability and security of supply is a very important aspect on the power utility industry.

In the next chapter the research methods as well as the results of the empirical study are presented and discussed.

## **CHAPTER 3: RESEARCH MODEL AND METHODOLOGY**

### **3.1 INTRODUCTION**

The primary objective of this study was to assess the effectiveness and efficiency of the Eskom capital project prioritisation process under constrained financial conditions at the GCD of the organisation. In order to address the identified primary objective of the study, it is essential to analyse the existing prioritisation process of the GCD of the organisation and to perform a literature study on the subject discipline of capital project prioritisation. The literature study and the empirical study will assist in answering secondary objectives of the study.

According to Thomas (2004:14), the basic task of research is to describe and explain phenomena using specialised techniques and processes that researchers adopt focusing in archiving study objectives in a systematic and rigorous fashion. Vosloo (2014:299) stated that the research design is applied so that suitable research methods are used to ensure the attainment of the goals and objectives set out for the study. The research design and methodology provide the plan for the research and enable the researcher to anticipate the appropriate research design that ensures validity of the final results (Vosloo, 2014:299).

### **3.2 RESEARCH PROCESS**

According to Du Plooy-Cilliers (2014:10), research is a 'recursive process' because it starts with a question, goes through the process of finding answers, returns to answer the initial question which then leads to further questions. The author defines the start of the research process being the identification and analysis of the problem and ending with a research report. Figure 3.1 below illustrates a formal research process with steps that the researcher will follow when undertaking research.

**Figure 3.1:** Research process



Source: Du Plooy-Cilliers (2014:14)

### 3.3 RESEARCH DESIGN

The research design refers to a logical sequence that connects the empirical data to a study's initial research questions and to its conclusions (Yin, 2003:20). Vosloo (2014:316) defined research design as the functional plan in which certain research methods and procedures are linked together to acquire a reliable and valid body of data for empirically grounded analyses, conclusions and theory formulation. The research design provides the researcher with a clear research framework while guiding the methods, decisions and sets the basis for interpretation (Vosloo, 2014:316). The research design can be achieved either through quantitative, qualitative or mixed methods. Mixed method research is the kind of research where the researcher combines quantitative and qualitative techniques, methods and concepts in a single study (Vosloo, 2014:322).

In order to address the research questions as discussed in Chapter 1, a case study research strategy that is based on the mix of quantitative and qualitative approaches is

applied. According to Yin (2003:15), case studies can be based on any mix of quantitative and qualitative evidence. The essence of a case study, according to Yin (2003:12) is that it tries to illuminate a decision or a set of decisions in order to understand why they were taken, how they were implemented and what their intended outcome is.

In order to address the research problem and the related research questions, a single case study strategy with a mixed methods research design was adopted in this study. Single case strategy was deemed relevant in this study given the fact that the study represents a unique case in a national electricity provider, Eskom. Maree (2010:76) discussed a key strength of the case study method as being the ability to use multiple sources and techniques in the data gathering processes.

### **3.4 GATHERING OF DATA**

Gathering of data refers to the method of collecting the data and includes the identification of the appropriate measuring instruments that will be used in a study. To obtain valid and reliable data the researcher should make sure that the measurement procedures and the measurement instruments have acceptable levels of reliability and validity (De Vos *et al.*, 2011:172).

Data gathering for this study was through both qualitative and quantitative research methods. The tools used in the collection of collect data included questionnaires, interviews and archival records. These tools were developed and applied to evaluate capital projects prioritisation in a national electricity provider.

#### **3.4.1 Qualitative data gathering**

Maree (2010:78) discusses qualitative research as naturalistic and as seeking to understand phenomena in context (or real-world settings). In order to yield data in qualitative investigation, interviews were used in this study as measuring instruments.

- **Interviews**

Qualitative information was gathered through the use of semi-structured interviews and provided the researcher an opportunity to see through the eyes of the participants. Interviews can be a valuable source of information in a research study. They provide data that can be helpful to the researcher in understanding the participant's construction of knowledge and social reality (Maree, 2010:87).

The semi-structured interviews were used in the study in order to corroborate data that emerged from other data sources. A semi-structured interview questionnaire was developed in this regard to guide the researcher during the interviewing process and data collection for the study. Annexure 1 refers to a semi-structured interview questionnaire.

### **3.4.2 Quantitative data gathering**

Quantitative data collection methods are often used to find correlations that can be generalised to a broader population (Du Plooy-Cilliers *et al.*, 2014:148). Vosloo (2014:334) discussed quantitative research as the objective evaluation of the data which consist of numbers, trying to exclude bias from the researcher's point of view using questionnaires as the instruments and always involves the numerical analysis of data gathered.

- **Questionnaires**

Questionnaires that consist of close-ended questions were developed in order to produce quantitative data as part of data collection for the study. Together with other identified data collection tools for the study, questionnaires were used to evaluate the effectiveness of the capital project prioritisation process at Eskom. Another benefit is that it offers simplified and quantified responses that can be analysed through statistical methods. Annexure 2 refers to the questionnaire using a Likert scale, which was used for this study and is attached for ease of reference.

The criteria suggested by Maree (2010:156) were taken into consideration when constructing the questionnaire. The following is a summary of the criteria to be met in a questionnaire:

- Sampling issues, including sampling size and strategy as well as the minimum response rate acceptable;
- Questionnaires design issues, for example, appearance of the questionnaires, question sequence, wording of questions and response categories; and
- Data collection method, for example telephone, mail, personal interview, fax and email.

### **3.5 TARGET AND STUDY POPULATION**

A population is defined by Du Plooy-Cilliers *et al.* (2014:132) as “the total group of people or entities from whom information is required”. The research question and the research problem therefore assist in determining who or what would best help the researcher to get the answers needed in order to define the population of the research.

In this study, the target population is 86 Eskom employees that are employed in the GCD. The population includes project executive managers, project managers, program managers, contract managers, project leaders, project office managers who are involved and affected by the capital projects prioritisation process at Eskom. The target group of 86 was identified to receive questionnaires and three subject matter experts were identified for personal interviews. Subject matter experts include people that specialize in project prioritisation, capital investment and project management at Eskom GCD.

### **3.6 DATA ANALYSIS**

According to Yin (2003:109), the data analysis process consists of examining, categorising, tabulating, testing, or recombining both qualitative and quantitative evidence in order to address the initial proposition of a study. Descriptive statistical techniques were applied to organise, analyse and interpret the quantitative data.

De Vos *et al.* (2011:397) define qualitative data analysis as ‘the process of bringing order, structure and meaning to the mass of data’. The most common methods of qualitative data analysis are reduction, organisation, interpretation and substitution (Du Plooy-Cilliers *et al.*, 2014:232).

### **3.7 VALIDITY AND RELIABILITY**

Reliability is linked to the findings of the research and can be seen as the extent in which the findings can be generalised in that similar results could be obtained if the study can be repeated (Du Plooy-Cilliers *et al.*, 2014:254). According to Maree (2010:215), the different types of reliability include test-retest reliability, equivalent form reliability, split-half reliability and internal reliability.

Maree (2010:212) defines validity of an instrument as the extent to which it measures what it is supposed to measure. The different types of validity are face validity, content validity, construct validity and criterion validity.

Both the qualitative and quantitative research methods require data to be tested for credibility. The researcher herein ensured that the data collected for purposes of this study was credible by using reliable sources for archival records, for example, approved capital projects database and approved capital projects investment minutes. A questionnaire that was developed from the literature study was utilized as a measuring instrument to analyse the data.

### **3.8 RESEARCH ETHICS**

Thomas (2004:90) defines ethics as moral principles that are intended to guide a person's behaviour in a society. According to Du Plooy-Cilliers *et al.* (2014:263), ethics are crucial in research because it potentially affects all the stakeholders involved in research. The typical stakeholders in research include participants, broader public, employer, academic institutions, professional bodies and policy makers.

The following aspect was complied with in this research study:

- A detailed and prescribed application was submitted to the Research Ethics Committee of the North-West University for approval to conduct the research.

For the chosen method of collecting data for the study, the researcher ensured that all the participants in this study were not subjected to any risk of unusual stress, embarrassment or loss of self-esteem and that they remained anonymous throughout the reporting of the findings of this study.

### **3.9 SUMMARY**

This chapter explained the research methodology used in this study. It was further explained that in order to address the research problem and the related research questions, a single case study strategy with a mixed methods research design was adopted. This study made use of questionnaires, interviews and archival documents as methods of gathering the data. The questionnaires used in this study were developed from the literature study. In addition, interviews have been conducted with identified persons while the review of archival records was also conducted. The data collected in this study is tabled and discussed in the next chapter.

## **CHAPTER 4: ANALYSIS AND DISCUSSION**

### **4.1 INTRODUCTION**

This chapter focuses on the opinions of employees as the target population identified to participate in the project prioritisation process as part of the current research study. The perceptions of these participants regarding the effectiveness and the main challenges associated with the prioritisation process are also presented in this chapter.

The empirical study was conducted by means of a questionnaire administered to various employees occupying different roles in the GCD. The questionnaire was constructed and the reliability thereof was calculated with the assistance of the North-West University Statistical Consultation Services and the research supervisor.

Qualitative data was collected through semi structured interviews wherein specialist personnel responsible for the prioritisation process were identified and interviewed. The qualitative analysis was used to support the main analysis of data received through the questionnaires method.

### **4.2 CONFIDENTIALITY**

Confidentiality was ensured towards all respondents who participated in the study. Respondents' individual results were treated anonymously and were not disclosed. A confidentiality agreement was signed between the researcher and the GCD where the investigation was made.

