Assessment of Project Management practice in Repi Waste-to-Energy Plant Construction Project

A Thesis Submitted to the School of Graduate Studies of Jimma University in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Arts in Project Management and Finance

By: Haile Getachew

Under the Supervision of

Matewos Kebede (Ph.D)
And
Sintayew Tulu

JIMMA UNIVERSITY

FACULTY OF BUSINESS AND ECONOMICS

DEPARTMENT OF ACCOUNTING AND FINANCE

GRADUATE PROGRAM IN PROJECT MANAGEMENT & FINANCE

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Ethiopia

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DECLARATION OF CANDIDATE

I hereby declare that this thesis report entitled **"Assessment of Project Management Practices in Repi Waste to Energy Plant Construction Project" submitted** to Research and Postgraduate Studies' Office of Business and Economics College of Jimma University is my original work and it has not been submitted previously in part or full to any university. All materials and works of others used in the research are properly cited and dully acknowledged.

Name: **Haile Getachew**

Signature: 

Date: 29/06/20

CERTIFICATE

This is to certify that the thesis entitled "**Assessment of Project Management Practices in Repi Waste to Energy Plant Construction Project"** submitted to Jimma University for the award of the Degree of Master in Project Management and Finance (MPMF) and is a record of bonafide research work carried out by Mr. Haile Getachew, under our guidance and supervision.

Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.

Matewos Kebede (PhD)

Signature_____

Date_____

(Main Advisor)

Mr. Sintayew Tulu

Signature_____

Date_____

(Co-Advisor)

Acknowledgment

First of all, I would like to place my special and honorable regards to my Advisor: Matewos Kebede (Ph.D) and Co-Advisor: Mr. Sintayew Tulu, for their unlimited assistance. Next My deep and sincere gratitude to my family for their continuous and unparalleled love, help and support. I am grateful to my sister for always being there for me.

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Acronyms / Abbreviations

CIL	Cambridge Industrial Ltd
CNEEC	China National Electric Engineering Co
EEPCO	Ethiopian Electric Power Company
IPCC	The international panel on climate change
LSE	London School of Economics
MW	Mega Watt
PMMEP	Project Monitoring & Evaluation Process
USD	United States Dollar
WtE	Waste to Energy
GWHr	Giga Watt-Hour

Abstract

The main objective of this research was to assess the application of project management practices based on PMBOK in Repi Waste to energy plant construction project. The study used both primary and secondary data. A self-administered close-ended questionnaire was used to gather data from 40 respondents. Purposive sampling technique was employed in selecting the samples. Furthermore, published and unpublished progress reports, contract documents, letters exchanged between parties involved in the project, financial reports, minutes of meetings have been used as secondary data. A descriptive research method with a combination of quantitative and qualitative designs approach was used to assess project management practices. The results of the study indicated lack of effective application of project management knowledge areas. Further, the project had faced both internal and external challenges. The extended delay in time, defects in quality, failure in power generate capacity, and over budget were results of poor project management practices that cause the increase of project cost by more than 27 million dollars despite in decrease of 50 percent power generating capacity to 25 MW and delay for more than two years. The project management team was inattentive to overcome the internal and external challenges of the project by setting specific direction in order to clarify the scope of the project and making plans to take into account what is likely to happen in advance related to time, cost, and quality management. Because it does not meet the performance requirement, cost, time, or scope targets, Repi Waste to Energy plant project is an example of a failure due to poor project management practices. The study asserts that lack of effective application of project management knowledge areas proved to be the cause of failure to the project. The findings show that the performance of project management practices in similar projects can improve by utilizing modern project management technologies and by providing sustainable training for project team to develop knowledge driven decision skills. Conducting further study in similar government projects would be recommended to propose a modified and transformative approach in project implementation mechanisms and practicalities of knowledge areas based on results or effects to satisfy the needs of the nation.

Keywords: Project management, Waste to Energy, Knowledge Areas, Project, Management practices, Power Generating, Repi, Addis Ababa, Ethiopia

CHAPTER ONE

INTRODUCTION

Background of the Study

As a nation striving forward to become the power hub of Africa, Ethiopia has launched several electric power generating projects including the Great Ethiopian Renaissance Dam soon to be the largest hydroelectric dam in the continent with a power generating capacity of 6450 MW. To diversify the sources for power generation, the government has launched several projects including Repi waste to energy plant with a generating capacity of initially planned 50 MW. According to Shi Yinglun (2015), by utilizing its vast untapped resources like hydro, wind, geothermal, solar and biomass energy sources, the Ethiopian government is working to increase the electric generation capacity of the nation from the current 4,300 MW to 17,300 MW by the end of 2020.

Aside from power generation, several small scale and mega infrastructure projects are underway and some of them are completed throughout the country. Implementing project management processes and techniques has become highly in demand to ensure success in delivering these projects (Itegi FM, 2015; Pitagorsky, 2020; Richardson, 2010). Regardless of vigorous attempts to increase awareness and application of project management techniques by organizations, most of the nation's small scale and mega projects are going through difficulties like an overabundance of budget, nonperformance in coordination between schedule and execution.

Wideman's (2002) explains as Cited by Tigest (2017), one can say a project is successful when the deliverables of the project have been attained as per requirements of the users, all closeout tasks have been achieved and all pronounced portion, incorporating the project's sponsor /or initiator, formally accepts the projects output or products and closes the project.

For projects like Repi waste to energy, which is unique in operation and function, project management processes and techniques should be carried out wisely in order to guarantee its

success. The application of project management should also be capitalized in any firm or organization to cope up with drawbacks and challenges in delivering projects successfully.

It is common to see projects failing to achieve their deliverables within the specified cost and time. According to House of Representatives[1], mismanagement of government and public resources were a common phenomenon in most of the projects administered by the government and almost none of the projects were completed on schedule and within the allocated budget. The degree and magnitude of occurrence in delay and over budget are greatly different depending on the nature of the project. In order to avoid occurrences of a similar phenomenon, conducting a study is obligatory to identify and describe the exact nature of the root causes.

Hence, the purpose of undertaking this research is to assess, understand, and explain the practices and application of universal principles related to the process of project management at Repi Waste to energy construction project. The assessment is conducted by evaluating the proper application of project management practices and how much of the components of the project management body of knowledge areas such as project scope management, project time management, project cost management, project quality management, project risk management, project integration management, project human resource management, project communication management, project procurement management, and project stakeholder management; were implemented effectively in the project. The findings of this study will also help to uncover critical areas that should be emphasized by managers to improve performance of project management techniques implemented from early inception stage of Repi Waste to Energy plant construction project. Thus, managers that apply the recommended approach derived from the result of this study will be able to attain deliverables of the project within planned budget, schedule and desired quality.

1.2 Background of the Project

Repi Waste-to-energy plant construction project, one of the nation's ambitious electric power generating projects, officially launched in September 2014 to generate 50 MW of electricity from

[1] House of Peoples representatives, annual Report on Performance assessment of Irrigation and Energy Minister March 19, 2019

the 420,000 tons of waste collected and dumped to open dumpsite from the city's households and industries annually. The project is commenced with an estimated investment of 95,880,000 USD.

Development, Design, and Construction of the project is conducted by a Consortium comprising Cambridge Industries Ltd (CIL) and its partner China National Electric Engineering Co (CNEEC), on behalf of the Employer, Ethiopian Electric Power Company (EEP). EEP is being advised by its Owners Engineer, Ramboll of Denmark (Cambridge Industrial Ltd, 2015).

Fig 1.1 General project Profile

General Project Profile	
Owner	**Ethiopian Electric Power (EEP)** *(www.eep.gov.et)*
	Waste Disposal Partner Municipality: **Addis Ababa City Administration (AACA)**
Owner's Engineer	**Ramboll Group** *(www.ramboll.com)*
Total Investment	USD 95,880,000 + ETB 434,530,557
Commencement Date	**September 24, 2014**
EPC Contractor	Consortium of: **China National Electric Engineering Co. Ltd.** (CNEEC) and **Cambridge Industries Ltd** (CIL)
Scope of EPC Contractor	Turnkey Engineering, Procurement and Construction
Lead Design Firm	China Urban Construction Design and Research Institute Co, LTD.
Project Development	Part of development program for 7 African city WtE Facilities

Source Cambridge Industrial Ltd

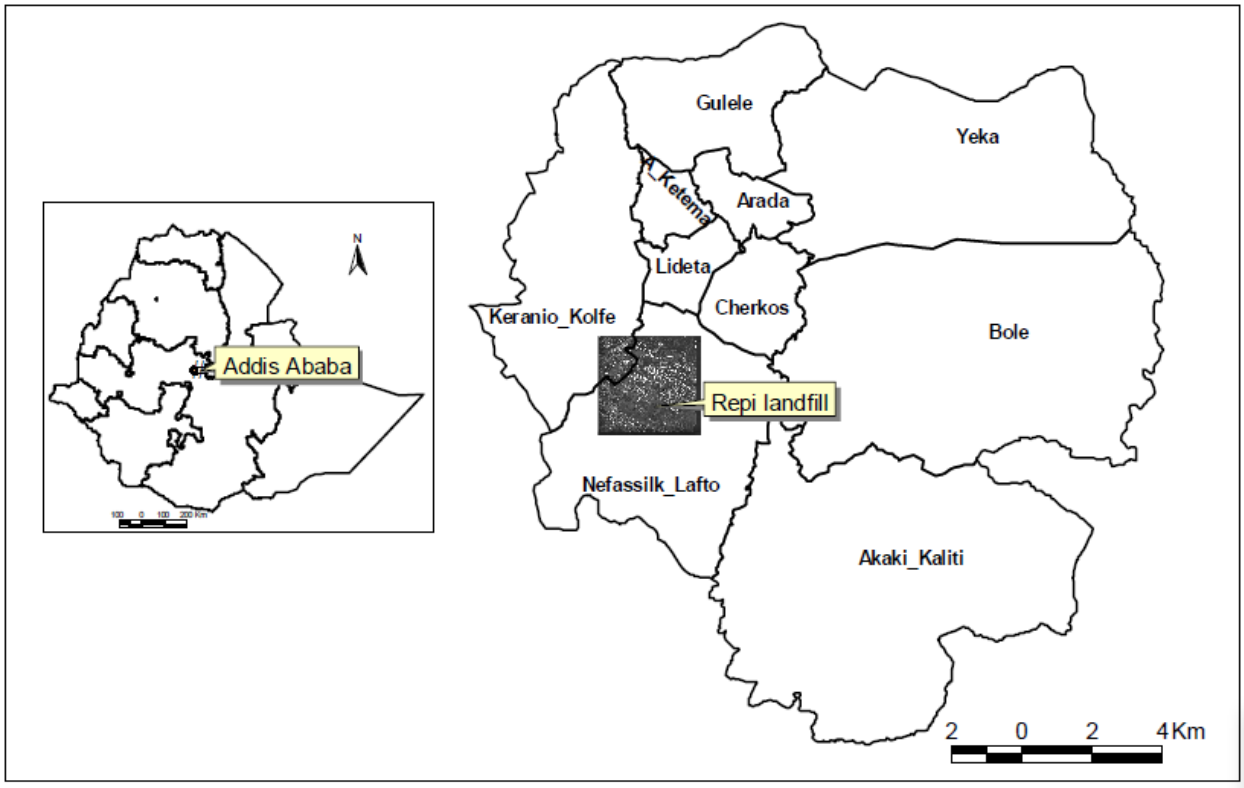
Repi Waste to Energy plant was officially inaugurated August 19, 2018 by former federal democratic republic of Ethiopia president Mulatu Teshome (PhD) and experienced astounding media coverage from local and international news outlets as a symbol of success and example.

A statement issued by United Nations Environment Organization (UNEP, 2017), Repi waste-to-energy plant is set to transform the site and revolutionize the entire city's approach to dealing with waste and Ethiopia's broader strategy to address pollution and embrace renewable energy across all sectors of the economy. The Organization also praises Repi Waste to Energy plant as an environmentally friendly investment that needed to be replicated by other African countries (UNEP, 2017).

Despite exemplary success stories in the media, a technical dispute regarding power generating capacity and project quality raises in the project after the dawn of inauguration. The argument, which was between EEP and two contractors, Cambridge Industries and its partner (CIL), China National Electric Engineering Company (CNEE) led to the plant ceasing operations (John, 2019).

After more than a year-long dispute between the contractors and EEP, the case was transferred to Federal Government of Ethiopia and Peoples Republic of China's government to handle it and the plant started generating 25 MW in early October, 2019; which is half of originally planned amount 50 MW power.

Fig 1.2 Location of the project



Source: Yirgalem Mahiteme: Landfill Management, its Impacts on the local Environment and Urban Sustainability (2015)

Repi Waste-to-energy facility is located at an open dumpsite in the southwestern part of Addis Ababa around Ayer Tena and can be found at the geographical coordinates 9.5067181N, 39.6833745E (Google Map, 2019)

1.3 Statement of the Problem

According to reports from the house of people representatives in November 2019[2], many of the government's Mega-Electric generating projects had faced challenges of failure of being behind schedule, over budget, and negligence to meet business objectives. Even more, some projects which have to be built by government long term foreign loan, the payback period is reached before the projects are completed. Mohammed (2019, p.5) revealed that

> "72 percent of projects financed by the Development Bank of Ethiopia were under the failure category. Implementation delay, overestimation of project return, and poor manpower quality of projects were found to be a statistically significant cause of project failures to meet their objectives."

Taking the above reality into consideration, in December 2019 the federal government passed a decision to not launch new projects temporarily until undergoing projects come to fully operational.

Repi Waste to Energy Project is a result of the government's ambitiously driven plan to make the nation the power hub of Africa. At the project start, the Repi Waste to Energy project office had said in 2014 that the project would cost 96 million USD and expected to generate up to 50 MW and take two years to complete, according to the government-owned EEPCO report. But the EEPCO forced to pay an additional 27 Million USD to complete the project 5 years later since the official commencement date (September 14, 2014) for generating 25MW which is half of the expected amount.