### **4.3 STATISTICAL ANALYSIS OF DATA**

Data captured through the questionnaire was analysed by the North-West University's Statistical Consultation Services at the Potchefstroom Campus using the Statistical Analysis System (SAS Institute Inc., 2005). Frequency tables were drawn to describe the socio-biographic variables of the study population. Reliability coefficients were computed for each measuring instrument's subtest and confirmatory factor analyses were done to confirm construct validity of subtests. To determine whether a factor analysis may be appropriate, Kaiser's measure of sample adequacy (MSA), which gives

an indication of the inter correlations among variables, was computed (Tabachnick & Fidell, 2001:96) for each confirmatory factor.

Guidelines according to Hair *et al.* (1998:730) were used to ensure that the MSAs were appropriate. Cronbach Alpha coefficients were calculated to assess the internal consistency and reliability between the statements in each construct in the questionnaire. Interpretation of comparisons between group means was done according to Cohen's effect sizes (Cohen, 1988:22).

#### **4.4 RESPONSES TO THE SURVEY**

The target population for the study became the study population as random sampling was not performed. According to the study population, the total number of respondents was 69. Table 4.1 below presents the results of the responses of the survey.

**Table 4.1: Responses to the survey**

| <b>Response Type</b>                 | <b>Frequency</b> | <b>Percentage</b> |
|--------------------------------------|------------------|-------------------|
| Number of questionnaires distributed | 86               | 100%              |
| Number of questionnaires returned    | 69               | 80.25%            |
| Number of questionnaires discarded   | 0                | 0%                |
| Number of questionnaires analysed    | 69               | 80.25%            |

Most of Eskom GCD target group under investigation is geographically located in Megawatt park offices in Sunninghill, Gauteng. Some GCD employees are however based at projects sites such as Kusile and Medupi power stations.

A total of 86 questionnaires were sent to employees within GCD via email while some were hand delivered. A total of 69 questionnaires were returned and collected within a two-week period, resulting in a response rate of 80.2%.

#### **4.5 BIOGRAPHIC AND GENERAL INFORMATION OF RESPONDENTS**

##### **2.12.1 Section I: Biographic and general information**

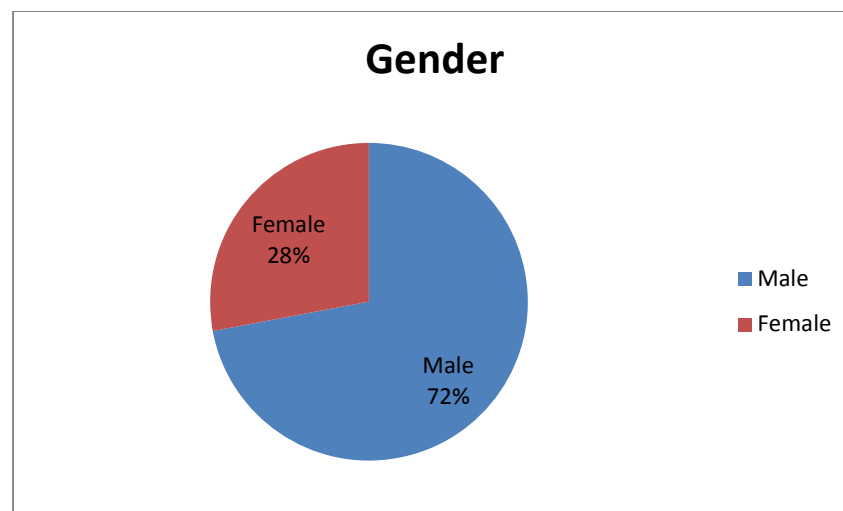
Section I gathered the biographical information of the respondents wherein they were requested to indicate their gender, age group, qualifications and position they occupy

within the GCD. Another question that was asked under general information was related to how many times the respondents had participated in the capital project prioritisation process during the past 24 month period under investigation. The respondents were expected to indicate the number of times they participated in the prioritisation process.

### **2.12.2 Gender of the respondents**

Respondents indicated their gender, male or female in section I of the questionnaire. The results are presented in Figure 4.1 below.

**Figure 4.1: Gender percentage breakdown**

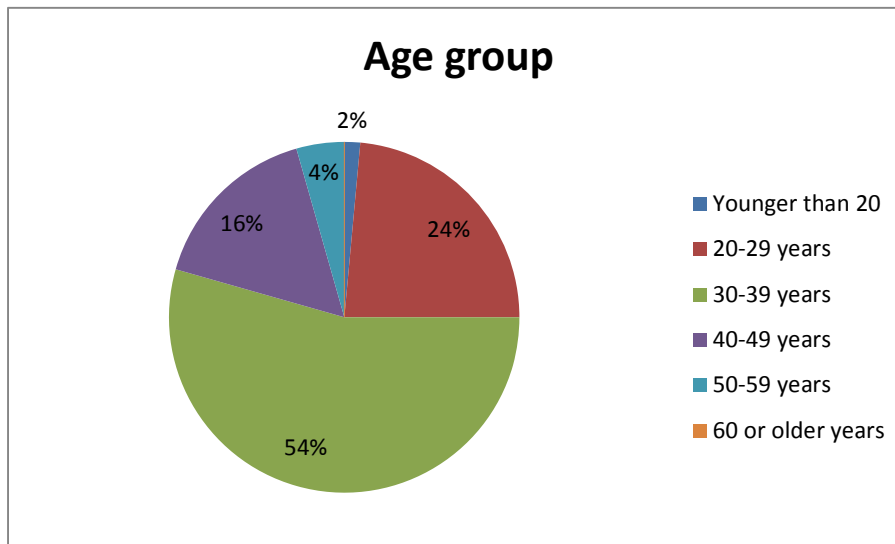


As reflected in Figure 4.1 above, there were more male than female respondents with 49 (72%) male and 19 (28%) female respondents. Respondents were asked to indicate the gender in order to understand the gender composition of the respondents.

### **2.12.3 Age group of respondents**

Respondents were requested to indicate their age group in one of the predetermined categories. The results of classified age grouping of respondents are presented in the Figure 4.2 below.

**Figure 4.2: Age group breakdown**

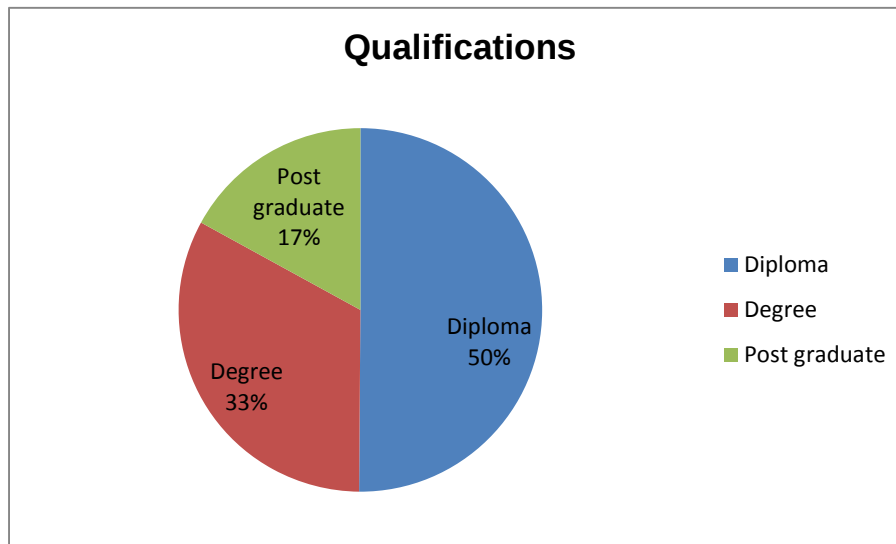


The highest percentage of respondents falls within the age group of 30 -39 years (54%) followed by the 20-29 years age group (24%). There were no respondents who were 60 years or older in this category.

#### **2.12.4 Qualifications of respondents**

Respondents were requested to indicate their highest level of academic qualifications. Three qualification levels were available for selection, namely: diploma, degree and post graduate. The qualifications results are presented in Figure 4.3 below.

**Figure 4.3: Qualification breakdown**

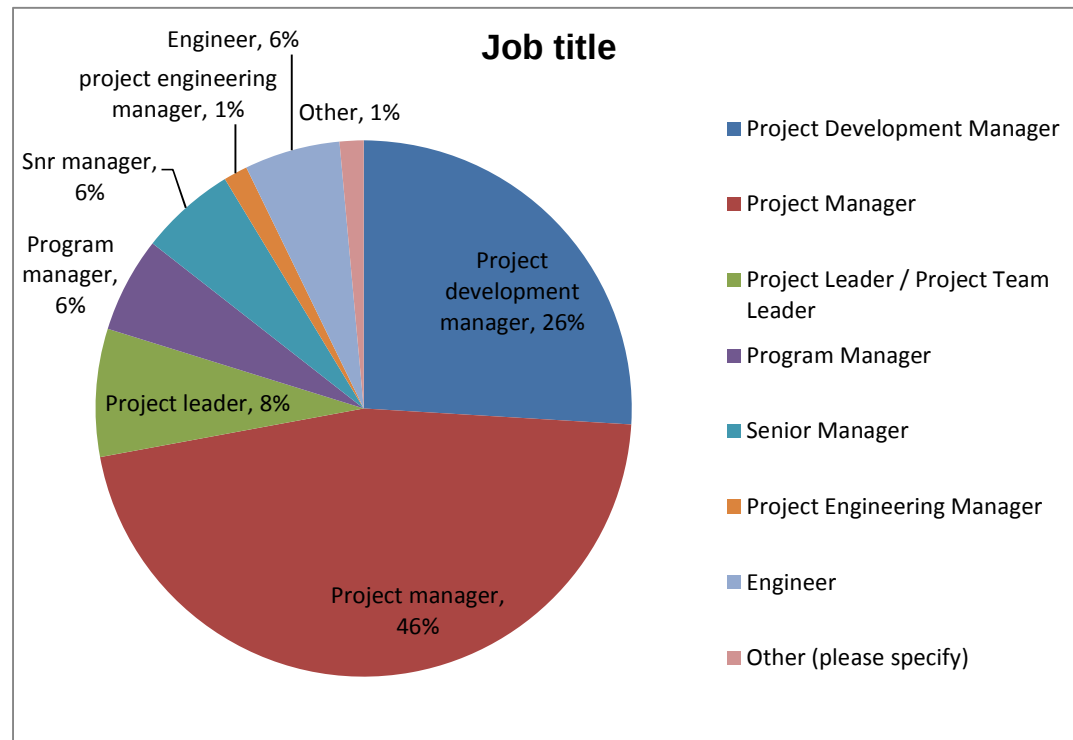


The majority of respondents indicated diplomas as their highest qualifications (50%) while 33% indicated degrees as their highest qualifications. A total of 17% of the respondents indicated that they have a post graduate qualification.

#### **2.12.5 Distribution of position/job title of the respondents (Question 2)**

The respondents were requested to indicate their job title within the GCD. Figure 4.4 below presents the breakdown of the job titles of the respondents.

**Figure 4.4: Job title analysis**

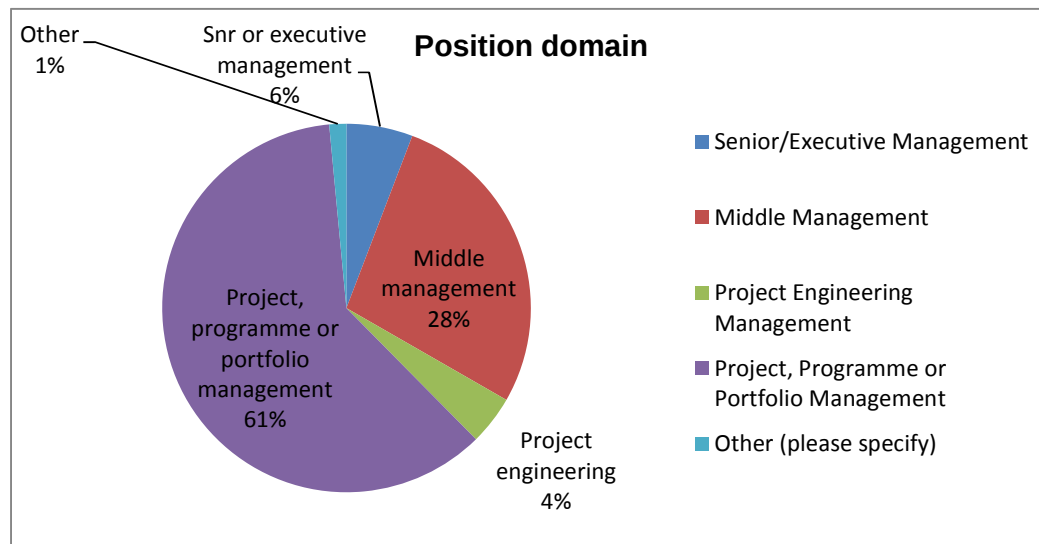


The majority of respondents occupy the position of project manager (46%) followed by those occupying the position of project development manager (26%).

#### **2.12.6 Distribution of position domain of the respondents (Question 3)**

The respondents were requested to indicate the domain of their position within the GCD. In figure 4.5 below the results are presented.

**Figure 4.5: Position domain analysis**



The highest number of respondents were from the project, programme or portfolio management environment (61%) followed by middle management (28%).

#### **2.12.7 Times participated on project prioritisation process (Question 4)**

Respondents were requested to indicate the number of times that they have participated in the prioritisation process of capital projects. The mean from 69 observations was 2.01 which indicate that the average time a person participated in the prioritisation process is an average of two (2) times during the 24 months period under investigation.

#### **4.6 RELIABILITY OF THE QUESTIONNAIRE**

Cronbach Alpha coefficients were calculated to assess the internal consistency and reliability between the statements in each construct in the questionnaire. According to Struwig and Stead (2004:132), the Cronbach Alpha coefficient is based on the average correlation of variables within a test. The greater the value of the Cronbach Alpha coefficient, the higher the internal consistency and the more reliable the construct used in the study (Struwig & Stead, 2004:133).

Table 4.2 below indicates the Cronbach Alpha coefficients of the constructs measuring the elements of section II of the questionnaire which investigated the effectiveness of the prioritisation process.

**Table 4.2: Cronbach Alpha coefficients of the constructs**

| <b>N0</b> | <b>CONSTRUCT</b>                           | <b>Cronbach Alpha Coefficients</b> |
|-----------|--------------------------------------------|------------------------------------|
| 1         | The use of prioritisation process          | 0.95                               |
| 2         | Alignment with corporate strategies        | 0.91                               |
| 3         | Transparency of the prioritisation process | 0.69                               |
| 4         | Consistency of the prioritisation process  | 0.76                               |

The results shown in Table 4.2 above suggest that the research instrument used in the study to assess the four constructs is reliable and internally consistent. The values of the Cronbach Alpha Coefficients are very close to 0.7 and above thus supporting the argument to include these constructs in the research as suggested by Nunnally and Bernstein's (1994:265). In a case where the Cronbach Alpha Coefficient was low, the decision was made to analyse the items separately to ensure that the results of this study are reliable.

#### **4.7 SECTION II: THE EFFECTIVENESS OF THE PRIORITISATION PROCESS**

This section posed questions that were aimed at assessing the respondents' opinions regarding the effectiveness of the current prioritisation process at Eskom, given the current funding constraints. The following key constructs were included in the questionnaires:

- The use of the prioritisation process (Construct 1, Question 5.1 - 5.2);
- Alignment with corporate strategies (Construct 2, Question 7.1 – 7.7);
- Transparency of the prioritisation process ( Construct 3, Question 8.1 – 8.5), and
- Consistency of the prioritisation process (Construct 4, Question 9.1 – 9.5).

A four-point Likert scale ranging from strongly disagree (1), disagree (2), agree (3) and strongly agree (4) was used to allow respondents to make a selection on relevant statements or questions. The four constructs consisted of 20 statements the respondents had to consider.

The frequency distribution of each statement was calculated as well as the mean and standard deviation. The results of the calculations have been presented in table format as shown in Tables 4.3, 4.4, 4.5, 4.6 and 4.7 below.

#### 2.12.8 The use of the prioritisation process to select capital projects (Construct 1, Question 5)

The objective of this construct was to determine the perception of respondents regarding the use of the prioritisation process. Two questions were asked in this construct. Table 4.3 below indicates the results of construct 1.

**Table 4.3: Response to the use of the prioritisation process**

| 5   | The use of the prioritisation process              | Likert scale & frequency (%) |     |    |      | Mean | S    |
|-----|----------------------------------------------------|------------------------------|-----|----|------|------|------|
|     |                                                    | 1                            | 2   | 3  | 4    |      |      |
| 5.1 | Does the prioritisation process serve the purpose? | 1.45                         | 5.8 | 71 | 21.7 | 3.13 | 0.56 |
| 5.2 | Should the prioritisation process be continued?    | 1.45                         | 2.9 | 71 | 24   | 3.18 | 0.55 |

The results of the first element of the construct indicated that the respondents agree with the statement that the prioritisation process serve the purpose it was created for with a mean of  $\bar{x} = 3.13$ . Respondents tend to agree with the second statement that the prioritisation process should be continued as the results indicate with a mean of  $\bar{x} = 3.18$ .

Most of the respondents agree with the use of the prioritisation process with the combined group mean of  $\bar{x} = 3.15$  and a standard deviation of  $s = 0.55$ . The Kaiser's measure of sampling adequacy (MSA) for this construct is 0.5 indicating that the statistical analysis is the correct tool to analyse the questionnaire.

### 2.12.9 Knowledge of Eskom prioritisation process (Question 6)

This element deals with respondents' knowledge of the prioritisation process and respondents were asked to indicate how familiar they are with the prioritisation process. Table 4.4 below indicate the results of the respondents' knowledge of the prioritisation process.

**Table 4.4: Response to knowledge of prioritisation process**

| 6 | The knowledge of the prioritisation process | Likert scale & frequency (%) |    |    |    |
|---|---------------------------------------------|------------------------------|----|----|----|
|   |                                             | 1                            | 2  | 3  | 4  |
| 6 | Familiarity with the prioritisation process | 1                            | 25 | 58 | 16 |

The results of the familiarity of respondents with the prioritisation process indicate that most respondents selected the option of agree (58%) and strongly agree (16%), giving a total of 74% of respondents indicating that they are familiar with the prioritisation process. In contrast, 25% and 1% of respondents selected the option of disagree and strongly disagree, giving a total of 26% of respondents indicating that they were not familiar with the prioritisation process.

### 2.12.10 Alignment with corporate strategy (Construct 2, Question 7)

The objective of this construct was to investigate how the prioritisation process was aligned with the corporate strategy. The construct consisted of seven elements that deal with the alignment of the prioritisation process with the corporate strategy. Table 4.5 below indicate the results.