According to some documents[3] obtained from the project office and different works of literature from scholars on regard to Repi waste to Energy project, the major cause of the extended delay in time, defects in quality, and less output below the planned to generate capacity are due to poor project management practices. From those documents analyzed, it is also disclosed that the

[2] Annual evaluation report presented by House Standing committee on EEPCO projects
[3] Minutes of meetings, Monthly reports, Letters exchanged between Contractors & Client, and Financial reports

procurement was not conducted clearly as the guideline and policies set by the government. Not only a lack of transparency in the contractors' selection process observed but also there was no clear evidence on the selection of materials, machines, equipment, and technology that are compatible with the current waste to energy-generating technology. Most of the machineries and equipment planted in the project are failed or broken within the first few days of testing operation.

This study mainly evaluates the overall project management techniques implemented from the initial phase to implementation (phaseout) based on management knowledge areas defined by PMBOK. According to Zwikael, O. (2009), the PMBOK® Guide identifies Ten knowledge areas on which a project manager should focus in order to successfully manage a project. But most project managers are not aware of the knowledge areas that have the greatest impact on project success. Therefore, they do not necessarily invest more effort in performing them. Implementation of PMBOK help project managers improve decision making with regard to the way that time and resources are allocated among knowledge areas and associated processes. It is expected that in different type of projects, each knowledge areas has different impact on project success. For example, recent studies have showed that when planning processes are improved, the likelihood of project success increases (Zwikael & Globerson, 2004). The ten knowledge areas exert different levels of influence on a project's success; therefore, the proper application is important to any project success when the higher extent of use of its related processes significantly improves project success rate (Zwikael, O, 2009).

It will also investigate the immensity of destruction experienced by the Ethiopian electric utility enterprise regarding cost, time, and quality.

1.4 Basic Research Questions

This study has tried to answer the following questions:

- Were the project management knowledge areas practiced effectively in Repi waste to energy project from conception to implementation?
- What were the challenges in practicing project management processes? And what's done to downsize their implications?

- What are the areas needed to be improved for further implementation of projects like Repi waste to energy?

1.5 Objectives of the Study

1.5.1 General objective of the study

The major objective of this study is to assess the overall implementation of project management practices in Repi waste to energy construction project by referring to the project management body of knowledge areas as a benchmark.

1.5.2 Specific objectives of the study

The main objective of the study has the following specific objectives:

- To identify the major cause of delay and cost overrun of the Repi WtE construction project.
- To assess and evaluate the process of project management practices in the Repi WtE construction project.
- To examine the challenges Repi waste to energy faced in practicing project management processes?
- To evaluate prevention measures taken by the project office in order to downsize and mitigate risks.
- To suggest areas of improvement for further implementation of projects which the EEPCO has planned to execute in the near future.

1.6 Significance of the Study

The finding of this study will provide significant data and information about the project management principles practiced in The Repi Waste-to-energy facility for professionals and policymakers of the nation in general and EEPCO in particular. In addition to this, the findings will help policymakers to uncover critical areas in the planning and implementation process of megaprojects that were not considered in the conception phase. Moreover, the recommendations

serve as input for cost and time estimator and will be a valuable source of information for further study on the project. The researcher also believes that the findings will serve as input for the researchers in the project management discipline for further studies.

1.7 Scope and Delimitation of the study

The focal point of this research is only the Repi waste to energy project, which is one of among the many projects executed by the EEPCO. The research draws attention in order to assess the implementation of project management practices within the specific project only based on the proposed research design. All of the participants/respondents have been selected as the best or most appropriate source to provide insightful thoughts of the project via a close-ended questionnaire and interview. From EEPCO archives, only documents related to Repi waste to energy project are used as input for the assessment of project management practices.

1.8 Limitation of the study

Due to controversy raised from the decline in power generating capacity of the plant from the initially planned amount, delay, and quality issues; the contractor of the project Cambridge International Ltd has closed its office doors and fled out of the country which makes it difficult to generalize this study's conclusions. The absence of some critical documents and data from the contractor's side has left some shadows in partiality of the outputs of this assessment.

The government has also launched a legal investigation and court processes are undergoing. This also restricts the researcher to access some documents and limited to not reveal some of the findings of the research to avoid interference in court hearings.

1.9 Organization of the study

The research paper consists of five chapters and the executive summary part

Abstract, which gives the reader the chance to grasp the essentials of the research paper in a short summary.

Chapter One; Background: the background part gives an introductory view to the reader and involves four sub-parts under it; problem statement, objective, significance, and limitations of the study.

Chapter Two; Literature Review: the literature review part describes the works of literature which are reviewed concerning the process of project management practices. It gives an overview of what has been said about project management practices based on PMBOK.

Chapter Three; Methodology: the methodology part tries to clarify how the research work carried out and incorporates five subparts under it: the research design & approach; data types, source and collection tools; data measurement scale; data analysis tools & presentation of the paper.

Chapter Four; Results & Discussions: this part covers the assessment of project management practices in Repi waste to energy project based on the collected data from the respondents and the reviewed documents from project archives. The findings part summarizes the results of the data analyzed.

Chapter Five; Summary, Conclusion & Recommendations: this chapter part is the last part of the research paper. It contains four sections: Summary, conclusion, recommendation & suggestions for further studies. The summary & conclusion parts describe the inferences drawn from the findings whereas the recommendation & suggestion parts illustrate the prescriptions based on conclusions.

REFERENCES; the references section allows the reader to know the sources of the research paper information.

ANNEXES; the annexes contain sets of questionnaires, and Cronbach's alpha tables derived from the data collected

CHAPTER TWO
REVIEW OF RELATED LITERATURE

2.1 Introduction

Since the miraculous discovery of fire, human beings come across several inventions and discoveries' which shapes the current world of ours. Some of these inventions and discoveries are expressed or presented through intangible and tangible forms of assets like buildings, monuments, pyramids, etc. through those periods, whether in undertaking tasks like hunting, agriculture, or building roofs over their heads, everyone manages projects in daily routines. As its ability increases in creativity and invention through gradual development, the need to build cities, palaces, temples, churches, and monuments increased. Alongside the process of those activities, humans developed behavioral patterns and natural functions in relation to managing their piece of works. These accumulated patterns and natural functions through periods and experiences become the driving force behind the origination of the idea of modern-day project management theories and techniques.

Many scholars have tried to set forth the beginning of the project management era from ancient Egypt civilization and some of them are also attributed it towards the construction of the great wall of China. According to Young-Hoon Kwak (2005), project management has been practiced for thousands of years, ever since the Egyptian era. It has been only since about half a century ago, however, that organizations started applying systematic project management tools and techniques to complex projects.

The literature review segment of this research tries to provide a brief insight into the application of project management processes. It provides a summary of previously conducted studies and various works of literature related to the research problem areas by focusing on project management, types of projects, project management processes, project management knowledge areas, and other related topics.

2.2 Definitions of Project

Several scholars and authors defined a project based on their standpoint of respected discipline or fields related to different perspectives and orientations. The Project Management Institute (PMI, 2017) succinctly defines a project in a brief and clearly as a temporary endeavor undertaken to create a unique product, service, or result

- Unique product, service, or result. Projects are undertaken to fulfill objectives by producing deliverables. An objective is defined as an outcome toward which work is to be directed, a strategic position to be attained, a purpose to be achieved, a result to be obtained, a product to be produced, or a service to be performed. A deliverable is defined as any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project. Deliverables may be tangible or intangible (PMI, 2017).

In his work from 1983 Tuman, (as cited in Cleland & Gareis 2006), also explains, A project is an organization of people dedicated to a particular and unique purpose or goals. Projects generally involve large, expensive, unique, or high-risk undertakings which have to be completed by a certain date, for a certain amount of money, with some expected level of performance. At a minimum, all projects need to have well-defined objectives and sufficient resources to carry out all the required tasks.

Denis Lock (2007, p.5), additionally explains that the principal identifying characteristic of a project is its originality and uniqueness. It is a step into the unknown, fraught with risk and uncertainty. No two projects are ever exactly alike: even a repeated project will differ from its predecessor in one or more commercial, administrative or physical aspects. However, I have found it possible and convenient to classify projects as four different general types. These are:

- Civil and/or construction projects,
- Manufacturing projects,
- IT projects and projects associated with management change and
- Pure scientific researches

Reiss (1995) also adds the human element to the definition by suggesting that a project is "a human activity that achieves a clear objective against a time scale" projects nearly always have the following characteristics:

- one clear objective;
- a fixed time scale;
- a team of people;
- no practice or rehearsal;
- change.

2.3 Definitions of Project management

Project management is a powerful tool in achieving all of the project goals and objectives while overcoming constraints such as time, money, scope, quality and so forth (David et al, 2006).

Joseph Phillips (2003) states that Project management is the implementation of initiating, planning, executing, controlling, and closing the work of a team to deliver specific goals and meet specific success criteria within the defined time. The primary challenge of project management is to achieve all of the project deliverables within the given limitations.

As defined by the Project Management Institute (PMI, 2017) management is the application of knowledge, skills, tools, and approaches to project activities to meet the project targets. Project management is achieved through the suitable implementation and integration of the project management processes determined for the project. Project management enables organizations to execute projects effectively and efficiently.

Chandra and Prasana (1995), explains project management as an organized venture for managing projects, involves scientific application of modern tools and techniques in planning, financing, implementing, monitoring, controlling and coordinating unique activities or task produce desirable outputs in accordance with the determined objectives within the constraints of time and cost.

Additionally, Gray & Larson (2006), supported the above definitions by explaining project management is a task derived from an organization that enables professional project managers to

use their skills, tools and knowledge to plan, execute and control a unique project within a limited lifespan by meeting the specification requirements of the organization.
Another definition of project management by (APM, 2006) is the process by which projects (unique, complex, non- routine, one-time effort limited by time, budget, and resources) are defined, planned, monitored, controlled and delivered such that the agreed benefits are realized.

Project management is the planning, organizing, directing, and controlling of company resources for a relatively short-term objective that has been established to complete specific goals and objectives. Furthermore, project management utilizes the systems approach to management by having functional personnel (the vertical hierarchy) assigned to a specific project (the horizontal hierarchy) (Kerzner, 2003).

Project management can be defined as the attainment of project deliverables through people and involving the organization, planning and control of resources allocated to the project. It requires the development of constructive human relations with and between all those involved, both in the contracting company and in all the other organizations that might be involved (Harrison & Lock, 2004).

2.4 Success of Project and project management

Most scholars recognize that there is a positive relationship between project success and the project management method. Some experts rightfully confirm that the involvement of stakeholders from all levels both within and outside the organization within the framework of the communication ecosystem is required to make the project successful (Mesly & Olivier, 2017). The most frequently used definition is that a project is a failure when it does not meet its performance, cost, time, or scope targets.

Project Management Institute (PMI, 2017, p.63), notes that the major ordinary challenges in project management is deciding whether or not a project is successful. Traditionally, the project management measurement of time, cost, scope, and quality have been the most important factors in defining the success of a project. Now a days, practitioners and scholars have decided that project success should also be measured with consideration toward the achievement of the project goals.

The manager of a classic project would consider the task well done if the project completed on time, according to its specified performance and within its budgeted cost. These three objectives are traditionally the basic parameters for measuring project success. The success of the contractor and the project manager will usually be judged according to how well they achieve the three primary goals of cost, performance and time. Many things need to be in place and many actions taken during the project execution period to help ensure success. (Lock, 2007)

Baker et al., 1988 (as cited by Lewis, 2000) says that, If the project attains the technical performance specifications and/or mission to be excutes, and if there is a high level of satisfaction regarding the project result among key personnel in the parent organization, key people in the client organization, key people on the project team, and key users or clientele of the project effort, the project is considered an overall success.

According to Kerzner (2003) project success determined as the accomplishment of a task within the constraints of time, cost, and performance. This was the definition used in earlier date of project management. Currently, the definition of project success has been altered to incorporate completion:

- Within the allocated time period
- Within the budgeted cost
- At the proper performance or specification level
- With the acceptance by the customer/user
- With minimum or mutually agreed upon scope changes
- Without disturbing the main workflow of the organization
- Without changing the corporate culture

Kerzner (2003) further points out that project success is often measured by the "actions" of three groups: the project manager and team, the parent organization, and the customer's organization. There are certain actions that the project manager and team can take in order to achieve project deliverables. These actions include:

- Insist on the right to select key project team members.
- Select key team members with proven track records in their fields.
- Develop commitment and a sense of mission from the outset.

- Seek sufficient authority and a projectized organizational form.
- Coordinate and maintain a good relationship with the client, parent, and team.
- Seek to enhance the public's image of the project.
- Have key team members assist in decision-making and problem-solving.
- Develop realistic cost, schedule, and performance estimates and goals.
- Have backup strategies in anticipation of potential problems.
- Provide a team structure that is appropriate, yet flexible and flat.
- Go beyond formal authority to maximize influence over people and key decisions.
- Employ a workable set of project planning and control tools.
- Avoid overreliance on one type of control tool.
- Stress the importance of meeting cost, schedule, and performance goals.
- Give priority to achieving the mission or function of the end-item.
- Keep changes under control.
- Seek to find ways of assuring job security for effective project team members.

The analysis of the (Harrison & Lock, 2004) shows that project achievement or failure mainly depends not only on the performance of the individual people involved but also on the following important factors:

- How well people communicate with each other
- How well people work within groups or teams
- How well all the groups, larger units and companies involved in the overall project
- Organization work together to achieve the set objectives

As a result, continuing to incorporate the quality of the project management process, integration, scope, communication, procurement, risk, and stakeholder management processes are crucial factors for project management success. Based on that, this assessment established the project management knowledge areas defined by PMBOK as a reference for effective project management. Taking the above factors into consideration, ensuring effective project management practice is a point of departure to reach the height of project success.

2.5 Project Management Processes

According to (inloox.com, no date), the project management process is an executive process for the planning and control of the services or the implementation of a project. The process starts after the approval of the customer, is based on the contract, and is targeted on the initial values of the process and the general management of a project.

The project management process requires a unique configuration that contains the project management documentation; project plans; project management methods; information exchange; resources for the project planning and project implementation. The following features should be performed during the project management process: project introduction; project planning; project realization; project control; analysis and assessment of the project requirements. The results of one of these processes are: delivery of the project product; achievement of the project objectives; documentation of the learning processes (inloox.com, no date).

According to the Project Management Institute (PMI, 2017), Process Groups are not project phases. If the project is divided into phases, the processes in the Process Groups interact within each phase. It is possible that all Process Groups could be represented within a phase. As projects are separated into clear phases, such as concept development, feasibility study, design, prototype, build, or test, etc., processes in each of the Process Groups are repeated as necessary in each phase until the completion criteria for that phase have been satisfied.