**Table 4.5: Responses to alignment with the corporate strategy**

| 7   | Alignment with corporate strategy                                       | Likert scale & frequency (%) |      |      |      | Mean | S    |
|-----|-------------------------------------------------------------------------|------------------------------|------|------|------|------|------|
|     |                                                                         | 1                            | 2    | 3    | 4    |      |      |
| 7.1 | The prioritisation process support the selection of capital projects.   | -                            | 23   | 62   | 15   | 2.91 | 0.61 |
| 7.2 | The prioritisation process support the allocation of limited resources. | 1.5                          | 20   | 64   | 14.5 | 2.91 | 0.63 |
| 7.3 | The prioritisation process is aligned with business strategies.         | 1.5                          | 27.5 | 58   | 13   | 2.82 | 0.66 |
| 7.4 | The prioritisation process is effective.                                | 1.4                          | 39   | 48   | 11.6 | 2.69 | 0.69 |
| 7.5 | The prioritisation process need some adjustment                         | 13                           | 33.3 | 33.3 | 20   | 2.39 | 0.95 |
| 7.6 | Capital project allocations are well managed.                           | -                            | 44   | 49   | 7    | 2.63 | 0.61 |
| 7.7 | Funding constraints are well managed.                                   | -                            | 41   | 49   | 10   | 2.69 | 0.64 |

The first two elements (7.1 and 7.2) both have the highest mean for this construct of  $\bar{x} = 2.91$ . The first element indicates that the prioritisation process is well defined to support the selection of capital projects. The second element reveals that the prioritisation process supports the allocation of limited resources needed to accomplish project goals and objectives. Element 7.5 has the lowest mean in this construct and deals with whether the prioritisation process needs some adjustment. The mean of  $\bar{x} = 2.39$  indicates that the respondents are neutral in this regard.

The results indicate that the majority of the respondents fairly agree with statement that the prioritisation process is aligned to corporate strategy and that the process is effective and support allocation of resources under financial constraints. The group mean of the construct for the alignment to corporate strategy analysis is ( $\bar{x} = 2.72$ ) and standard deviation ( $S=0.56$ ) which tend to suggest that respondents' opinion of the

prioritisation process is that it meets minimum requirements for aligning with corporate strategy. The MSA for this construct was 0.83.

#### 2.12.11 Transparency of prioritisation process (Construct 3, Question 8)

This construct deals with the transparency of the prioritisation process and consists of five elements. Table 4.6 below indicates the results for the transparency of the prioritisation process.

**Table 4.6: Response to transparency or prioritisation process**

| 8   | The transparency of the prioritisation process       | Likert scale & frequency (%) |      |      |      | Mean | S    |
|-----|------------------------------------------------------|------------------------------|------|------|------|------|------|
|     |                                                      | 1                            | 2    | 3    | 4    |      |      |
| 8.1 | Transparent with a focus on newly built projects     | 1.5                          | 27.5 | 32   | 39   | 3.08 | 0.85 |
| 8.2 | Transparent with a focus on maintenance              | -                            | 53.6 | 33.3 | 13   | 2.58 | 0.71 |
| 8.3 | Transparent with a focus on plant reliability        | -                            | 54   | 31   | 15   | 2.60 | 0.73 |
| 8.4 | Transparent with a focus on safety projects          | 1.4                          | 36.2 | 40.6 | 23.2 | 2.88 | 0.76 |
| 8.5 | Transparent with a focus on future capacity projects | 5.8                          | 49   | 40.6 | 4.4  | 2.43 | 0.67 |

The results indicate that the first element measuring transparency on new building projects has the highest mean of  $\bar{x} = 3.08$ . Element 8.5 measuring transparency with a focus on future capacity projects has the lowest mean of  $\bar{x} = 2.43$ . Transparency with a focus on maintenance was also rated fairly low with a mean of just above average of  $\bar{x} = 2.58$ .

Two elements in this construct had low Cronbach Alpha Coefficients of 0.38. Therefore these two elements were removed and discussed separately.

**Factor 1: Transparency with a focus on new built projects**

The respondents on this statement tend to strongly agree with the statement that the prioritisation process is transparent towards new building projects. This was evident by the high mean of  $\bar{x} = 3.08$  and standard deviation  $S=0.85$  compared to the mid-point mean of  $\bar{x} = 2.5$  for agreeing with the statement.

**Factor 2: Transparency with a focus on future capacity projects**

The respondents disagree that the prioritisation process tend to be transparent towards future capacity projects with a mean of  $\bar{x} = 2.43$  and standard deviation of  $S=0.67$ .

With these two elements deleted from the construct, the rest of the elements have a group mean of  $\bar{x} = 2.68$ . This indicates that the respondents are moderately agreeing that the prioritisation process is transparent.

**2.12.12 Consistency of prioritisation process (Construct 4, Question 9)**

This construct deals with the consistency of the prioritisation process and consists of five elements. Table 4.7 below indicates the results for the consistency of the prioritisation process.

**Table 4.7: Response to consistency of prioritisation process**

| 9   | The consistency of the prioritisation process       | Likert scale & frequency (%) |      |      |      | Mean | S    |
|-----|-----------------------------------------------------|------------------------------|------|------|------|------|------|
|     |                                                     | 1                            | 2    | 3    | 4    |      |      |
| 9.1 | Consistent with newly built projects                | -                            | 24.6 | 39.1 | 36.2 | 3.11 | 0.78 |
| 9.2 | Consistent with a focus on maintenance              | -                            | 62.3 | 31.8 | 5.8  | 2.44 | 0.61 |
| 9.3 | Consistent with a focus on plant reliability        | -                            | 51.5 | 36.8 | 11.8 | 2.60 | 0.69 |
| 9.4 | Consistent with a focus on safety projects          | -                            | 36.7 | 40.6 | 2.7  | 2.85 | 0.76 |
| 9.5 | Consistent with a focus on future capacity projects | 2.9                          | 52.2 | 40.6 | 4.4  | 2.46 | 0.63 |

The results indicate that element 9.1 that deals with the consistency on new built projects has the highest mean of  $\bar{x} = 3.11$ . Element 9.5 which refers to consistency with a focus on future capacity projects has the lowest mean of  $\bar{x} = 2.46$ . Consistency with a focus on maintenance was also rated low with a mean below average of  $\bar{x} = 2.44$ .

Two elements in this construct had low Cronbach Alpha Coefficients of 0.31. Therefore these two elements were removed and discussed separately.

#### **Factor 1: Consistency with a focus on new built projects**

The respondents on this item tend to agree with the statement that the prioritisation process is consistent towards the new built projects. This was evident by the mean of  $\bar{x} = 3.11$  and standard deviation of  $S=0.78$  as compared to the mid-point  $\bar{x} = 2.5$  for agreeing with the statement.

#### **Factor 2: Consistency with a focus on future capacity**

The results indicate that the respondents tend to disagree with the statement that the prioritisation process is consistent towards future capacity projects with a mean of  $\bar{x} = 2.46$  and standard deviation  $S=0.63$ .

With these two elements deleted, the group mean for the rest of the construct was  $\bar{x} = 2.62$ . This is an indication that the respondents moderately agree that the prioritisation process is consistent.

### **4.8 Section III: The challenges associated with the prioritisation process**

This section focuses on the challenges that are associated with the current prioritisation process and consist of three key areas, namely:

- Selecting the main challenge associated with the prioritisation process (Question 10);

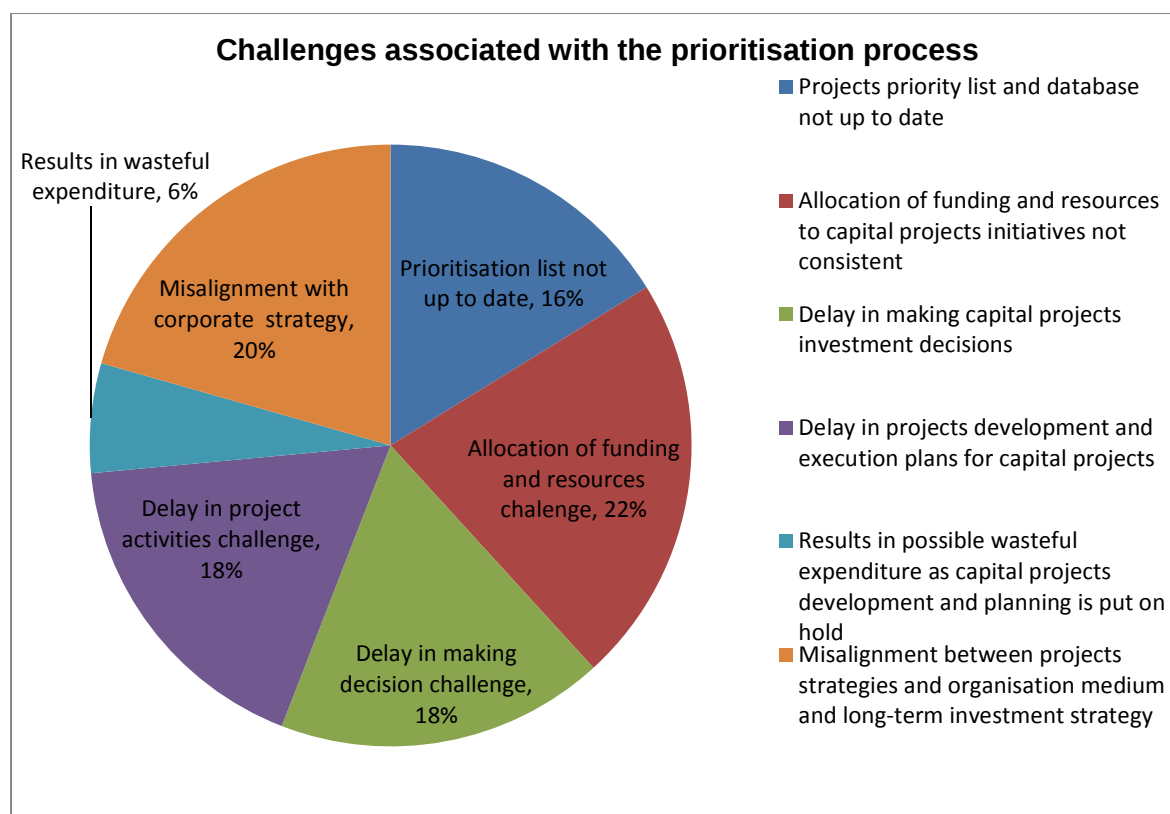
- Challenges associated with communicating the prioritisation results (Question 11), and
- Challenges associated with managing the prioritised projects (Question 12).

The above three items had a total of 15 statements which the respondents had to consider.

### 2.12.13 Main challenge of current prioritisation process (Question 10)

Respondents were requested to select one main challenge out of six challenges that were provided in the questionnaire. Figure 4.6 below indicates the percentage breakdown of challenges associated with the prioritisation process in graphical format.

**Figure 4.6: Breakdown of challenges associated with the prioritisation process**



The findings show that 22% of the respondents indicated that the main challenge associated with the prioritisation process is the allocation of funding and resources for capital projects. The second biggest challenge with 20% is the misalignment between project strategies and organisational investment strategies. This was followed by the next two challenges namely, the delay in making capital projects investment as well as

the delay in projects development and execution plans for capital projects with 18% respectively. The smallest challenge was identified as possible wasteful expenditure as capital projects development is put on hold with a total of 6%.

#### 2.12.14 Communication of prioritisation results (Question 11)

In this question that deals with challenges in the prioritisation process, communication was identified as an important factor to evaluate. Three questions dealing with communication challenges were asked. Table 4.8 below indicates the results.

**Table 4.8: Response to communication of prioritisation results**

| 11   | Communication of prioritisation results  | Likert scale & frequency (%) |      |      |     | Mean | S    |
|------|------------------------------------------|------------------------------|------|------|-----|------|------|
|      |                                          | 1                            | 2    | 3    | 4   |      |      |
| 11.1 | Results are well communicated            | 8.7                          | 36.5 | 32   | 3   | 2.28 | 0.66 |
| 11.2 | Familiar with the media of communication | 10                           | 77   | 11.6 | 1.4 | 2.04 | 0.52 |
| 11.3 | Challenges if not timeously communicated | 4.4                          | 40.6 | 42   | 13  | 2.63 | 0.76 |

Results for item 11.1 indicate that respondents tend to disagree with the statement that prioritisation results are well communicated with the mean of  $\bar{x} = 2.28$ . Item 11.2 deals with whether respondents were familiar with the media of communication used and has the lowest mean of  $\bar{x} = 2.04$ . Results for Item 11.3 indicate that respondents fairly agree that there are challenges if the prioritisation results are not timeously communicated to stakeholders with a mean of  $\bar{x} = 2.63$  which is above the mid-point of 2.5.

In summary most respondents disagree with the statement that results are well communicated, that they are familiar with the media used for communication and that

there are challenges associated with results not communicated on-time. This is evident with a group mean of  $\bar{x} = 2.32$  and standard deviation  $S=0.65$  that was calculated for items 11.1 to 11.3.

### 2.12.15 Managing prioritised projects (Question 12)

This question deals with how prioritised projects are managed and executed. Respondents were asked five questions that deal with the management of prioritised projects. Table 4.9 indicate the results of managing prioritised projects.

**Table 4.9: Response to managing prioritised projects**

| 12   | Managing prioritised projects                                     | Likert scale & frequency (%) |      |      |      |
|------|-------------------------------------------------------------------|------------------------------|------|------|------|
|      |                                                                   | 1                            | 2    | 3    | 4    |
| 12.1 | Teams have clear plans                                            | -                            | 34.8 | 56.5 | 8.7  |
| 12.2 | Projects completed within set timelines                           | 2.9                          | 46.4 | 40.6 | 10.1 |
| 12.3 | Funding and resources well allocated                              | -                            | 51.5 | 39.7 | 8.8  |
| 12.4 | Capital investment decision is risk informed                      | -                            | 42   | 47.8 | 10.2 |
| 12.5 | Project teams experience fewer challenges on prioritised projects | 2.9                          | 52.2 | 40.6 | 4.4  |

Item 12.1 indicates that 56.5% and 8.7% of respondents selected agree and strongly agree options of the statement that teams have clear plans when managing prioritised projects. Item 12.3 indicate that 51.5% of respondents disagree with the statement that funding and resources are well allocated for prioritised projects. Respondents also tend to disagree with the statement that teams experience fewer challenges on prioritised projects. 42% of respondents on item 12.4 indicated that capital investment decisions are risk informed.

The respondents tend to fairly agree that managing projects that have undergone a prioritisation process is less challenging as resources can be allocated and project management plans can be well developed. The majority of respondents have selected the option of agree and strongly agree as a preferred statements with more than 50%

combined average on items 12.1 to 12.5 agreeing to prioritisation process resulting in less challenges.

#### **4.9 INTERVIEWS**

The semi-structured interview was used in order to collaborate data emerging from conducting questionnaires. A semi-structured interview questionnaire was developed to guide the researcher during interviews and data collection for the study. Annexure 1 refers to a semi-structured interview questionnaire.

Four (4) personnel with specialist knowledge and skills regarding the project prioritisation process within GCD were identified to participate in the interview sessions. The interviews were conducted face-to-face and telephonically. The specialist included corporate GCD finance specialist Mr. L Badenhorst, project engineering specialist Mr. M Smit, capital efficiency specialist Miss L Kleiner and asset management specialist Mr. N Volk. The questions and responses that were asked during the interview process are discussed below:

##### **2.12.16 Are you familiar with Eskom corporate strategy?**

- The respondents indicated that they are familiar with Eskom corporate strategies which outline the organisational strategies and objectives for medium to long term and how to achieve these objectives.
- The strategy is revised annually to ensure that the organisation retains its competitive advantage in the power sector industry and that the organisation is able to respond to various challenges such as funding constraints.
- Respondents further indicated that projects strategies should follow a similar approach in terms of reviews to ensure that dynamics and challenges such as the funding constraints can be dealt with.
- Respondents indicated that there is an opportunity to improve the alignment between the corporate strategy and the projects strategies. The alignment will ensure that all prioritised projects support strategic objectives of the organisation.

**2.12.17 Which projects from your division were selected following Nersa MYPD 3 announcement in February 2013?**

- Respondents indicated that they are familiar with the current list of prioritised projects and that they did participate in the prioritisation process with an average of eight (8) times in a 24-month period. The prioritisation process was being conducted on a quarterly basis since the announcement made by Nersa regarding MYPD 3.

**2.12.18 How are projects prioritised? Could you describe the Eskom prioritisation process?**

- Respondents indicated that projects are prioritised based on the level of risk to supply electricity.
- Another criterion for prioritising projects was the consideration of projects that are linked to the new built programmes as these are projects that will increase generation capacity and assist with mitigation of risk of load shedding, once completed.
- Respondents indicated that the current prioritisation process require some minor adjustments to ensure that resources can be optimised and funding can be spent on the correct projects.

**2.12.19 What are the criteria for selecting and prioritising new projects and existing portfolio of projects?**

- Respondents agree that the security of electricity supply is the main criterion that is used to select and prioritised resources under the current funding constraints.
- In general financial feasibility and strategy alignment is also a key consideration when prioritising and selecting projects.

**2.12.20 Are there any constraints that hinder the performance of prioritised on-going projects that you are aware off? If yes, what are they?**

- Respondents indicated that the prioritisation process allows for resources to be correctly allocated and that project teams should have clear plans.

- Respondents indicated that a shortage of skills required to manage the execution of the prioritised projects does impact on the successful execution of prioritised projects.

**2.12.21 Who are the decision-making bodies at Eskom GCD for prioritizing selecting and projects?**

- Respondents indicated that prioritised projects are submitted to various internal and in some cases external governance for approval. Internally, prioritised projects are submitted for approval to investment committees that are mandated to make decisions on which projects should receive investment for further development and execution. External approval includes the government structures such as Nersa, Department of Energy, and the Department of Public Enterprises in terms of legislation and policies governing state owned enterprises.

**2.12.22 Have you ever cancelled any projects which were already prioritised, approved or started? What was the reason to cancel the projects?**

- Respondents indicated that there has been cancellation of already prioritised projects as a result of the on-going prioritisation process that takes place quarterly. The performances of the electrical system and the risk to security of the supply have necessitated the need to reprioritise in some cases. The cancellation of projects that were prioritised have negative impacts.

The main findings and discussions from the semi-structured interviews are summarised in Table 4.10 below.

**Table 4.10: Summary of interview results**

| Number | Discussion topic                      | Literature                                                                                                                                      | Interview response                                                                                                                                                                                             |
|--------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | Corporate strategy                    | <ul style="list-style-type: none"> <li>Corporate strategy is long term and documented</li> <li>Target of project selection framework</li> </ul> | <ul style="list-style-type: none"> <li>Corporate strategy is documented</li> <li>Medium to long term</li> <li>Revised annually</li> <li>Gap exist between project strategies and corporate strategy</li> </ul> |
| 2      | Prioritised project list              | <ul style="list-style-type: none"> <li>Communicated to key stakeholders</li> <li>Prioritisation process annually</li> </ul>                     | <ul style="list-style-type: none"> <li>Communicated to key stakeholders</li> <li>Prioritisation process quarterly</li> </ul>                                                                                   |
| 3      | Prioritisation and selection criteria | <ul style="list-style-type: none"> <li>Approved sets of prioritisation and selection criteria for each category of projects</li> </ul>          | <ul style="list-style-type: none"> <li>Risk to security of electricity supply</li> <li>Financial feasibility and return on investment</li> </ul>                                                               |
| 4      | Selection committee                   | <ul style="list-style-type: none"> <li>Delegated governance committees and key stakeholder</li> </ul>                                           | <ul style="list-style-type: none"> <li>Investment governance committee and external governance structures</li> </ul>                                                                                           |

#### 4.10 Summary

In order to evaluate the capital project prioritisation in a national electricity provider, a questionnaire was used as a main instrument to collect data and semi structured interviews were used as a secondary instrument to collect data. The questionnaire consisted of three sections, namely: Section I consisted of the respondents' biographical information, section II assessed the effectiveness of the capital project

prioritisation process under a funding constraint environment and section III consistent of the challenges associated with the prioritisation process.