This plenty of project management activities can be categorized into five main processes. The Process Groups are independent of the application areas, Individual processes in the Process Groups are often iterated prior to completing a phase or a project.

The project management processes, according to PMBOK, can be organized into the following five groups

2.5.1 Initiating Process Group

The Initiating Process Group consists of those processes performed to define a new project or a new phase of an existing project by obtaining authorization to start the project or phase (PMI, 2017).

This is the starting phase of the project. Major activities during the initiating process are:

- Select the project manager
- Defining the project scope
- Identifying the key stakeholders
- Identifying potential risks
- Producing an estimated budget and timeline

According to Duprey (2010), Initiating process is officially committing to start a project. The appointed project manager comes across the real objectives of the project, identifies the potential project stakeholders, and works with the customer and other stakeholders to come up with an approach to realize those objectives. This process involves setting clear phases for the work to be completed, initializing teams, and having the budget in place before work.

2.5.2 Planning Process Group

The Planning Process Group consists of those processes that establish the total scope of the effort, define and refine the objectives, and develop the course of action required to attain those objectives (PMI, 2017).

Major activities during this process:

- Develop a project management plan
- Plan scope management
- Collect requirements
- Define scope
- Create WBS

Planning is of major importance to a project because the project involves doing something which has not done before. As a result, there are relatively more processes in this section. However, the number of the processes does not mean that the project management is primarily planning, the amount of planning performed should be commensurate with the scope of the project, and the usefulness of the information developed (PMI, 2017).

2.5.3 Executing Process Group

The Executing Process Group consists of those processes performed to complete the work defined in the project management plan to satisfy the project requirements. This Process Group

involves coordinating resources, managing stakeholder engagement, and integrating and performing the activities of the project in accordance with the project management plan (PMI, 2017).

During this process group, the actual outputs of the project and project deliverables are produced. Executing process group activities help to deliver project deliverables during executing phase (MoPA, No Date).

- Direct, manage project work, project knowledge, and project quality
- Acquire resources
- Develop and manage team
- Manage communications
- Implement risk responses
- Conduct procurements
- Manage stakeholder engagement

Executing process group includes managing teams effectively while coordinating timeline expectations and achieving target goals. Project managers utilizing this set of skills will demonstrate a high degree of organization and communication skills while addressing team concerns (Tigest, 2017).

2.5.4 Monitoring and Controlling Process Group

The Monitoring and Controlling Process Group consists of those processes required to track, review, and regulate the progress and performance of the project; identify any areas in which changes to the plan are required; and initiate the corresponding changes. Monitoring is collecting project performance data, producing performance measures, and reporting and disseminating performance information. The Monitoring and Controlling Process Group also involves:

- Evaluating change requests and deciding on the appropriate response;
- Recommending corrective or preventive action in anticipation of possible problems;
- Monitoring the ongoing project activities against the project management plan and project baselines; and
- Influencing the factors that could circumvent the change control process so only approved changes are implemented.

This process group focuses on monitoring and measuring project performance to see whether the project is on track with plan. Processing change orders, addressing ongoing budget considerations, and mitigating unforeseen circumstances that may affect a team's ability to meet initial project expectations are all part of the core skills and competencies involved in this process group.

2.5.5 Closing Process Group

As mentioned on PMBOK (2017), The Process Group includes the processes performed to formally finalized or close a project, phase, or contract. This Process Group verifies that the defined processes are finalized within all of the Process Groups to close the project or phase, as appropriate, and formally establishes that the project or project phase is complete. The major profit of this group is that phases, projects, and contracts are closed out appropriately. While there is only a single process in this Process Group, businesses may have their own processes associated with project, phase, or contract closure. Therefore, the term Process Group is maintained.

According to PMI (2017) definition, projects have a finish line. Closing out is a major phase in the project life cycle, which should follow particular disciplines and procedures with the objective of:

- Effectively bringing the project to closure according to agreed-on contractual requirements
- Preparing for the transition of the project into the next operational phase, such as from production to field installation, field operation, or training
- Analyzing overall project performance with regard to financial data, schedules, and technical efforts
- Closing the project office, and transferring or selling off all resources originally assigned to the project, including personnel
- Identifying and pursuing follow-on business

Some additional characteristics of the project processes are:

- Process groups are linked by the results they produce; the result or outcome of one becomes an input to another.

- Process groups are not discrete, one-time events; they are overlapping activities which occur at varying levels throughout each phase of the project.
- The process group interactions also cross phases such that closing one phase provides an input to initiating the next which means that in actual projects there will be many overlaps.

2.6 Project management practices

Project management processes and techniques are used to coordinate resources to achieve predictable results (Bolles, 2002). Best practice is based on experience and is used to narrate the process of developing and following a regular way of accomplishing tasks. In project management, best practice is a general term that includes: guidelines and international standards. The two standards and guidelines are looking to improve project management (Liviu et al., 2010).

As corporate goals and organizational success became more closely linked to project success, it was critical that teams were trained properly, integrated support systems effectively, and implemented projects efficiently. Corporations needed to develop the capability to improve their project management processes and their project results time and time again. Corporations needed to develop the capability to improve their project management processes and their project results time and time again (Cleland & Rareis, 2006).

Examples of the capacities required for a successful project delivery include launching enterprise-wide project management processes and implementing integrated supporting systems (Pennypacker & Grant, 2003).

According to Stokowski (2015), A Knowledge Area in the PMBOK ® Guide is a idiom for the collection of associated processes to execute a certain type of task. The main three examples are the Risk Management, Time Management, or Scope Management Knowledge Areas. In addition, there is a tenth Knowledge Area called Integration for cross-functional processes. Although the concept of Knowledge Areas and Process Groups is in actuality straightforward, the PMBOK ® Guide has gained a reputation of being difficult to understand.

2.6.1 Project Scope Management

Project scope management is primarily concerned with defining and controlling what is and is not included in the project. It encompasses the processes needed to ensure that the project includes all the work required, and only the work required, to complete the project successfully (Moustafaev, 2015).
The totality of the area of coverage of a project. Scope demarcates the complete and unambiguous domain of a project.

According to Schwalbe (2015, p.184), Project scope management includes the processes required in defining and controlling what work is or is not included in a project. It makes certain that the project team and stakeholders have the common understanding of what products the project will produce and what processes the project team will use to produce them and the six main processes are involved in project scope management are the following:

1. ***Planning scope management*** involves determining how the project's scope and requirements will be managed. The project team works with appropriate stakeholders to create a scope management plan and requirements management plan.

2. ***Collecting requirements*** involves defining and documenting the features and functions of the products as well as the processes used for creating them. The project team creates requirements documentation and a requirements traceability matrix as outputs of the requirements collection process.

3. ***Defining scope*** involves reviewing the scope management plan, project charter, requirements documents, and organizational process assets to create a scope statement, adding more information as requirements are developed and change requests are approved. Outputs of scope definition are the project scope statement and updates to project documents.

4. ***Creating the WBS*** involves subdividing the major project deliverables into smaller, more manageable components. Outputs include a scope baseline (which includes a WBS and a WBS dictionary) and updates to project documents.

5. ***Validating scope*** involves formalizing acceptance of the project deliverables. Key project stakeholders, such as the customer and sponsor for the project, inspect, and then formally accept the deliverables during this process. If the deliverables are not acceptable, the customer or sponsor usually requests changes. The outputs of this process are accepted deliverables, change requests,
work performance information, and updates to project documents.

6. ***Controlling scope*** involves controlling changes to project scope throughout the life of the project—a challenge on many IT projects. Scope changes often influence the team's ability to meet project time and cost goals, so project managers must carefully weigh the costs and benefits of scope changes. The outputs of this process are work performance information, change requests, and updates to the project management plan, project documents, and organizational process assets.

2.6.2 Project Time/Schedule Management

According to Schwalbe (2015), Schedule management integrates dictating the policies, procedures, and documentation that will be used for planning, executing, and controlling the project schedule. The major yield of this process is a schedule management plan. Project time management includes estimating the time it will take to complete the work, developing an adequate project schedule, and ensuring timely completion of the project. Some common time-management tools and techniques include Gantt charts, project network diagrams, and critical path analysis.

Schwalbe (2015), further states that, Managers frequently mention the need to deliver projects on time as one of their biggest challenges and the main cause of dispute. Perhaps part of the reason that schedule problems are so common is that time is easily measured and recalled. Anyone can debate scope and cost overruns and make actual numbers appear closer to estimates, but once a project schedule is set, people remember the projected completion date, and people can easily estimate schedule performance by subtracting the original time estimate from how long it really took to complete the project. Anyone often compares planned and actual project completion period without considering the approved changes in the project. Time is the variable that has the least amount of flexibility. Time passes no matter what happens on a project.

How long does it take to execute the project? When is the project deadline? These are questions that are not easily answered by look-over. The time knowledge area provides a number of techniques for defining, sequencing, and analyzing the time-span of each activity within the project as well as the project in general. Since the analysis of time in the project context results in the development of the project schedule, the recent edition of the PMBOK, PMBOK 6, now refers to the Project Time Management knowledge area as Schedule Management (Marion, 2018).

According to Schwalbe (2015), Project time management, simply defined, involves the processes required to ensure timely completion of a project; the seven main processes involved in project time management are:

1. Planning schedule management involves determining the policies, procedures, and documentation that will be used for planning, executing, and controlling the project schedule. The main output of this process is a schedule management plan.

2. Defining activities involves identifying the specific activities that the project team members and stakeholders must perform to produce the project deliverables. An activity or task is an element of work normally found on the work breakdown structure (WBS) that has expected duration, cost, and resource requirements. The main outputs of this process are an activity list, activity attributes, a milestone list, and project management plan updates.

3. Sequencing activities involves identifying and documenting the relationships between project activities. The main outputs of this process include project schedule network diagrams and project documents updates.

4. Estimating activity resources involves estimating how many resources, people, equipment, and materials—a project team should use to perform project activities. The main outputs of this process are activity resource requirements, a resource breakdown structure, and project documents updates.

5. Estimating activity durations involves estimating the number of work periods that are needed to complete individual activities. Outputs include activity duration estimates and project documents updates.

6. Developing the schedule involves analyzing activity sequences, activity resource estimates, and activity duration estimates to create the project schedule. Outputs include a schedule baseline, project schedule, schedule data, project calendars, project management plan updates, and project documents updates.

7. Controlling the schedule involves controlling and managing changes to the project schedule. Outputs include work performance information, schedule forecasts, change requests, project management plan updates, project documents updates, and organizational process assets updates.

2.6.3 Project Cost Management

Project Cost Management includes the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget (PMI, 2017). Project cost management also includes the processes required to ensure that a project team completes a project within an approved budget.

According to Schwalbe, (2015), there are four processes for project cost management:

1. Planning cost management involves determining the policies, procedures, and documentation that will be used for planning, executing, and controlling project cost. The main output of this process is a cost management plan.

2. Estimating costs involves developing an approximation or estimate of the costs of the resources needed to complete a project. The main outputs of the cost estimating process are activity cost estimates, basis of estimates, and project documents updates.

3. Determining the budget involves allocating the overall cost estimate to individual work items to establish a baseline for measuring performance. The main outputs of the cost budgeting process are a cost baseline, project funding requirements, and project documents updates.

4. Controlling costs involves controlling changes to the project budget. The main outputs of the cost control process are work performance information, cost forecasts, change requests, project management plan updates, project documents updates, and organizational process assets updates.

2.6.4 Project Quality Management

The purpose of project quality management is to ensure that the project will satisfy the needs for which it was undertaken (Schwalbe, 2015).

According to Sokowski (2012), A quality management plan is needed to ensure strict adherence to quality requirements from the very start of the project. It is created by experts from the quality assurance function of the organization, specific subject area experts, and project team members, again under the overall guidance of the project manager.

Sokowski (2012), furtherly mentioned that, the quality management plan specifies and documents the following three aspects of quality:

- Adherence to quality requirements will be managed with deliverables and to the management of the project itself
- The organization's quality policies, procedures, and standards that must be adhered to in the project
- The legal, regulatory, and industry quality standards that are applicable to the project

According to Schwalbe (2015), Project quality management ensures that the project will satisfy the stated or implied needs for which it was undertaken.
Project quality management involves the following three main processes:

1. Planning quality management includes identifying which quality requirements and standards are relevant to the project and how to satisfy them. Incorporating quality standards into project design is a key part of quality planning. The main outputs of planning quality management are a quality management plan, a process improvement plan, quality metrics, quality checklists, and project documents updates. A metric is a standard of measurement. Examples of common metrics include failure rates of products, availability of goods and services, and customer satisfaction ratings.

2. Performing quality assurance involves periodically evaluating overall project performance to ensure that the project will satisfy the relevant quality standards. The quality assurance process involves taking responsibility for quality throughout the

project's life cycle. Top management must take the lead in emphasizing the roles all employees play in quality assurance, especially senior managers' roles. The main outputs of this process are change requests, project management plan updates, project documents updates, and organizational process asset updates.

3. Controlling quality involves monitoring specific project results to ensure that they comply with the relevant quality standards while identifying ways to improve overall quality. This process is often associated with the technical tools and techniques of quality management, such as Pareto charts, quality control charts, and statistical sampling. The main outputs of quality control include quality control measurements, validated changes, validated deliverables, work performance information, change requests, project management plan updates, project documents updates, and organizational process asset updates.

2.6.5 Project Resource Management

According to PMI (2017), Project Resource Management comprises the processes to identify, acquire, and manage the resources desired for the successful completion of the project. These processes help ensure that the right resources will be available to the project manager and project team at the right time and place.

The Project Resource Management processes are:

1. Plan Resource Management—The process of defining how to estimate, acquire, manage, and utilize physical and team resources.

2. Estimate Activity Resources—The process of estimating team resources and the type and quantities of material, equipment, and supplies necessary to perform project work.

3. Acquire Resources—The process of obtaining team members, facilities, equipment, materials, supplies, and other resources necessary to complete project work.

4. Develop Team—The process of improving competencies, team member interaction, and the overall team environment to enhance project performance.

5. Manage Team—The process of tracking team member performance, providing feedback, resolving issues, and managing team changes to optimize project performance.