The target population were the employees of the GCD under investigation. The study population consisted of 69 employees. The biographical information was analysed in terms of gender, age, qualification and position occupied in the organisation. All 69 questionnaires were analysed and reported upon.

Respondents tend to agree that the prioritisation process is fairly effective and that more needs to be done in order to improve the transparency and consistency when prioritising projects. The results indicated that projects that address the risks associated with security of supplying electricity were perceived to be of high priority as compared to projects that support other strategic objectives. The alignment of corporate strategy with project strategies was reported to be fairly positive as the average mean score of 2.72 was reported.

The main challenge of the prioritisation process was indicated that the allocation of funding and resources to capital projects initiatives is not consistent during the prioritisation process. The second challenge is misalignment between project strategies and organisational investment strategies followed by the delay in making capital projects investments as well as a delay in projects development and execution plans for capital projects with 18% respectively.

The internal consistency and reliability of the questionnaire was assessed by calculating Cronbach Alpha Coefficients. The results have indicated to have an acceptable internal consistency and reliability, since most of the constructs had Cronbach Alpha Coefficient greater than or very close to 0.7.

Targeted specialists were interviewed using a semi structured questions and data was collected to support the main research findings. The findings of data collected through the semi structured interviews tend to support the results of the questionnaire data analysis on the key element of alignment to corporate strategy, challenges associated with prioritisation process and communication of prioritisation results.

In the next chapter, conclusions drawn from this study are presented. Recommendations arising from the findings of the study are also presented in this next chapter.

## **CHAPTER 5: CONCLUSION AND RECOMMENDATION**

### **5.1. INTRODUCTION**

Project prioritisation and selection of capital projects evidently do contribute to the achievement of corporate strategies in organisations. It is important for organisations to have efficient processes and techniques that support the effective and efficient prioritisation processes of capital projects.

This final chapter on evaluating capital project prioritisation in a national electricity provider is aimed at discussing the outcome of the analysis and to draw conclusions from the findings of the empirical study and literature study as presented in Chapters 2 and 4. Furthermore, the achievement of the objectives of the study is also outlined in this chapter. The discussion focuses on the findings and analysis of qualitative and quantitative data as well as on the literature study conducted.

Based on the findings and conclusion of this study, recommendations have been generated and can be made available for consideration by the organisation where the investigation was conducted. Limitations of this study as well as the need for further research are also discussed in this chapter.

### **5.2. CONCLUSIONS**

The conclusions have been discussed and arranged according to the structure of the questionnaire and the analysis of the qualitative portion of the study. The biographical information is discussed first followed by those of the findings of section II and III respectively. The relationship between the qualitative and quantitative results is also discussed. From the results of the questionnaire and the semi structured interviews the following conclusions about this study are drawn:

#### **Section I: Biographical information**

- The target population identified and participated in this study consisted out of 72% males and 28% females. The results further indicate that the respondents are employed by GCD and participate in project management activities are professionals with qualifications such as diplomas, degrees and post graduate qualifications. Most

respondents who participated are assigned to perform project development and management roles.

- The study found that the respondents of the questionnaire participated an average of two times in a prioritisation process whereas the specialists' interviews were found to have participated an average of eight times on the prioritisation process.

## **Section 2: The effectiveness of the prioritisation process**

### **Means of constructs**

Table 5.1 below indicates mean and standard deviations for the key constructs identified in the study. Factor analysis was used to reduce several variables (elements) and are reported in the following table.

**Table 5.1: Means of constructs**

| <b>N0</b> | <b>Construct</b>                           | <b>Sample</b> | <b>Mean</b> | <b>Std deviation</b> | <b>Minimum</b> | <b>Maximum</b> |
|-----------|--------------------------------------------|---------------|-------------|----------------------|----------------|----------------|
| 1         | The use of prioritisation process          | 69            | 3.16        | 0.55                 | 1              | 4              |
| 2         | Alignment with corporate strategies        | 69            | 2.72        | 0.56                 | 1.85           | 4              |
| 3         | Transparency of the prioritisation process | 69            | 2.68        | 0.57                 | 2              | 4              |
| 4         | Consistency of the prioritisation process  | 69            | 2.62        | 0.56                 | 2              | 4              |

The midpoint of the scale is a mean of 2.5, the lower construct mean value indicate that respondents disagree with the construct whereas a higher mean value indicate that the respondents agree or strongly agree with the construct element.

### **The use of the prioritisation process**

- Table 5.1 indicates that most respondents tend to agree with the use of the prioritisation process as a means to prioritise and select capital projects with the construct mean of of  $\bar{x} = 3.16$  and standard deviation  $S=0.55$ . This also indicate that

they agree that the prioritisation process serves its purpose and that 95% is in favour that the current prioritisation process should continue.

- 58% of the respondents stated that they were familiar with the prioritisation process while 24% stated that they were not familiar with the prioritisation process.

### **Alignment with corporate strategies**

- The literature study conducted indicated that alignment of the prioritisation process to corporate plans is important for organisations to achieve their stated objectives.
- The findings show that there are some level of alignment between the current prioritisation process and the corporate strategy. About 66% of the respondents indicate that the process needs some adjustments. The results of the semi structured interviews suggest that the project prioritisation list is reviewed on a quarterly basis while the corporate strategy is reviewed annually which creates some level of misalignment.
- The Nersa announcement on Eskom MYPD 3 application has caused the organisation to relook at how it conduct the prioritisation process hence the prioritised list is reviewed quarterly. The adjustment necessitated the need to evaluate whether the current prioritisation process is effective and efficient under such conditions.

### **Transparency of the prioritisation process**

- The findings in this area indicate that the prioritisation process tends to be more transparent on the newly built projects with the mean,  $\bar{x} = 3.09$  and standard deviation  $S=0.85$ . The newly built projects such as Medupi power station are regarded as high priority projects in that they are linked to security of supply and increase in capacity of generation.
- The results further indicate that the prioritisation process is not transparent when it comes to maintenance-related projects and future capacity projects with mean,  $\bar{x} = 2.43$  and standard deviation  $S=0.67$ .

## **Consistency of the prioritisation process**

- The results in this area indicate that the prioritisation process tend to be consistent when it comes to the newly built projects with mean,  $\bar{x} = 3.09$  and standard deviation  $S=0.85$ . The newly built project such as Kusile power station are one of the high priority projects in that they are linked to secure the supply and increase in capacity of generation and as such require more resources in order to be completed.
- The results further indicate that the prioritisation process is not consistent when it comes to maintenance-related projects and future capacity projects with mean,  $\bar{x} = 2.46$  and standard deviation  $S=0.63$ .

The findings of this section indicate that the current prioritisation process at Eskom is effective as it is aligned to the company's corporate strategy. The process tends to focus more on projects that are related to secure the supply of electricity and has less focus on maintenance related projects.

## **Challenges associated with the prioritisation process**

The findings in this area indicate the main challenge with the project prioritisation process as being the allocation of funding and allocation of resources to capital projects initiatives. They further indicate that this brings about a lot of inconsistencies in the prioritisation process with 22% identifying this as the biggest challenge. The second challenge is the misalignment that exists between project strategies and organisational investment strategies followed by a delay in making capital project investments and delays in project development and execution plans for capital projects with 18% respectively. Results in possible wasteful expenditure as capital projects development is put on hold, is indicated as the least challenging with 6%.

About 45% of the respondents indicate that communication of the prioritisation process results are problematic. Another key challenge is that the prioritisation results are not timeously communicated to all relevant stakeholders more especially at the project team level. This was evident through the results where almost 50% of the respondents indicated that they were not familiar with the media used to communicate the results of the prioritisation process.

The findings of the data collected through the semi structured interviews tend to support the results of the questionnaire data analysis on the key elements of alignment with corporate strategy, challenges associated with the prioritisation process and communication of prioritisation results.

### **5.3. RECOMMENDATIONS**

In general, the study did not find any serious problems with the current application of the project prioritisation process at GCD as the division has mature structures, procedures, processes and resources to manage the prioritisation process. However, due to the fact that the announcement by Nersa regarding the MYPD 3 application has resulted in the need to apply tighter measures when selecting projects, certain changes and improvement to the current process are recommended to ensure that resources on capital projects are optimised and that investment funding can be channeled to the right project portfolios and programmes. The recommendations listed below are aligned to the conclusion remarks that were drawn above:

- It is evident that most of the respondents are familiar with the prioritisation process, however there were still 26% that indicated that they were not familiar with the prioritisation process. This impacted on the respondents' knowledge of the approved prioritised project list. An awareness workshop by GCD as the custodian of the prioritisation process could assist in this regard with making personnel in the division to be more aware of the impact caused by the Nersa announcement and understanding why the prioritisation process should be adapted to manage the impact.
- The alignment of the prioritisation process with the corporate strategy requires some improvement in that the organisation should consider other key considerations for project selection on and above the security of supply risk and financial methods. Other considerations can include techniques used for prioritisation and investments strategies for capital projects.
- The current prioritisation process is more focused on newly built projects and this may create a bigger problem in the long run due to other projects being delayed or postponed. GCD should consider the long-term impact of delaying investment or implementation of projects in order to minimise long-term impact. The matrix techniques scoring method can be revised to take into account the long-term

impact of delaying capital projects. By adjusting the matrix scoring template, the prioritisation process will be fully transparent and consistent in all capital projects.