6. Control Resources—The process of ensuring that the physical resources assigned and allocated to the project are available as planned, as well as monitoring the planned versus actual use of resources, and performing corrective action as necessary.

2.6.6 Project Communications Management

The communications management defines the communication needs; responsibilities; how to communicate, manage, and control communication; communication technology; and resources needed (financial, human, technical) for the project (Sokowski, 2012).

According to Schwalbe (2015), The goal of project communications management is to ensure timely and appropriate generation, collection, dissemination, storage, and disposition of project information. He explains three main processes in project communications management as follows:

1. Planning communications management involves determining the information and communications needs of the stakeholders. Who needs what information? When will they need it? How will the information be given to them? The outputs of this process include a communications management plan and project document updates.

2. Managing communications involves creating, distributing, storing, retrieving, and disposing of project communications based on the communications management plan. The main outputs of this process are project communications, project documents updates, project management plan updates, and organizational process assets updates.

3. Controlling communications involves monitoring and controlling project communications to ensure that stakeholder communication needs are met.

2.6.7 Project Risk Management

Project risk management is the art and science of identifying, analyzing, and responding to risk all over the duration of a project and in the best interests of meeting project requirements. Risk

management can have a positive influence on choosing projects, determining their scope, and developing realistic schedules and cost estimates. It helps project stakeholders understand the nature of the project, involves team members in defining strengths and weaknesses, and helps to integrate the other project management knowledge areas (Schwalbe, 2015).

According to PMI (2017), Project Risk Management includes the processes of conducting risk management planning, identification, analysis, response planning, response implementation, and monitoring risk on a project. The objectives of project risk management are to increase the probability and/or impact of positive risks and to decrease the probability and/or impact of negative risks, in order to optimize the chances of project success.

According to PMI (2017), The following are 7 Project Risk Management processes:

1 Plan Risk Management The process of defining how to conduct risk management activities for a project.

2 Identify Risks The process of identifying individual project risks as well as sources of overall project risk, and documenting their characteristics.

3 Perform Qualitative Risk Analysis The process of prioritizing individual project risks for further analysis or action by assessing their probability of occurrence and impact as well as other characteristics.

4 Perform Quantitative Risk Analysis The process of numerically analyzing the combined effect of identified individual project risks and other sources of uncertainty on overall project objectives.

5 Plan Risk Responses The process of developing options, selecting strategies, and agreeing on actions to address overall project risk exposure, as well as to treat individual project risks.

6 Implement Risk Responses The process of implementing agreed-upon risk response plans.

7 Monitor Risks The process of monitoring the implementation of agreed-upon risk response plans, tracking identified risks, identifying and analyzing new risks, and evaluating risk process effectiveness throughout the project.

2.6.8 Project Procurement Management

Project Procurement Management includes the processes necessary to purchase or acquire products, services, or results needed from outside the project team (Schwalbe, 2015).

According to (PMI 2017), Project Procurement Management includes the management and control processes required to create and control agreements such as contracts, purchase orders, memoranda of agreements, or internal service level agreements. The personnel authorized to procure the goods and/or services required for the project may be members of the project team, management, or part of the organization's purchasing department if applicable.

Based on Schwalbe (2015) explanation, the four main processes in project procurement management are the following:

1. ***Planning procurement management*** involves determining what to procure and when and how to do it. In procurement planning, one must decide what to outsource, determine the type of contract, and describe the work for potential sellers. Sellers are providers, contractors, or suppliers who provide goods and services to other organizations. Outputs of this process include a procurement management plan, procurement statements of work, procurement documents, source selection criteria, make-or-buy decisions, change requests, and project documents updates.

2. Conducting procurements involves obtaining seller responses, selecting sellers, and awarding contracts. Outputs include selected sellers, agreements, resource calendars, change requests, and updates to the project management plan and other project documents.

3. Controlling procurements involves managing relationships with sellers, monitoring contract performance, and making changes as needed. The main outputs of this process include work performance information, change requests, and updates to the project management plan, project documents, and organizational process assets.

4. Closing procurements involves completion and settlement of each contract or agreement, including resolution of any open items. Outputs include closed procurements and organizational process assets updates.

2.6.9 Project Integration Management

According to project management body of knowledge guide (2017), the processes required to identify, combine, unify and coordinate various activities and manage interdependencies to ensure various elements of the project are properly coordinated.

The major processes under project integration management are; develop project charter, project plan development, project plan execution and overall change control. The first process helps formally authorize the project and allow the project management to apply organizational resources. Project plan development aids in taking the results of other/subsidiary planning processes and putting them into a consistent, coherent document. Project plan execution helps to carry out the project plan by performing the activities included therein and implementing the approved process improvement plans and changes. Finally, overall change control supports in coordinating changes across the entire project (Tigest, 2017).

2.6.10 Project Stakeholder Management

Project Stakeholder Management includes the processes required to identify the people, groups, or organizations that could impact or be impacted by the project, to analyze stakeholder expectations and their impact on the project, and to develop appropriate management strategies for effectively engaging stakeholders in project decisions and execution (PMI, 2017).

According to Schwalbe (2015), The four processes in project stakeholder management are the following:

1. Identifying stakeholders involves identifying everyone involved in the project or affected by it and determining the best ways to manage relationships with them. The main output of this process is a stakeholder register.

2. Planning stakeholder management involves determining strategies to effectively engage stakeholders in project decisions and activities based on their needs, interests, and potential impact. Outputs of this process are a stakeholder management plan and project documents updates.

3. Managing stakeholder engagement involves communicating and working with project stakeholders to satisfy their needs and expectations, resolving issues, and fostering engagement in project decisions and activities. The outputs of this process are issue logs, change requests, project management plan updates, project documents updates, and organizational process assets updates.

4. Controlling stakeholder engagement involves monitoring stakeholder relationships and adjusting plans and strategies for engaging stakeholders as needed. Outputs of this process are work performance information, change requests, project documents updates, and organizational process assets updates.

2.7 Waste to Energy

According to Wikipedia, (Wikipedia.com, no date) A waste-to-energy plant is a waste management facility that combusts wastes to generate electricity. This kind of power plant is sometimes called a trash-to-energy, municipal waste incineration, energy recovery, or resource recovery plant. Modern waste-to-energy plants are very different from the trash incinerators that were commonly used until a few decades ago. Unlike modern ones, those plants usually did not remove hazardous or recyclable materials before burning. These incinerators have negative impact on the health of the plant workers and the nearby residents, and most of them did not generate electricity.

Considering all pillars of sustainability, energy recovery represents a preferable option for residual waste that cannot be effectively recovered and/or placed in the market. In this context, waste-to-energy (WtE) is a sustainable solution for many regions as it presents less ambitious targets and maybe the first step in moving higher up the waste treatment hierarchy.

According to Stehlik (2016), The sole purpose of Waste to Energy is waste processing with minimum influence on the environment. There are other important aspects related to WtE operation defined under Environmental, Energy and Economic issues. Energy can be produced and delivered to the consumers in the form of electricity, heat and/or cold. Energy production in an efficient cogeneration system has a positive effect on environment, plant economy and its competitiveness in terms of securing enough waste for its operation.

2.8 Waste Processing and WtE

The analysis of Stehlik (2016, p.4*)* shows that, waste is any substance or object which the holder discards or is required to discard. Waste processing within organized waste management systems represents a global challenge. It overcomes hazards and environmental burdens originating from specific features of waste produced by inhabitants and industry. These are: toxicity, environmental persistence, bioaccumulation, air pollution caused by greenhouse gases emission from organic waste, soil and water contamination, etc. Based on logical rules and approaches, the so-called "waste treatment hierarchy" can be defined. The priority is waste minimization followed by reuse and recycling and by waste processing. Waste separation may be done in many different systems. As to municipal solid waste, waste can be pre-separated by citizens in the area (municipal solid waste producers), then collected and split into desired fractions. Finally, these fractions are transported to serve as a secondary raw material source or as material for alternative fuel production.

As stated by Rogoff & Screve (2011, p.9), the successful implementation of a WTE project rests primarily upon the following essential building blocks or key elements:

- A reason or need for the project because of a critical community solid waste disposal problem or crisis;
- An implementing government agency or private project developer with political commitment willing and able to undertake the project;
- An adequate supply of solid waste for the project or means to assure waste stream control or attract sufficient quantities from other communities;
- Markets for the recovered energy and recovered materials; and
- A project site that is environmentally, technically, socially, and politically acceptable.

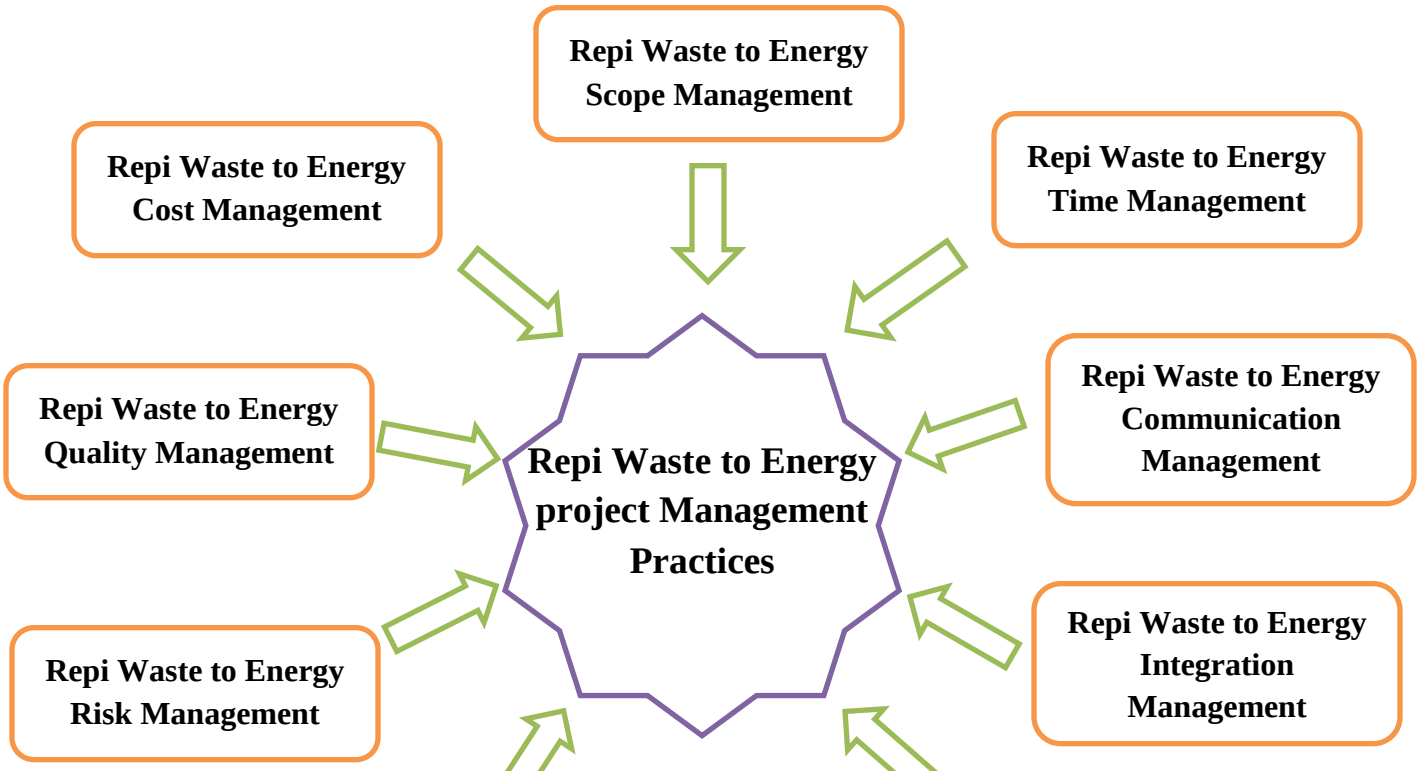
In their book, Rogoff & Screve (2011, p.10), furtherly explains, the most critical element that must be in place if a WTE project is to succeed is that a need for the project exists. That is, a situation exists such that community leaders perceive that the community is facing an immediate or long-term solid waste disposal problem and that planning for an alternative to sanitary landfilling should be undertaken.

Based on Rogoff & Screve view (2011, p.10), A second major element that must be present for the success of the project is political leadership. Unfortunately, the most well-conceived plans for public benefit projects are often implemented without such leadership. WTE projects are capital intensive and require planning that frequently extends over a two to five year period. What is somewhat unique about these projects, aside from their complexity, is the tortuous paths they have often taken from project inception through to construction.

2.9 Conceptual Framework for assessing Project Management Practices

The considered framework for this study is displayed in the following figure. It exhibits assessment of the project management practices in Repi waste to energy plant construction project vis-à-vis the ten project management knowledge areas.

Figure 2.1 Conceptual framework for assessing project management practices



Source: from the study, 2020

CHAPTER THREE

Research Design and Methodology

3.1 Introduction

The research design and methodology in this study is developed in such a mode as to answer the source of data and how it is collected, target population and sample size, data processing, analysis and presentation techniques, why these techniques and methods have been selected and how they were applied to assess the project management practices in Repi Waste to Energy plant construction project and how far the practice followed theories in project management.

3.2 Research Design

The research design is outlined based on accessibility of information and data to answer the basic research questions of the study. The study was conducted with a descriptive research method and used a data collection technique by developing close-ended questionnaire and interview questions. It combines both quantitative and qualitative research approaches and practices mixed method research methodology. A mixed design approach is selected to blend the effectiveness of both qualitative and quantitative approaches in mastery of apprehending basic questions to provide stronger evidence for conclusion of findings.

Despite collecting qualitative and quantitative data to draw conclusion, the data have to be mixed in proper pattern to provide a better understanding of the problem than if either dataset had been used alone. Thus, to construct narrative about diverse perspective, merging or converging the two datasets by actually bringing them together plays a vital role (Creswell, 2006). To determine existence of convergence, differences or some combination; comparing the two datasets is performed using concurrent triangulation approach. In this approach, the quantitative and qualitative data collection is concurrent, happening in one phase of the research. Ideally, the weight is equal between two methods, but often in practice, priority may be given to one or the other (Creswell, 2009)

3.3 Sources of Data

Careful attention is paid to select the required credible sources for both primary and secondary data in order to obtain the appropriate outcome of the research and to meet the expected objectives. Relevant Primary data collection is made through questionnaires, and in-depth interviews. A self-administered close-ended questionnaire with a written request to fill and complete it confidentially and anonymously was prepared and distributed to potential employees who had direct access to the project work includes the Project managers, support staff, Project members, and other related participants. These members of the project were selected from the project management office of the client EEP, its partner China National Electric Engineering Co (CNEEC), and from the current employees of the Repi waste to energy power plant. In addition to this, a face to face interview with a sample of employees and project members also conducted to gather their anonymous view in order to address important issues regarding the project.

To obtain secondary data from the project; Internal documents like contract documents of the project, financial reports, minutes of meetings have been used as secondary data.

3.4 Target Population & Sampling Methods

The target populations for the study were all project management department team members of EEPCO, CIL and CNEEC. They have been considered purposely because of their involvement in the project from early inception stage to completion of the project. The sample comprises of project managers, project team leaders and members, supervisors, technical experts and support staffs of the projects. Purposive Sampling technique/method was employed in selecting the

samples based on the researcher's subjective judgment which regards as having a specified quality to give experiential facts without any difficulty.

As the total number of employees directly involved in the project from the three companies were 57. The contractor of the project (CIL) was closed its office and left the country; also, the whereabout of its employees were unknown during the study period. To achieve the representativeness of the data the study forced to determine to participate 40 of the available 43 employees from both EEPCO and CNEEC.as stated by Yan Li (2016),

In spite of small sample number, all of participants are experts who well know about the subject were selected to take place in the study. This usually makes more sense in a small-scale study to deliberately select cases, individuals, or situations that are known to be typical (Maxwell, 1996).

3.5 Methods of data collection

A self-administered close-ended questionnaire and semi-structured interview were used to collect primary data. Questionnaire is one of the most widely used data collection techniques within the survey strategy (Saunders, Lewis & Thornhill, 2012). The close ended questionnaire used in this study is divided into demographic and background section, general issue section and the third section is about assessment of project management practices based on knowledge areas of project management according to PMBOK and reviewed literatures. The third section has 10 major questions with sub questions which are derived from the ten knowledge areas defined by the project management body of knowledge areas classified under A guide to the project management body of knowledge (PMBOK® guide book) Sixth Edition (2017) by project management institute (PMI). A Likert scale is implemented to measure responses ranging from five to one; where 5 represents Strongly agree, 4 agree, 3 Neutral, 2 disagree, and 1 strongly disagrees. Moreover, the questionnaire is influenced by factors highly related to the objectives of the research question focused on the effectiveness of project management practices. As well as that, they work best with standardized questions that you can be confident will be interpreted the same way by all respondents (Robson, 2011). Furthermore, tailored semi-structured interviews

also conducted face to face with volunteer respondents to collect more extensive corroboration for study problems.

To obtain secondary data from the project; internal documents like published and unpublished progress reports, contract documents of the project, copies of letters exchanged between parties involved in the project, financial reports, minutes of meetings have been used. Public records, websites, publications on magazines and newspapers, Company information like brochures, websites, advertisements, printed and electronics news outlets also used as secondary data. As revealed by researchers, in order to make sure, the collected literature is verifiable and reliable, the researchers should able to critically evaluate those kinds of literature by comparing it with other different authenticated sources (Creswell, 2007).

3.6 Method of Data Analysis & Presentation

In order to address the research questions and meet the objectives of the study based on collected data, some analytical and/or statistical softwares are used for primary and secondary data analysis. As well as that, Microsoft Word is also used as a tool to transcribe an audio-recorded interview and interpreting the data collected with a semi-structured interview. As this research is mainly driven by data obtained based on mixed data, subsequent analyses were made in pursuance to describe the data and exploring relationships. Statistical procedures were implemented to analyze scores collected using close ended questionnaire to answer basic research questions. The analysis of qualitative data collected from documents and interview questions done by aggregating the diverse ideas into categories of information to draw a common understanding about the questions and present them using words.

To present and disseminate the output of processed data; the combination of tables, graphs and structured texts is used in a meaningful way.

3.7 Validity and Reliability

As Saunders et al, (2012) explained, Validity defined as the extent to which data collection method or methods accurately measure what they were intended to measure and is concerned with whether the findings are really about what they appear to be about. Much is done to

authenticate the reliability and validity issues of the data to safeguard the credibility of the research and to avoid any flaws in the transparency of the implied output. According to Garson (2013) A study is valid if its measures actually measure what they claim to, and if there are no logical errors in drawing conclusions from the data. The study tried to eliminate those logical errors and validity issues in order to strengthen the reliability and validity of data sources by applying integrated qualitative and quantitative procedures that produce reliable and consistent findings throughout the research.

To make sure the reliability of data collection and process techniques implemented, the study gave detailed attention to select credible sources for both primary and secondary data in order to attain the appropriate outcome of the research and to meet the expected objectives. The study attempted to keep away from possibilities which reduces the study's reliability by bringing down any circumstances that negatively impacts the way participant performs; and avoid occurrence of participant error by selecting the best suitable time to conduct the interview and fill the questionnaire. In line manner, the interview is conducted in separate office without others presence to avoid the fear of answers overheard by someone else which produces a false positive response and to boost the participants confidence which avoids or reduces participant bias. The study also concentrates to be subjective when interpreting the result obtained from the respondent and tried to remain objective by focusing on the outputs only to avoid research errors and bias to produce a consistent result.

The validity is also verified by testing and comparing previously conducted similar study or projects using virtually indistinguishable variables in project management knowledge areas. Moreover, to achieve the construct validity of this study the questionnaire is carefully developed based on universally accepted and existing project management knowledge areas that measures project management practices. Besides, to ensure the results from the collected data accurately relates with the variables internally, the study used clearly prepared questionnaire tailored to fit the project which provides evidence to support or prove the existed problem areas and the data was collected analyzed and interpreted thoroughly in organized way. In addition to that proper sampling strategies are implemented and experts who well know most about the subject were selected to take part in the study. The sample on the study are representative of the project and

appear accurate sample size in order to measure and prove the validity of data to prove whether the study's findings can be generalized to other relevant groups.

Furthermore, the measurement of data reliability is conducted to check the Cronbach's alpha value using SPSS 26. Cronbach's alpha is widely used to prove internal consistency construct validity, with .60 considered acceptable for exploratory purposes, .70 considered adequate for confirmatory purposes, and .80 considered good for confirmatory purposes (Garson, 2013, 11). The test result confirms that the overall value is .862 which makes it good in confirming both reliability and validity. The individual Cronbach's alpha values of the constructs are displayed in the following table

Table 3.1 Reliability Result of the Constructs

S/No.	Variables	Cronbach's Alfa	Number of Items	Scale
1	Processes of Project Scope Management	0.726	6	1 - 5
2	Processes of Project Time Management	0.757	7	1 - 5
3	Processes of Project Cost Management	0.704	4	1 - 5
4	Processes of Project Quality Management	0.719	4	1 - 5
5	Processes of Project Resource Management	0.743	6	1 - 5
6	Processes of Project Communication Management	0.714	3	1 - 5
7	Processes of Project Risk Management	0.863	6	1 - 5
8	Processes of Project Integration Management	0.712	7	1 - 5
9	Processes of Project Procurement Management	0.898	7	1 - 5
10	Processes of Project Stakeholders Management	0.728	4	1 - 5

Source: from study's analyzed data

3.8 Research Ethics

University of Oxford press (2019) explained research ethics, the exercise of ethical directives and professional codes of conduct to the gathering, analysis, reporting, and publication of data concerning the focus of scientific attention or experiment, or research subjects, in specific active acceptance of participants' right to privacy, confidentiality, and informed consent.

To keep the importance of ethics throughout the process of collecting the necessary data, the study strictly applied moral rules and followed a universally accepted code of conduct to protect the privacy of participants by pledging the confidentiality of their responses. The anonymity of respondents was assured and clearly mentioned in the invitation part of the questionnaire that, the collected data are confidential and will not be shared with third parties. Likewise, documents from the archives of the institution which used as secondary data sources are accessed based on the application of the company's terms and conditions regarding its privacy and confidentiality policy.

CHAPTER FOUR

RESULT AND DISCUSSION

4.1 Introduction

This part of the research is designed to present, analyze, and interpret secondary data extracted from the company's archive and primary data collected from respondents by using the self-administered close-ended questionnaire. Raw data collected from the respondents are processed to produce meaningful information with the help of Statistical Package for Social Science (IBM_SPSS_Statistics_26.0) software. This analysis is conducted based on the questionnaire created to measure the attitudes and opinions of respondents towards the implementation of project management techniques used in Repi waste to energy plant construction project. The analysis of qualitative data collected from documents and interview questions done by aggregating the diverse ideas into categories of information to draw a common understanding about the questions and present them using words and tables. The output from the

processed data is presented and summarized on tables and discussed in light of the literature in ways to answer the basic questions posed in the study.

4.2 Response Rate

Cited by the American Association for Public Opinion Research (2015), "As defined by Council of American Survey Research Organizations (CASRO) (Frankel, 1983) and other sources (Groves, 1989; Hidiroglou, et al., 1993; Kviz, 1977; Lessler and Kalsbeek, 1992; Massey, 1995), the response rate is the number of complete interviews with reporting units divided by the number of eligible reporting units in the sample."

Out of the 40 questionnaires distributed to be filled and returned by volunteer respondents, 3 were not returned, one questionnaire is returned partially filled which makes it not pertinent to provide valuable input for the research and 36 of them which accounted for 90% were filled and returned duly. According to most social researchers, for academic purposes, this amount of response rate is considerably representative.

Table 4.1 Response rate

S/No	Status	Number/Frequency	Percentage %
1	Correctly filled and returned	36	90
2	Partially filled and returned	1	2.5
3	Not filled returned	3	7.5
	Total	**40**	**100**

4.2. Demographic Characteristics of Respondents

Identifying the demographic characteristics of the audiences in the study plays an important role in order to confirm we are targeting the right respondents who have appropriate insights about the project. The demographic characteristics considered in this study were: gender, age, the highest level of education, years of work experience and position in the project.

The principal motive of demographic characteristics presentation in this study is to give detailed account of the diversity of the respondents for readers. Taking sample size and project nature into account, the study doesn't under represented any group either in gender, age or academic qualification which has effects on their response or study findings.

Supporting tables with comparative information are provided below.

4.2.1. Gender

Out of 36 respondents participated in this study 72.2% were male and 27% were Female

Table 4.2 Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	26	72.2	72.2	72.2
	Female	10	27.8	27.8	100.0
	Total	**36**	**100.0**	**100.0**	

4.2.2. Age group representation

Due to its sensitiveness in most societies, to overcome some hurdles regarding revealing the actual age of respondents, the questionnaire is prepared using age categories.

Out of all the respondent's 8.3 percent of all are under the age of 25, and 38.1 percent are between the ages of 25 and 30. The majority of responders which accounts for 44.4 percent are between the age of 31 and 40. Only 8.3 percent of respondents among all are above the age of 40.

Table 4.3 Age Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Under 25 Years	3	8.3	8.3	8.3
	25-30 Years	14	38.9	38.9	47.2
	31-40 years	16	44.4	44.4	91.7

	41-50 Years	3	8.3	8.3	100.0
	Total	**36**	**100.0**	**100.0**	

4.2.3. Educational background

Regarding the educational background of the respondents, level of qualification and field of specialization were asked. Observation on table 4.3 indicates that 19.4 percent have a Diploma in different disciplines, 61.1 percent have bachelor degree and 16.7 percent had some Master's degrees. Only 2.8 percentages of the respondents have the only unidentified educational background.

Table 4.4 Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	7	19.4	19.4	19.4
	BA/BSc	22	61.1	61.1	80.6
	Masters	6	16.7	16.7	97.2
	Other	1	2.8	2.8	100.0
	Total	**36**	**100.0**	**100.0**	

4.2.4. Field of specialization

It becomes clear that a project like Repi waste to energy requires a variety in academic background and field of specialization. Employees with a different level of academic discipline with a larger pool of specialization are observed in the project. A widespread between most disciplines was observed with the larger proportion being in different Engineering fields as shown in the following table. The researcher observed that none of the project members have project management as a major field of specialization through different academic levels.

Table 4.5 Field of Specialization

	Description	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Civil Engineering	7	19.4	20.0	20.0

	Mechanical Engineering	3	8.3	8.6	28.6
	Electrical Engineering	6	16.7	17.1	45.7
	Business Administration	2	5.6	5.7	51.4
	Hydraulics	1	2.8	2.9	54.3
	Management	2	5.6	5.7	60.0
	Purchasing	2	5.6	5.7	65.7
	Environmental Science	1	2.8	2.9	68.6
	Computer Science	2	5.6	5.7	74.3
	Secretarial Science	2	5.6	5.7	80.0
	Electronics	1	2.8	2.9	82.9
	Surveying	2	5.6	5.7	88.6
	Electricity	1	2.8	2.9	91.4
	Accounting	2	5.6	5.7	97.1
	Power Engineering	1	2.8	2.9	100.0
	Total	**35**	**97.2**	**100.0**	
Missing	System	1	2.8		
	Total	**36**	**100.0**		

4.2.5. Work experience

Regarding the work experience of the respondents, 14 percent had experiences of below 5 years and the majority of responders which accounts for 39 percent lies between 5 -10 years of working experience as well as that 36% had above 10 -15 years of experience. The remaining 11 percent had more than 15 years of experience. This composition of experience indicates that, almost all of the respondents were active during the life span of the project. Unquestionably getting actual insight data from these years'-long experience in the project is mostly prudent and well-judged which in turn makes the output of the study reliable.

Table 4.6 Work Experience

	Frequency	Percent	Valid Percent	Cumulative Percent

	Under 5 Years	5	14	14	13.9
	5-10 Years	14	39	39	52.8
Valid	11-15 Years	13	36	36	88.9
	More than 15 Years	4	11	11	100.0
	Total	**36**	**100**	**100**	

Source

4.2.6. Respondent's Role in the Project

Due to the demand for statistical requirements, the researcher gives attention to collect the required data from a diversified group of employees who participated in different roles and position backgrounds in the project. Among the respondents, two of them acted as Project managers, four team leaders, and twenty-four project team members and the remaining six are support staff.

Table 4.7 Role in the Project

		Frequency	Percent	Valid Percent	Cumulative Percent
	Project Manager	2	6	6	5.6
	Project Team leader	4	11	11	16.7
Valid	Project Team member	24	67	67	83.3
	Support Staff	6	17	17	100.0
	Total	**36**	**100**	**100**	

4.3 Assessing major challenges to project performance

This portion of the study analyses the views of the respondents regarding the general background of the project. All of the respondents answered that there is existed a separate project

management office in EEP. When respondents were asked about their opinion concerning the internal challenges of the project, 13.9 percent believe that there was a lack of clarity in the scope of the project. The majority of the respondents, which account for 75 percent, explained that there is a problem related to time, cost, and quality that hinders the project progress to achieve its goal. The remaining 11.1 percent believe that the internal challenges of the project are related to resource handling and management. Considering the external challenges of the project, two-thirds of the respondents linked government policy and intervention to the main challenges the project faced. Apart from that, the remaining one-third believes the organizational culture and environment are liable for the external challenges. It should be noted that, based on the above views of responders the project faces both internal and external challenges.

Concerning the status of the project's success, it was noted that only 5.6 percent of responders consider it as a successful project. 61.1 percent acknowledge the project as fairly successful and the remaining 33.3 percent rated it as a non-successful or a failed project regarding status. Based on this summary, the project is in a nutshell less successful. The aforementioned findings are illustrated in the table below.

Table 4.8 General background about the project

S/No.	Description		Frequency	Percent	Valid Percent	Cumulative Percent
1	Is there a separate project management office for Repi WtE in EEPCO?	Yes	36.0	100.0	100.0	100
		Total	**36**	**100.0**	**100.0**	
2	In Your opinion what are the major internal challenges of the Project	Lack of clarity in the scope of the project	5	13.9	13.9	13.9
		Time, cost and quality	27	75.0	75.0	88.9

		Resources	4	11.1	11.1	100.0
		Total	**36**	**100.0**	**100.0**	
3	In Your opinion what are the major External challenges of the Project	Organizational Culture	10	27.8	27.8	27.8
		Government	24	66.7	66.7	94.4
		Environment	2	5.6	5.6	100.0
		Total	**36**	**100.0**	**100.0**	
4	Status of the Project Success	Successful	2	5.6	5.6	5.6
		Fairly Successful	22	61.1	61.1	66.7
		Not Successful	12	33.3	33.3	100.0
		Total	**36**	**100.0**	**100.0**	

4.4 Project management practices applied in Repi WtE vis-à-vis the project management knowledge areas

The process of gathering and analyzing information on the evaluation of practices implemented based on project management knowledge areas in Repi waste to energy project office is undertaken by manipulating mean scores of the question and feedback of respondents under each knowledge areas. As cited by Tigest (2017), Scott, (1999) suggested that for Likert type scale ranging from 1 (Strongly Disagree/ highly dissatisfied) to 5 (Strongly Agree/Highly Satisfied), interpretation should be like; mean up to 2.8 is considered as Disagree, from 2.9 to 3.2 means neutral or neither disagree nor agree and mean above 3.2 is considered as an agreement. Mean Values have been interpreted by adopting the criteria based on the above explanation.

Table 4.9 Processes of Project Scope Management

Processes of Project Scope Management	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Total		Mean
	N*	%	N	%	N	%	N	%	N	%	N	%	
Project's Scope Management Planned	0	0	10	28	10	28	11	31	5	14	36	100	2.69

Project's Requirements were Collected	0	0	5	14	8	22	17	47	6	17	36	100	2.33
Project's Scope Defined	0	0	1	2.8	13	36	14	39	8	22	36	100	2.19
Project's WBS (work breakdown structure) Created	0	0	5	14	9	25	14	39	8	22	36	100	2.31
Project's Scope was Validated	0	0	5	14	6	17	19	53	6	17	36	100	2.28
Project's scope Changes was controlled	0	0	1	2.8	13	36	14	39	8	22	36	100	2.19
Average													**2.33**

*N: is frequency.

As shown in the above table, 28 percent of respondents agreed that plan scope management was planned. at the same time the other 28 percent of respondents have not a clear stance on whether plan scope management was defined or not and remain to opted neutral. Whereas, 31 percent of them disagreed that the plan scope management was clearly defined. Whereas the remaining 14 percent of respondents strongly disagree that the plan scope management was clearly defined. The mean 2.69 from the abovementioned opinion of respondents, revealed that plan scope management was not defined well for the project.

The above table also stated that 14 percent of respondents agreed that the project's requirements were identified. 22 percent were not sure if the requirements were collected. On the contrary, the majority of respondents which are accounted for 47 percent of them, disagreed that requirements were collected and the remaining 17 percent strongly disagreed that the project's requirements were identified and. The mean 2.33 indicates the majority of respondents disagreed project requirements were collected.

It became evident that 2.8 percent of respondents agreed that project scope was defined and 36 percent were not sure if project scope was defined. On the contrary, the majority of the respondent which are accounted for 39 percent of them, disagreed that the project's scope was defined and the remaining 36 percent strongly disagreed that the project's scope was defined properly.

The next question was if WBS was created and only very low percentages of the respondent's which accounts for 14 percent agreed that it was created, 25 percent opted to remain on neutral, the majority respondents disagreed that WBS was created and the remaining 36 percent strongly disagreed that it was created. Depending on the above outcome a conclusion reached that WBS was not created as good as it was supposed to be. The respondents were also requested to share their opinion on whether the project scope was validated or not. The finding showed that 14 percent agreed that it was validated, 17 percent had no opinion, more than half of the respondents (54 percent) disagreed that scope was validated and the remaining 36 percent strongly disagreed. Hence, this result shows that a greater part of the respondents disagreed scope was validated. Respondents were also asked if the project's scope changes were controlled, and 2.8 percent of respondents agreed that the project's scope changes were controlled and 36 percent were not sure if the project's scope changes were controlled. On the contrary, the majority of the respondent which are accounted for 39 percent of them, disagreed that the project's scope changes were controlled and the remaining 36 percent strongly disagreed that project's scope changes were controlled in the right way.

With reference to the respondents' views as summarized on the above, the average mean for processes of project scope management is 2.33. One of the major components in defining a project is the process of project scope management. It is observed that the absence of the most important part of the upfront process, leads to a threat of damage to the goal which the project intended to achieve. From the interview of respondents and documents analyzed, it is also noted that changes that have a negative implication on schedule cost and quality were allowed to take place during the project execution without appropriate impact analysis. Unquestionably, the 2.33 mean and the result from the interview held indicate that the scope of a project is not properly defined, validated, documented, or changes are controlled.

Table 4.10 Processes of Project Time Management

Processes of Project Time Management	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Total		Mean
	N*	%	N	%	N	%	N	%	N	%	N	%	

Project's Schedule management planned	1	2.78	20	56	10	28	2	5.6	3	8.3	36	100	3.39
Project's activities defined	1	2.78	6	17	11	31	14	39	4	11	36	100	2.61
Project's activities sequenced	0	0	4	11	8	22	15	42	9	25	36	100	2.19
activity resources requirements	1	2.78	4	11	9	25	14	39	8	22	36	100	2.33
estimated activity duration estimated	0	0	2	5.6	10	28	16	44	8	22	36	100	2.17
Project's Schedule/timeline developed	0	0	2	5.6	12	33	17	47	5	14	36	100	2.31
Project's Schedule Controlled	0	0	3	8.3	13	36	16	44	4	11	36	100	2.42
						Average							**2.49**

*N: is frequency.

The above table also stated that very low percentages of the respondent's which accounts for 2.78 percent strongly agreed and the majority of respondents, 56 percent of respondents agreed that the project's schedule management planned. 28 percent were not sure about it and opted to be neutral. On the contrary, 5.6 percent of them, disagreed that the project's schedule management planned and the remaining 8.3 percent strongly disagree with that. The mean 3.39 indicates the majority of respondents agreed the project's schedule management was planned well.

The table also revealed that 2.8 percent of respondents strongly agreed that the project's activities defined and 17 percent agreed that the project's activities defined. 31 percent were not sure if the project's activities defined. On the contrary, the majority of the respondent which are accounted for 39 percent of them, disagreed that the project's activities defined and the remaining 11 percent strongly disagreed that project's activities defined properly.

The next question was if project activities sequenced and low percentages of the respondent's which accounts for 11 percent agreed that it was sequenced, 22 percent opted to remain on neutral, the majority respondents, 42 percent disagreed that project activities sequenced and the remaining 25 percent strongly disagreed that it was sequenced. Depending on the mean obtained (2.19) above, that project's activities were not sequenced well. The respondents were also requested to share their opinion on whether the activity resources requirements estimated or not. The finding showed that 2.78 percent strongly agreed on the issue and 11 percent agreed that it was estimated, 25 percent were having no opinion, the majority of respondents (39 percent) disagreed that activity resources requirements estimated and the remaining 22 percent strongly disagreed. The mean 2.33 implies that a greater part of the respondents disagreed with resource requirements were estimated. Respondents were also asked if the activity duration estimated, and 5.6 percent of respondents agreed that the activity duration estimated, and 2.8 percent were not sure if the activity duration estimated. On the contrary, the majority of the respondent which are accounted for 44 percent of them, disagreed that the activity duration estimated and the remaining 22 percent strongly disagreed that. Mean 2.17 shows that activity duration was not estimated in the right way. The table also shows that 8.3 percent of respondents agreed that the project's schedule controlled. the majority of respondents who are accounted for 36 percent were not sure if the project's schedule was controlled. On the contrary, 44 percent of them, disagreed and the remaining 11 percent strongly disagreed with that project's project's schedule controlled. The mean, 2.42 indicates the majority of respondents disagreed with the project's schedule controlled.

The above analysis revealed that the mean value for processes of project time management is 2.49, which is an indicator of low performance of execution. In addition to the above statistical fact, answers obtained from the interview confirmed that there was a lack of processing proper project time management skills and techniques.

The analysis from secondary data also revealed low performance in the execution of proper project time management skills and techniques. Due to mismanagement of time, the project encountered an extended delay of more than two years.

Table 4.11 Processes of Project Cost Management

Processes of Project Cost Management	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Total		Mean
	N*	%	N	%	N	%	N	%	N	%	N	%	
Project's cost management plan defined	0	0	0	0	21	58	13	36	2	5.6	36	100	2.53
Project's cost was estimated	0	0	6	17	13	36	15	42	2	5.6	36	100	2.64
Project's required budget was determined	0	0	1	2.8	13	36	20	56	2	5.6	36	100	2.36
Changes to the project budget was controlled	0	0	3	8.3	17	47	14	39	2	5.6	36	100	2.58
Average													2.53

*N: is frequency.

As shown in the above table, more than half of the respondents, which are accounted for 58 percent, have not a clear stance on whether plan project's cost management plan defined or not and remain to opted neutral and 36 percent of them disagreed that project's cost management plan clearly defined. Whereas the remaining 5.6 percent of respondents strongly disagree that the plan scope management was clearly defined. The mean 2.53 indicates the majority of respondents disagreed project's cost management plan defined.

The above table also stated that 17 percent of respondents agreed that the project cost was estimated. 36 percent were not sure if the requirements were collected. On the other hand, the majority of respondents which are accounted for 42 percent disagreed and the remaining 5.6 percent strongly disagreed that the project cost was estimated. The mean 2.53. indicates the majority of respondents disagreed project cost was estimated.

Furthermore, 2.8 percent of respondents agreed that the project's required budget was determined and 36 percent were not sure about it. On the contrary, the majority of respondents which are

accounted for 56 percent of them, disagreed that projects required budget was determined and the remaining 5.6 percent strongly disagreed that projects required budget was determined accurately.

The next question was if changes to the project budget were controlled and only very low percentages of the respondent's which accounts for 8.3 percent agreed that it was controlled, 47 percent opted to remain on neutral, the other 39 respondents disagreed that changes to the project budget were controlled and the remaining 5.6 percent strongly disagreed that changes were controlled. Depending on the above outcome a conclusion reached that changes to the project budget were controlled as good as it was supposed to be.

The mean 2.53, derived from the above table, dictates that there were a lack of project cost estimation, budget allocation, and cost control techniques in the project. This is also substantiated by the interview conducted with the project members. Documents obtained from the company also emphasized that there was a failure in processing the project's cost management.

In addition to that, the finding from secondary data shows that there was a lack of project cost estimation, budget allocation, and cost control techniques in the project. Repi waste to energy plant construction has cost more than 27 million US dollars in excess of the initially estimated budget.

Table 4.12 Processes of Project Quality Management

Processes of Project Quality Management	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Total		Mean
	N*	%	N	%	N	%	N	%	N	%	N	%	

Project's Quality standards were identified	0	0	8	22	9	25	13	36	6	17	36	100	2.53
Project's Quality standards were reviewed	0	0	3	8.3	11	31	15	42	7	19	36	100	2.28
Project performance were evaluated on regular basis	0	0	6	17	9	25	14	39	7	19	36	100	2.39
Results were monitored to check if they comply with the quality standards identified	1	2.78	4	11	9	25	2	5.6	20	56	36	100	2.00
Average													2.30

*N: is frequency.

As shown in the above table, 22 percent of respondents agreed that the project's quality standards were identified at the same time the other 25 percent of respondents have not a clear stance on whether the project's quality standards were identified or not and remain to opted neutral. Whereas, 36 percent of them disagreed that the project's quality standards were identified. Whereas the remaining 17 percent of respondents strongly disagree that the project's quality standards were identified. The mean 2.53 from the abovementioned opinion of respondents, revealed that the project's quality standards were identified well for the project.

The above table also stated that 8.3 percent of respondents agreed that the project's quality standards were reviewed. 31 percent were not sure and opted to remain neutral. On the contrary, the majority of respondents which are accounted for 42 percent of them, disagreed that the project's quality standards were reviewed and the remaining 19 percent strongly disagreed that project's quality standards were reviewed. The mean 2.28 indicates the majority of respondents disagreed project's quality standards were reviewed.

It became evident that 17 percent of respondents agreed that project performance was evaluated regularly and 25 percent were not sure if project performance was evaluated regularly. In contrary, the majority of the respondent which are accounted for 39 percent of them, disagreed project performance were evaluated on regular basis and the remaining 19 percent strongly disagreed project performance were properly evaluated on regular basis. The next question was if results were monitored to check if they comply with the quality standards and only very low percentages of the respondent's which accounts for 2.78 percent strongly agreed and 11 percent agreed that it was monitored. 25 percent opted to remain neutral, only 5.6 percent disagreed that results were monitored and the majority 56 percent strongly disagreed that it was monitored. Depending on the above outcome, a conclusion reached that results were not monitored to check if they comply with the quality standards.

The mean obtained from each factor revealed that review, identification, performance evaluation, and control processes were not implemented as per the standards. The mean 2.30 is below average and reflects the negligence of project office staff in the project quality management process. The above conclusions were also confirmed from the result of an interview conducted with the project staff.

Based on the secondary data outcome, a conclusion reached also reflects that project office staffs were negligent in the project quality management process. This expresses the absence of review, identification, performance evaluation, and control processes that were not implemented as per the standards. The same reports and evaluation reports also uncover that some of machineries and equipments planted are either out of standards or outdated ones

Table 4.13 Processes of Project Resource Management

Processes of Project Resource	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total	Mean

Management	N*	%	N	%	N	%	N	%	N	%	N	%	
Project's resource management Planned	0	0	12	33	20	56	2	5.6	2	5.6	36	100	3.17
Project's activity resources estimated	1	2.78	18	50	7	19	8	22	2	5.6	36	100	3.22
Project's resources acquired	0	0	23	64	10	28	1	2.8	2	5.6	36	100	3.50
Projects team developed	3	8.33	25	69	3	8.3	3	8.3	2	5.6	36	100	3.67
Project's team managed	0	0	0	0	17	47	17	47	2	5.6	36	100	2.42
Project's resources controlled	0	0	0	0	5	14	15	42	16	44	36	100	1.69
						Average							2.94

*N: is frequency.

The above table also stated that, 33 percent of respondents agreed that the project's resource management planned. More than half of respondents were not sure about it and opted to be neutral. On the contrary, 5.6 percent of them, disagreed that the project's resource management planned and the remaining 5.6 percent strongly disagree with that. The mean 3.17 indicates the majority of respondents agreed that the project's resource management planned well. The table also revealed that 2.78 percent of respondents strongly agreed that the project's activity resources estimated and almost half of the respondents agreed that the project's activities defined. 19 percent were not sure if the project's activity resources estimated. 22 percent of respondents disagreed that the project's activity resources estimated and the remaining 5.6 percent strongly disagreed that the project's activity resources estimated properly. The mean 3.22 indicates the majority of respondents agreed that the project's activity resources were estimated well.

The next question was if the project resources acquired and 64 percent of the respondents agreed with that it was acquired, 28 percent opted to remain neutral, and 2.8 percent disagreed that the project's resources acquired. The remaining 5.6 percent strongly disagreed with that it was

acquired. The mean obtained 3.5 shows that project resources were well acquired. The respondents were also requested to share their opinion on whether the projects team developed or not. The finding showed that 8.33 percent strongly agreed on the issue and the majority of respondents, 69 percent agreed that the projects team was developed. 8.3 percent had no opinion and opted neutral, 8.3 disagreed that activity projects team developed and the remaining 5.6 percent strongly disagreed. The mean 3.67 implies that a greater part of the respondents agreed with the projects team were properly developed. Respondents were also asked if the project's team managed, and 47 percent were not sure if the project's team managed and have a neutral stance. Aside from that, the majority of the respondent which are accounted for 47 percent of them, disagreed that the project's team managed and the remaining 5.6 percent strongly disagreed that. Mean 2.42 shows that the project's team was not managed accordingly. The table also shows that 14 percent of respondents were not sure if the resources are controlled, and 42 percent of them, disagreed and the remaining 44 percent strongly disagreed with that project's resources controlled. The mean 1.69 indicates the majority of respondents disagreed with the project's resources were controlled as per requirement.

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The above analysis shows the average mean of the factors is 2.94. This emphasizes that not only most of the project's resource management planned, resources estimated, acquired well but also apprise that the project team was properly developed by the book. The secondary data generated from viewed documents and literature also supported the above conclusion. In addition to that interview conducted with the project's staff shows that there was a relatively good implementation of project resource management in some segments of the process and also shortcomings in the project's team management and controlling resources.

Table 4.14 Processes of Project Communication Management

Processes of Project Communication Management	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Total		Mean
	N*	%	N	%	N	%	N	%	N	%	N	%	
Project's Communications Management Planned	0	0	6	17	20	56	7	19	3	8.3	36	100	2.81
Project's Communications Planned	0	0	4	11	23	64	7	19	2	5.6	36	100	2.81
Project's Communications Controlled	0	0	2	5.6	16	44	17	47	1	2.8	36	100	2.53
						Average							2.71

*N: is frequency.

As shown in the above table, 17 percent of respondents agreed that the project's communications management was planned. More than half of the respondents (56 percent) of respondents have not a clear stance on whether the project's communications management was planned or not and remain to opted neutral. On the contrary, 19 percent of them disagreed that the project's communications management was planned. Whereas the remaining 8.3 percent of respondents strongly disagree that the project's communications management was planned. The mean 2.81 indicates the majority of respondents disagreed that the project's communications management was planned well for the project.

The above table also stated that 11 percent of respondents agreed that the project's communications planned. the majority of respondents who are accounted for 64 percent were not sure if the project's communications planned. On the contrary, 19 percent of them, disagreed and the remaining 5.6 percent strongly disagreed that project’s communications planned. The mean 2.81 indicates the majority of respondents disagreed with the project's communications plan. It became evident that 5.6 percent of respondents agreed that the project's communications were controlled and 44 percent were not sure if communications were controlled. On the contrary, the majority of respondents which are accounted for 47 percent of them, disagreed that

communications were controlled and the remaining 2.8 percent strongly disagreed that communications were controlled properly.

As shown above the project communication management process was average in planning communications. This is also supported by the outcomes of some report documents reviewed. The interview held with project staff also proves the above fact. There were also findings that indicate that the project experienced lower performance in controlling communication management.

Table 4.15 Processes of Project Risk Management

Processes of Project Risk Management	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Total		Mean
	N*	%	N	%	N	%	N	%	N	%	N	%	
Project's Risk management plan developed	0	0	0	0	8	22	21	58	7	19	36	100	2.03
Project's Risks identified and registered	0	0	0	0	11	31	16	44	9	25	36	100	2.06
Project's qualitative and quantitative risks analyzed	0	0	0	0	10	28	18	50	8	22	36	100	2.06
Project's Risk response plan developed	0	0	0	0	10	28	19	53	7	19	36	100	2.08
Project's Risk response implemented	0	0	0	0	11	31	20	56	5	14	36	100	2.17
Project's risks were monitored	0	0	0	0	11	31	18	50	7	19	36	100	2.11
						Average							2.08

*N: is frequency.

The above table also stated that, none of the respondents strongly agreed or agreed with that the project's risk management plan developed. More than 22 percent of respondents were not sure about it and opted to be neutral, and more than 58 percent of them disagreed that the risk management plan developed and the remaining 19 percent strongly disagree with that. The mean 2.03 indicates the risk management plan was not developed well. The table also revealed that 31 percent of respondents were not sure if the risks are identified and registered and opted neutral. 44 percent of respondents disagreed with that and the remaining 25 percent also strongly disagreed with that properly. The mean 2.06 indicates the risks are not identified and registered accordingly.

The next question was if the project's qualitative and quantitative risks analyzed and 28 percent of respondents were not sure if the risks are risks are analyzed and opted neutral. 50 percent of respondents disagreed with that and the remaining 22 percent also strongly disagreed with qualitative and quantitative risks analyzed. The mean 2.06 indicates that the project's qualitative and quantitative risks were not analyzed accordingly. The respondents were also requested to share their opinion on whether the project's risk response plan developed or not and 28 percent of respondents were not sure if the project's risk response plan developed and opted neutral. 53 percent of respondents disagreed with that and the remaining 19 percent also strongly disagreed with the project's risk response plan developed. The mean 2.08 indicates that the project's project's risk response plan was not developed accordingly. Respondents were also asked if the project's risk response implemented, and 31 percent of respondents were not sure if the project's risk response was implemented and opted neutral. 56 percent of respondents disagreed with that and the remaining 14 percent also strongly disagreed with the project's risk response implemented. The mean 2.17 indicates that the project's risk response was not implemented accordingly. The table also shows that 14 percent of respondents were not sure if the project's risks were monitored, and 31 percent of respondents were not sure if the project's risks were monitored and opted neutral. 50 percent of respondents disagreed with that and the remaining 19 percent also strongly disagreed with the project's risks were monitored. The mean 2.11 indicates that the project's risks were not monitored accordingly.

The above analysis shows the average mean of the factors is 2.08 which is way below average. This signified that process of project risk management was not implemented in Repi waste to energy project. The secondary data generated from viewed documents and literature also

revealed that there was no smooth and efficient process execution in minimizing risks. Furthermore, this issue is firmly confirmed by interviews held with project staff and observed in the manifestation of failure in generating capacity, corruption and fraud happened which are the result of lower risk management.

Table 4.16 Processes of Project Integration Management

Processes of Project Integration Management	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Total		Mean
	N*	%	N	%	N	%	N	%	N	%	N	%	
Project Charter Developed	0	0	0	0	11	31	14	39	11	31	36	100	2.00
Project management plan Developed	0	0	0	0	9	25	16	44	11	31	36	100	1.94
Perform Integrated Change Control	0	0	1	2.8	9	25	13	36	13	36	36	100	1.94
Project management plan, documents and process assets updated	0	0	2	5.6	8	22	23	64	3	8.3	36	100	2.25
Project Work monitored and controlled	0	0	4	11	11	31	18	50	3	8.3	36	100	2.44
Integrated change control performed	0	0	10	28	4	11	20	56	2	5.6	36	100	2.61
Close Project or Phase	0	0	2	5.6	13	36	19	53	2	5.6	36	100	2.42
						Average							**2.26**

*N: is frequency.

The above table also stated that, none of the respondents strongly agreed or agreed with that the project charter was developed. More than 31 percent of respondents were not sure about it and

opted to be neutral, and more than 39 percent of them disagreed that the project charter developed and the remaining 31 percent strongly disagree with that. The mean 2.00 indicates the project charter was not developed well. The table also revealed that 25 percent of respondents were not sure if the project management plan developed and opted neutral. 44 percent of respondents disagreed with that and the remaining 31 percent also strongly disagreed with that properly. The mean 2.06 indicates the project management plan was not developed accordingly.

The next question was if the integrated change control performed and only 2.8 percent have agreed on. 25 percent of respondents were not sure if the integrated change control performed and opted neutral. 36 percent of respondents disagreed with that and the remaining 36 percent also strongly disagreed with integrated change control performed. The mean 1.94 indicates that the integrated change control was not performed accordingly. The respondents were also asked if the project management plan, documents, and process assets updated regularly and only 5.6 percent have agreed on. 22 percent of respondents were not sure if the integrated change control performed and opted neutral. 64 percent of respondents disagreed with that and the remaining 8.3 percent also strongly disagreed with the project management plan, documents and process assets updated regularly. The mean 2.23 indicates that the project management plan, documents, and process assets were not updated regularly accordingly. Respondents were also asked if the project Work monitored and controlled. only 11 percent have agreed on and 31 percent of respondents were not sure if the project work monitored and controlled and opted neutral. 50 percent of respondents disagreed with that and the remaining 8.3 percent also strongly disagreed with project work monitored and controlled. The mean 2.44 indicates that the project work was not monitored and controlled by the book. The table also shows that 28 percent of respondents were not sure if integrated change control performed, only 11 percent have agreed on and 56 percent of respondents were not sure if the integrated change control was performed and opted neutral. 50 percent of respondents disagreed with that and the remaining 5.6 percent also strongly disagreed with the project's integrated change control performed. The mean 2.61 indicates that the integrated change control was not performed appropriately. Respondents were also asked about the closing of the project or phase. only 11 percent have agreed on and 31 percent of respondents were not sure if the closing of the project or phase done and opted neutral. 50 percent of respondents disagreed with that and the remaining 8.3 percent also strongly disagreed

with the closing of the project or phase is done. The mean 2.42 indicates that the closing of the project or phase was not done by the book.

The above analysis shows the average mean of the factors is 2.26 is below average. This signified that process project integration was not practiced at a level. The secondary data generated from viewed documents and literature also revealed that there was little done in project closing. Most of the employees disclose in the interview that failure in generating capacity, project delay, and excess in costs was easily avoidable if project integration is monitored and controlled as per the standard.

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Table 4.17 Processes of Project Recruitment Management

Processes of Project Recruitment Management	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Total		Mean
	N*	%	N	%	N	%	N	%	N	%	N	%	
Projects procurement management planned	0	0	0	0	4	11	7	19	25	69	36	100	1.42
Requirements of the project materials and technology selected	0	0	0	0	4	11	15	42	17	47	36	100	1.64
Potential sources were identified	0	0	0	0	4	11	14	39	18	50	36	100	1.61
Contract quotations, bid, offers or proposal were obtained	0	0	0	0	4	11	13	36	19	53	36	100	1.58
Potential contractors selected	0	0	0	0	5	14	14	39	17	47	36	100	1.67
Relationship with the contractor was managed	0	0	0	0	7	19	3	8.3	26	72	36	100	1.47

Contract was controlled and monitored properly	0	0	0	0	4	11	9	25	23	64	36	100	1.47
						Average							1.55

*N: is frequency.

The above table also stated that, none of the respondents strongly agreed or agreed with that the project's procurement management planned. More than 11 percent of respondents were not sure about it and opted to be neutral, and more than 19 percent of them disagreed that the projects procurement management planned and the remaining 69 percent strongly disagree with that. The mean 1.42 indicates the project's procurement management was not planned well. The table also revealed that 11 percent of respondents were not sure if the requirements of the project materials and technology selected and opted neutral. 42 percent of respondents disagreed with that and the remaining 47 percent also strongly disagreed with the requirements of the project materials and technology selected properly. The mean 1.64 indicates the requirements of the project materials and technology were not selected as of current technology.

The next question was if the potential sources were identified and 11 percent of respondents were not sure if the proper potential sources were identified and opted neutral. 39 percent of respondents disagreed with that and the remaining 50 percent also strongly disagreed with potential sources were identified. The mean 1.61 indicates that the potential sources were not identified using proper channels. The respondents were also requested to share their opinion on whether the contract quotations, bid, offers, or proposals were obtained or not and 11 percent of respondents were not sure if the contract quotations, bid, offers, or proposals were obtained and opted neutral. 36 percent of respondents disagreed with that and the remaining 53 percent also strongly disagreed with contract quotations, bid, offers, or proposals were obtained. The mean 1.58 indicates that the contract quotations, bid, offers, or proposals were not obtained. Respondents were also asked if potential contractors selected, and 14 percent of respondents were not sure if the potential contractors selected and opted neutral. 39 percent of respondents disagreed with that and the remaining 47 percent also strongly disagreed with potential contractors selected. The mean 1.67 indicates that the potential contractors selected accordingly. The table also shows that 19 percent of respondents were not sure if the relationship with the contractor was managed and opted neutral. 8.3 percent of respondents disagreed with that and the remaining 72 percent also strongly disagreed with the relationship with the contractor was

managed. The mean 1.41 indicates that the relationship with the contractor was managed wrongly. The table also shows that 11 percent of respondents were not sure if the contract was controlled and monitored properly and opted neutral. 25 percent of respondents disagreed with that and the remaining 64 percent also strongly disagreed with the contract was controlled and monitored properly. The mean 1.55 indicates that the contract was not controlled and monitored properly.

The data results displayed in the above analysis indicate that the mean of all factors is 1.55 which is much lower than the average. Not only the above data but also the input from interview held with the project members underlines that processes of project recruitment management conducted out of the loop.

Documents from the projects also highlight that procedures in conducting project procurement were failed to comply with the official tender and procurement policies set by the government. This is exhibited by the absence of contract quotations, bid, offers or proposal from more than one party; lack of transparency in the contractors' selection process, there was no any evidence on selection materials and technology which are compatible with the current waste to energy-generating technology. Relying on the aforementioned data, the extent of recruitment management processes in Repi WtE were low.

Table 4.18 Processes of Project Stakeholders Management

Processes of Project Stakeholders Management	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Total		Mean
	N*	%	N	%	N	%	N	%	N	%	N	%	
Project stakeholders were identified	5	13.9	12	33	11	31	6	17	2	5.6	36	100	3.33
Stakeholder management plan was defined	0	0	13	36	18	50	3	8.3	2	5.6	36	100	3.17
Stakeholder engagement managed	0	0	1	2.8	17	47	16	44	2	5.6	36	100	2.47
Stakeholders	0	0	0	0	6	17	22	61	8	22	36	100	1.94

engagement Monitored/ Controlled		
	Average	2.73

*N: is frequency.

As shown in the above table, 13.9 percent of respondents strongly agreed that project stakeholders were identified and 33 percent of respondents agreed that project stakeholders were identified. At the same time the other 31 percent of respondents have not a clear stance on whether project stakeholders were identified or not and remain to opted neutral. Whereas, 17 percent of them disagreed project stakeholders were identified was clearly defined. Whereas the remaining 5.6 percent of respondents strongly disagree that the project stakeholders were identified. The mean 3.33 indicates the majority of respondents agree that project stakeholders were identified well for the project.

The above table also stated that 36 percent of respondents agreed that the stakeholder management plan was defined. Half of the respondents were not sure if the stakeholder management plan was defined. 8.3 percent of them disagreed that the stakeholder management plan was defined and the remaining 5.6 percent strongly disagreed that. The mean 3.17 indicates the majority of respondents agreed stakeholder management plan was defined.

The respondents were also requested to share their opinion on whether stakeholder engagement managed or not. The finding showed that 2.8 percent agreed that it was managed, 47 percent were having no opinion, 44 percent disagreed that stakeholder engagement managed and the remaining 5.6 percent strongly disagreed. Hence, this result shows that the greater part of the respondents disagreed with stakeholder engagement managed.

Respondents were also asked if engagement of stakeholders had been monitored/ controlled, and 17 percent of respondents were not sure. But the majority of respondents which are accounted for 61 percent of disagreed that and the remaining 22 percent strongly disagreed that regarding appropriateness of the stakeholder's engagement monitoring/ controlling in the process of project management.

The above analysis shows all the factors under the processes of project stakeholders management have a mean value of 2.73. A good reputation in the identification of stakeholders and management plan definition were observed. The major drawback back identified by the respondents were in managing the engagement of stakeholders and the controlling process. Different documents analyzed from the project also strengthens the aforementioned conclusion.

Table 4.19 Rank of the application of PM practice identified in the study on the basis of aggregate mean perception of study participants

Rank	Variables	Cronbach's Alfa	Standard Deviation	Aggregate mean
1st	Processes of Project Resource Management	0.743	0.842	2.94
2nd	Processes of Project Stakeholders Management	0.728	0.798	2.73
3rd	Processes of Project Communication Management	0.714	0.853	2.71
4th	Processes of Project Cost Management	0.704	0.745	2.53
5th	Processes of Project Time Management	0.757	0.913	2.49
6th	Processes of Project Scope Management	0.726	0.916	2.33
7th	Processes of Project Quality Management	0.719	0.986	2.30
8th	Processes of Project Integration Management	0.712	0.795	2.26
9th	Processes of Project Risk Management	0.863	0.696	2.08
10th	Processes of Project procurement Management	0.898	0.769	1.55

Source: data from the study

In summary, the findings derived from the above discussion and results part of this study revealed poor performance in application of PMBOK areas and project management practices were carried out to limited extent that hinders the success of the project throughout the execution period and brought negative effect on the desired outcomes or deliverables of the project in comparison with theoretical assumptions and standards of project management institute (PMI).

As a recognized benchmark which comprises of the accumulation of widely proven practices from various project managers from different walk of life, application of PMBOK areas in project management steers the success of a project in a positive course of action or the other way round. Previous studies on similar projects also reaffirms that the proper application of project management knowledge areas could offer more tools and techniques which go beyond the

widely implemented focus areas of time cost and quality management to project managers to ensure the project completes successfully with all of its stakeholders satisfied. However, based on acquired facts from informants through this study exercising PMBOK areas were appear too complex for EEPCO which is a parent company for Repi Waste to Energy Plant, which have a void to be filled in the project management field. The results of the discussion also suggest that EEPCO, as institution working to increase the electric generation capacity of the nation to become the power hub of Africa; by building several undergoing and upcoming new small scale and mega infrastructure projects under its umbrella, must give prior to implement PMBOK areas in those projects to avoid difficulties like an overabundance of budget, nonperformance in coordination between schedule and execution.

4.5 Key informants' opinion

To enhance the validity of the study and to better answer the research question that aimed at identifying the main factors hindering the project performance from the project management perspective, the study identified 10 key informants from the Client Contractor and Consultants to discuss the study's findings and to ask their agreement or disagreement on the above rank ordered finding of project management application on the project. The Key informant interview was made using google doc online questionnaire form.

Table 4.20 Key informants' opinion on the rank ordered findings of PM application

S/No	Opinion	Number/Frequency	Percentage %
1	Strongly agree on the ranking	8	80
2	Agree on the ranking	1	10
3	Disagree on the ranking	1	10
	Total	**10**	**100**

The above table reflects the view expressed by key informants regarding to the study's findings on the ordered rank of PMBOK areas implementation in the project as the main factors hindering the project performance.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

Chapter five presents a brief summary of major findings and derived conclusions and the recommendations.

5.2. Summary

Based on the survey, the synopsis of findings are outlined below

- All of the respondents explained that there is existed a separate project management office in EEPCO.
- The project has encountered both internal and external challenges. Major internal challenges of the project are lack of clarity in the scope of the project; problems related to time, cost, and quality management; poor resource handling and management. The Major external challenge runs into organizational culture, government policy and intervention.
- Concerning the status of the project's success, the majority of respondents rated it as a non-successful or failed project. It failed in generating capacity.
- The scope of a project is not properly defined, validated, documented, or changes are not controlled. It is observed that there was a deficiency in defining the process of project scope which gives rise to a threat of damage to the goal of the project intended to achieve.
- The analysis revealed low performance in the execution of proper project time management skills and techniques. Due to mismanagement of time, the project encountered an extended delay of more than two years.

- Derived from the survey, the finding dictates that there was a lack of project cost estimation, budget allocation, and cost control techniques in the project. These substantiated by 25 million US dollars in excess of the estimated budget.
- Depending on the survey outcome, a conclusion reached reflects that project office staffs were negligent in the project quality management process. This expresses the absence of review, identification, performance evaluation, and control processes that were not implemented as per the standards. Some professionals also uncover that some of machineries and equipments planted are either out of standards or outdated ones.
- The outcome of the survey emphasizes that not only the project's resource management planned, resources estimated, acquired well but also apprise that the project team was properly developed by the book. In addition to that, there was a relatively good implementation of project resource management in some segments of the process and also shortcomings in the project's team management and controlling resources.
- The project communication management process in Repi waste to energy project lies in two categories, accomplished average in planning communications and experienced lower performance in controlling communication management.
- The end result of the analysis signified that process of project risk management was not implemented in Repi waste to energy. There was no smooth and efficient process execution in minimizing risks. a manifestation of failure in generating capacity, corruption and swindling were resulted due to lower risk management.
- The above analysis shows that the process of project integration was not practiced at a level and a bit has done in project closing. failure in power generating capacity, project delay, and excess in costs was easily avoidable if project integration is monitored and controlled as per the standard.
- The findings underline that the processes of project recruitment management conducted was out of the loop. It also highlights that procedures in conducting project procurement were failed to comply with the official tender and procurement policies set by the government. This is exhibited by the absence of contract quotations, bid, offers or proposal from more than one party; lack of transparency in the contractors' selection process, there was no any evidence on selection materials and technology which are compatible with the current waste

to energy-generating technology. Relying on the aforementioned data, it is to conclude that processes of project recruitment management were a total catastrophe.

- Good reputation in the identification of stakeholders and management plan definitions were observed. The major drawback identified by the study was in managing the engagement of stakeholders and the controlling process.

5.3 Conclusion

The objective of this study is to assess and examine the overall implementation of project management practices in Repi waste to energy construction project. Based on the output of the study, the following conclusions have resulted.

Project management practices influences the success of a project in a positive course of action or the other way round. Based on acquired facts from Repi waste to energy plant project through this study, project management practices were carried out to limited extent that hinders the success of the project and brought negative effect on the desired success or deliverables. The inferences drawn from low performance of application of project management knowledge areas is mainly exhibited by an extended delay for more than two years and by 27 million US dollars in excess of the estimated budget.

Some factors are identified as challenges in practicing project management knowledge areas. There was paucity in project management skill within project team. The project management team have not given attention to overcome the internal and external challenges of the project by setting specific direction in order to clarify the scope of the project and making plans to take into account what is likely to happen in advance related to time, cost, and quality management. In addition to that project integration management was not effectively practiced in the project. Lack of project risk management practices which resulted in failure in generating capacity, corruption, swindling and delay observed. There were also poor implementation in project stakeholders, resource, communication and procurement management practices. The procurement process was not conducted clearly as the guidelines and policies set by the government. There was a lack of transparency in the contractors' selection process; and no clear evidence on the selection of materials and technology which are compatible with the current waste to energy-generating technology. The study reveals that, little has done to downsize the consequences and improve

efficiency and productivity, utilization of resources, cost control, mitigating risk, enhancing planning, time management and more key factors in achievement of project deliverables through implementation of knowledge areas.

Comprehensively, Repi waste to energy plant construction project was guided without proper application of project management body of knowledge areas. It is a "failed and unsuccessful" because it does not meet performance, cost, time, or scope.

The application of all of knowledge areas, implementation of project management tools and techniques needed to be improved for further implementation of projects. Attention must be given for human resource management, project time management skills and techniques, cost management, risk management and response strategy, proper project recruitment management, and effective communication management strategy implementation to deal with challenges in further projects. Furthermore, EPPCO must have invest in modern project management technologies and human resources regarding to provide sustainable training for project team to develop knowledge driven decision skills which have high impact on project success.

5.3 Recommendations

Based on trends experienced from the survey, the study would like to recommend the following practices which are crucial in delivering successful projects.

- A solid foundation of the project must have lied by setting deliverables with stakeholders and team members.
- As the backbone of any project attention must be given for human resource management. Designating right team members with proper set and level of skills, aspiring team, foster a commitment, should have to be regarded as a priority.
- Stakeholders and project teams should define the scope of the project by integrating with plan scope management, requirements, scope validation, creating WBS and develop mechanisms to control changes.
- Project time management skills and techniques must be implemented by defining and sequencing activities, estimating the duration of activities, developing a schedule and controlling changes to the project schedule.

- Project cost management techniques must be implemented efficiently to execute cost estimation, budget allocation, and control changes in cost.
- Mapping adequate risk management and response strategy. Risks have to be identified in prior, registered, monitored and controlled wisely.
- Design an effective communication management strategy.
- Conducting proper project recruitment management. project procurement execution must be in compliance with the official tender and procurement policies set by the government. contract quotations, bid, offers, or proposals must be analyzed in accordance with quality standards and the desired technology before selecting or accepting them.

In summing up, to avoid similar drawbacks while implementing projects like Repi waste to energy, practicing project management knowledge areas wisely is essential to ensure success in delivering projects.

5.5 Future Research

EEPCO is undertaking a large number of Electric power generating projects, but this research is only focused on Repi waste to energy plant project. As EEPCO is a project-based institution, conducting large scale research will help in order to indicate directions to overcome the shortcomings in project management practices within it. The researcher recommends further researchers to deeply investigate and come up with better suggestions and recommendations to improve the practices of project management in the EEPCO.

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APPENDIX A:

Questionnaires and Interview

JIMMA UNIVERSITY
FACULTY OF BUSINESS AND ECONOMICS
DEPARTMENT OF ACCOUNTING AND FINANCE
GRADUATE PROGRAM IN PROJECT MANAGEMENT & FINANCE

Dear Participants

I want to convey my deepest gratitude in advance for all your time and effort to respond to this research questionnaire. This study is being conducted by Haile Getachew Tessema, a postgraduate student at Jimma University Business and Economics faculty department of accounting and finance, Project management and Finance MA program. The sole aim of this questionnaire is to gather data for a thesis, partial fulfillment of master's degree, which is titled **Assessment of Project Management practice in Repi Waste-to-Energy Plant Construction Project.**

I assure you that the collected data will be used for this thesis purpose and will be analyzed anonymously

The information is going to be