- It is recommended that the GCD prioritisation process should consider maintenance and categorise it as a high priority.
- The findings indicated that the allocation of funding and resources is the main challenge caused by the current inconsistent application of the prioritisation process. It is therefore important that the prioritisation process is applied in a consistent manner to avoid delays in making investment decisions, misallocation of funds and ensuring that the prioritised project list is up to date. These challenges can be avoided by ensuring that the GCD leading the prioritisation process is consistent and transparent when prioritising projects.
- It is also evident that communication is a challenge within the company as respondents indicated that they are not familiar with the prioritised project list nor is the media used to communicate prioritised results. This challenge can be managed by having quarterly updates sessions where the latest prioritised list of projects can be shared with all involved stakeholders. Using an existing information system database such as share point to share the prioritised list can also assist with managing challenges associated with poor communications of prioritised results.

#### **5.4. LIMITATIONS AND AREAS FOR FURTHER RESEARCH**

The results of this research study are limited by the fact that the focus was only evaluating capital projects prioritisation process as applying to the national electricity provider. This limitation is an area identified for further research. This research study can therefore be expanded to include independent power producers (IPP) as additional organisations. Furthermore, based on the limitations, conclusions and recommendations of this study, the following future research areas are suggested:

- Compare the application of capital project prioritisation process between IPPs and the national electricity provider, and
- The study focused on the existing prioritisation process, further research can focus on an alternative capital projects prioritisation model for the national electricity provider.

## REFERENCE LIST

Archer, N.P. & Ghasemzadeh, F. 1999. An integrated framework for project portfolio selection. *International Journal of Project Management*, 17(4):207-216.

Bonacorsi, S. 2011. Prioritization matrix.

[http://www.academia.edu/419992/Prioritization\\_Matrix](http://www.academia.edu/419992/Prioritization_Matrix) Date of access: 17 July 2015

Cao Le, M. & Nguyen, V.T. 2007. Strategy for project portfolio selection in private corporations in Vietnam.

[https://scholar.google.com/scholar?cluster=366705056655147173&hl=en&as\\_sdt=0,5&sciodt=0,5](https://scholar.google.com/scholar?cluster=366705056655147173&hl=en&as_sdt=0,5&sciodt=0,5) Date of access: 11 August 2015

Cohen, J. 1988. Statistical power analysis for the behavioural sciences. 2<sup>nd</sup> ed. Hillsdale, NJ: Erlbaum.

Cooper, R.G. 2005. Portfolio Management for Product Innovation. In Levine, H.A. eds. 2005. *Project Portfolio Management: A Practical Guide to Selecting Projects, Managing Portfolios and Maximizing Benefit*, pp.318-354. New York, NY: Pfeiffer Wiley.

Cooper, R.G., Edgett, S.J. & Kleinschmidt, E.J. 2000. New problems, new solutions: Making portfolio management more effective. *Research Technology Management*, 43(2):18-33.

Cooper, R. G., Edgett, S. J. & Kleinschmidt, E. J. 2001a. Portfolio management for new products. 2<sup>nd</sup> ed.. Reading, MA: Perseus.

Cooper, R.G., Edgett, S.J. & Kleinschmidt, E.J. 2001b. Portfolio management in new product development: Results of an industry practices study. *R & D Management*, 31(4):361-381.

De Vos, A.S., Strydom, H., Fouche, C.B. & Delport, C.S.L. 2011. Research at grass roots. 4<sup>th</sup> ed. Pretoria: Van Schaik.

Du Plooy-Cilliers, F., Bezuidenhout, R. & Davis, C. 2014. Research matters. Pretoria: Juta.

Dutra, C.C., Ribeiro, J.L. & De Carvalho, M.M. 2014. An economic–probabilistic model for project selection and prioritisation. *International Journal of Project Management*, 32:1042-1055.

EPRI. 2006. Pilot application of enterprise project prioritisation process at Nebraska Public Power District.

<http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000000001019205> Date of access: 26 Jul. 2015.

Eskom. 2015a. Eskom Intranet.

[http://www.eskom.co.za/CustomerCare/MYPD3/Pages/Nersas\\_Determination.aspx](http://www.eskom.co.za/CustomerCare/MYPD3/Pages/Nersas_Determination.aspx)

Date of access: 18 Jan. 2015.

Eskom. 2014. Eskom Intranet. <http://intranet.eskom.co.za/sites/gcd/Pages/default.aspx>

Date of access: 05 Jan. 2015.

Eskom. 2015b. Eskom Intranet.

<http://intranet.eskom.co.za/sites/gcd/Pages/default.aspx> Date of access: 05 Jan. 2015.

Frame, J.D. 1994. Selecting projects that will lead to success. Selecting and Prioritizing Projects for Competitive Advantage. New York: Jossey-Bass publishers. In: Dye, L. D. & Pennypacker, J. S. eds. 1999. *Project Portfolio Management: Selecting and Prioritizing Projects for Competitive Advantage*, pp.169-181, West Chester, PA: Center for Business Practices

Gosenheimer, C. 2012. Project prioritisation. <http://www.quality.wisc.edu/> Date of access: 28 Sep. 2015.

Hair, J.R., Anderson, R.E., Tatham, R.L. & Black, W.C. 1998. Multivariate data analysis. 7<sup>th</sup> ed. New York, NY: Prentice Hall.

Lee Willis, H. & Philipson, L. 2006. Understanding electric utilities and de-regulation. 2<sup>nd</sup> ed. New York, NY: Taylor & Francis.

Lefley, F. 2000. The FAP Model of Investment Appraisal. *Management Accounting*, 78(3):28-31.

Lefley, F. & Sarkis, J. 2007. The Financial Appraisal Profile (FAP) Model for evaluation of enterprise-wide information technology. Hershey, PA: IGI.

Levine, H.A. 2005. Project portfolio management: A practical guide to selecting projects, managing portfolios and maximizing benefit. Hoboken, NJ: Jossey-Bass.

Maree, K. 2010. First steps in Research. Pretoria: Van Schaik.

Moisiadis, F. 2002. The fundamentals of prioritising requirements.

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.92.4036&rep=rep1&type=pdf>

Date of access: 15 Jul. 2015.

Nersa, 2013.

<http://www.nersa.org.za/Admin/Document/Editor/file/News%20and%20Publications/Media%20Releases%20Statements/Media%20statement%20on%20Eskom%27s%20application%20for%20the%20Third%20Multi%20Year%20Price%20Determination.pdf> Date of

access: 15 Apr. 2015.

PMI. 2004. A Guide to the Project Management Body of Knowledge (PMBOK Guide), 3rd ed. Newton Square, PA: Author.

PMI. 2006. Standard for Portfolio Management. Newton Square, PA: Author.

PWC. 2014. Capital project and infrastructure in East Africa, West Africa and Southern Africa. <http://www.pwc.co.za/97BEC299-07A6-4158-A4A6-B80F300C75FE/FinalDownload/DownloadIdA2D78D3680D67B52D873F1816AC7C1AF/97BEC299-07A6-4158-A4A6-B80F300C75FE/en/assets/pdf/capital-projects-and-infrastructure.pdf> Date of access: 16 Jul. 2015.

Riahi-Belkaoui, A. 2001. Accounting theory: Business press.

<https://books.google.com/books?isbn=1291098917> Date of access: 15 August 2015

Sommer, R. J. 1999. Portfolio management for projects: Project portfolio management. West Chester, PA: Centre for Business Practices.

South Africa. Department of Economic Development. 2014. PICC.

<http://www.economic.gov.za/picc> Date of access: 12 Jul. 2015.

Struwig, F.W. & Stead, G.B. 2004. Planning, designing and reporting research. Cape Town: Oxford.

Tabachnick, B.G., & Fidell, L.S. 2001. Using multivariate statistics. 4<sup>th</sup> ed. Boston, MA: Allyn & Bacon.

- Taylor, J. 2006. A survival guide for project manager. 2<sup>nd</sup> ed. Broadway, NY: AMACOM.
- Thomas, A.B. 2004. Research skills for management studies. 3<sup>rd</sup> ed. Toronto: Routledge.
- Turner, J.. R. 2009. The handbook of project-based management: leading strategic change in organisations. 3<sup>rd</sup> ed. London: McGraw-Hill.
- Ullman, D.G. 2006. Making robust decisions: decision management  
<http://www.davidullman.com/images/DecisionPDFs/PLMDecisions.pdf> Date of access: 14 Aug. 2015.
- Van Der Merwe, A.P. 1995. Prioritizing multi projects. London: Brunel University. (Dissertation - MBA).
- Vosloo, J.J. 2014. Chapter 5: Research design and methodology.  
[http://dspace.nwu.ac.za/bitstream/handle/10394/12269/Vosloo\\_JJ\\_Chapter\\_5.pdf?sequence=6](http://dspace.nwu.ac.za/bitstream/handle/10394/12269/Vosloo_JJ_Chapter_5.pdf?sequence=6) Date of access: 27 June 2015.
- Vosloo, J.J. 2014. A sport management programme for educator training in accordance with the diverse needs of South African Schools. Potchefstroom: North-West University. (Thesis - PHD).
- Welman, C. & Kruger, F. 1999. Research methodology for the business and administrative science. Cape Town: Oxford University.
- Welman, C., Kruger, F. & Mitchell, B. 2011. Research methodology 3<sup>rd</sup> ed. Cape Town: Oxford University.
- Yin, R.K. 2003. Case study research: design and methods. 3rd ed. London: Sage.

## **ANNEXURES**

### **Annexure 1: semi structured interview questionnaire**

1. Are you familiar with Eskom corporate strategy?
2. Which projects from your division were selected following Nersa MYPD 3 announcement in February 2013?
3. How are projects prioritised? Could you describe the Eskom prioritisation process?
4. What are the criteria for selecting and prioritising new projects and existing portfolio of projects?
5. Are there any constraints that hinder the performance of prioritised on-going projects that you are aware of? If yes, what are they?
6. Who are the decisions making bodies at Eskom GCD for prioritizing selecting and projects?
7. Have you ever cancelled any projects which were already prioritised, approved or started? What was the reason to cancel the projects?

## ANNEXURE 2: EVALUATION OF CAPITAL PROJECT PRIORITISATION PROCESS QUESTIONNAIRE

### SECTION I: BIOGRAPHICAL AND GENERAL INFORMATION

**1. BIOGRAPHICAL** (Please indicate by making an **X** in the relevant column).

|                              |   |                 |   |             |   |               |   |
|------------------------------|---|-----------------|---|-------------|---|---------------|---|
| <b>Gender</b>                |   |                 |   | Male        | 1 | Female        | 2 |
| <b>Age Group</b>             |   | Younger than 20 | 1 | 20 – 29     | 2 | 30 – 39       | 3 |
| 40 – 49                      | 4 | 50 – 59         | 5 | 60 or older | 6 |               |   |
| <b>Highest Qualification</b> |   | Diploma         | 1 | Degree      | 2 | Post Graduate | 3 |

**2. POSITION / ROLE / JOB TITLE** (Please mark only one)

|                                      |    |
|--------------------------------------|----|
| Project Development Manager          | 1  |
| Project Coordinator/Administrator    | 2  |
| Project Manager                      | 3  |
| Project Leader / Project Team Leader | 4  |
| Program Manager                      | 5  |
| Portfolio Manager                    | 6  |
| Senior Manager                       | 7  |
| Project Engineering Manager          | 8  |
| Engineer                             | 9  |
| Consultant                           | 10 |
| Other (please specify)               | 11 |

**3. IN WHICH DOMAIN IS YOUR POSITION?** (Please mark only one)

|                                            |   |
|--------------------------------------------|---|
| Senior/Executive Management                | 1 |
| Middle Management                          | 2 |
| Project Engineering Management             | 3 |
| Commercial Management                      | 4 |
| Project, Programme or Portfolio Management | 5 |
| Business Development                       | 6 |
| Consulting                                 | 7 |
| Training                                   | 8 |
| Other (please specify)                     | 9 |

**4. HOW MANY TIMES HAVE YOU PARTICIPATED ON CAPITAL PROJECTS PRIORITISATION IN THE PAST 24 MONTHS FOLLOWING MYPD3 NERSA ANNOUNCEMENT?** (Please indicate by writing the number in the column below)

|                 |  |
|-----------------|--|
| Number of times |  |
|-----------------|--|

## SECTION II: THE EFFECTIVENESS OF THE CAPITAL PROJECT PRIORITISATION PROCESS UNDER CURRENT FUNDING COSNTRAINTS.

Please rate following questions as follows:

|   |                   |
|---|-------------------|
| 1 | Strongly disagree |
| 2 | Disagree          |
| 3 | Agree             |
| 4 | Strongly agree    |

### 5. THE USE OF PRIORITISATION PROCESS TO SELECT CAPITAL PROJECTS

|     |                                                                                               | Strongly disagree          | Disagree                   | Agree                      | Strongly agree             |
|-----|-----------------------------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|     |                                                                                               | [1]                        | [2]                        | [3]                        | [4]                        |
| 5.1 | Does the project prioritisation system serve the purpose it was created for?                  | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 5.2 | Should the prioritisation system continue to be utilised for capital projects prioritisation? | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |

### 6. WHAT IS YOUR KNOWLEDGE OF ESKOM PROJECT PRIORITISATION PROCESS? (Please indicate by making an X in the relevant column)

|                                                                                                                                        | Strongly disagree          | Disagree                   | Agree                      | Strongly agree             |
|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|                                                                                                                                        | [1]                        | [2]                        | [3]                        | [4]                        |
| I am familiar with the Eskom prioritisation process and the applicable Process Control Manual (PCM) for project prioritisation process | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |

**7. ALIGNMENT WITH CORPORATE STRATEGY: HOW EFFECTIVE IS THE PRIORITISATION PROCESS TO ENSURE ORGANISATION RESOURCES ARE SPENT IN PROJECTS THAT SUPPORT CORPORATE PLANS.** (Please indicate by making an **X** in the relevant column)

|     |                                                                                                                        | <b>Strongly disagree</b>   | <b>Disagree</b>            | <b>Agree</b>               | <b>Strongly agree</b>      |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|     |                                                                                                                        | [1]                        | [2]                        | [3]                        | [4]                        |
| 7.1 | The prioritisation process is well defined to support selection of capital projects.                                   | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 7.2 | The prioritisation process support allocation of limited resources needed to accomplish projects goals and objectives. | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 7.3 | The prioritisation process is aligned to Eskom business strategies and organisational goals                            | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 7.4 | The prioritisation process is effective to support Eskom business strategies                                           | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 7.5 | The prioritisation process need some adjustment in order to be efficient under current funding constraints             | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 7.6 | Capital project allocation are well managed through the use of prioritisation process                                  | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |

|     |                                                                                |                            |                            |                            |                            |
|-----|--------------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| 7.7 | Funding constraints are well managed through the use of prioritisation process | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
|-----|--------------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|

**8. ACCORDING TO YOU, IS THE PRIORITISATION PROCESS TRANSPARENT IN ALL CAPITAL PROJECTS?** (Please indicate by making an X in the relevant column)

|     |                                                                                                    | Strongly disagree          | Disagree                   | Agree                      | Strongly agree             |
|-----|----------------------------------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|     |                                                                                                    | [1]                        | [2]                        | [3]                        | [4]                        |
| 8.1 | With a focus on newly built projects e.g. Medupi, Kusile and Ingula.                               | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 8.2 | With a focus on maintenance projects for generation plants                                         | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 8.3 | With a focus on plant reliability and security of supply projects                                  | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 8.4 | With more focus on safety, health, environment and quality (SHEQ ) projects                        | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 8.5 | With a focus on future capacity expansion projects e.g. gas, renewables, nuclear and coal projects | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |

**9. ACCORDING TO YOU, IS THE PRIORITISATION PROCESS CONSISTENT TO ALL CAPITAL PROJECTS?** (Please indicate by making an X in the relevant column)

|     |                                                                                     | <b>Strongly disagree</b>   | <b>Disagree</b>            | <b>Agree</b>               | <b>Strongly agree</b>      |
|-----|-------------------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|     |                                                                                     | [1]                        | [2]                        | [3]                        | [4]                        |
| 9.1 | With a focus on newly built projects e.g. Medupi and Kusile                         | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 9.2 | With a focus on maintenance projects for generation plants                          | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 9.3 | With a focus on plant reliability and security of supply projects                   | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 9.4 | With more focus on safety, health, environment and quality (SHEQ ) projects         | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 9.5 | With a focus on future capacity expansion projects e.g. gas, renewables and nuclear | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |

### Section III: CHALLENGES ASSOCIATED WITH THE CURRENT PRIORITISATION PROCESS

#### 10. WHAT IS THE MAIN CHALLENGE OF CURRENT ESKOM CAPITAL PROJECT PRIORITISATION PROCESS? (Please mark only one challenge)

|                                                                                                      |   |
|------------------------------------------------------------------------------------------------------|---|
| Projects priority list and database not up to date                                                   | 1 |
| Allocation of funding and resources to capital projects initiatives not consistent                   | 2 |
| Delay in making capital projects investment decisions                                                | 3 |
| Delay in projects development and execution plans for capital projects                               | 4 |
| Results in possible wasteful expenditure as capital projects development and planning is put on hold | 5 |
| Misalignment between projects strategies and organisation medium and long-term investment strategy   | 6 |

#### 11. ACCORDING TO YOU, HOW WELL IS THE COMMUNICATION OF PROJECT PRIORITISATION RESULTS?

|      |                                                                         | Strongly disagree          | Disagree                   | Agree                      | Strongly agree             |
|------|-------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|      |                                                                         | [1]                        | [2]                        | [3]                        | [4]                        |
| 11.1 | Project prioritisation results are well communicated to me              | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 11.2 | I am familiar with the media used to communicate prioritisation results | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 11.3 | Challenges are experienced if prioritisation results are not            | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |

|  |                         |  |  |  |  |
|--|-------------------------|--|--|--|--|
|  | communicated timeously. |  |  |  |  |
|--|-------------------------|--|--|--|--|

**12. MANAGING PRIORITISED PROJECTS:** To what extent does the prioritised project list get executed? Please rate following questions as follows:

|      |                                                                                                                 | <b>Strongly disagree</b>   | <b>Disagree</b>            | <b>Agree</b>               | <b>Strongly agree</b>      |
|------|-----------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|      |                                                                                                                 | [1]                        | [2]                        | [3]                        | [4]                        |
| 12.1 | According to you, teams have clear plans and execution strategies for projects that are prioritised.            | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 12.2 | Projects that are prioritised are executed and completed within set timelines and budget                        | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 12.3 | Funding and resources are well allocated for projects that are prioritised.                                     | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 12.4 | Capital investment decision-making is risk-informed and supported by thorough analysis on prioritised projects. | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 12.5 | Projects teams experience fewer challenges when they manage prioritised projects.                               | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |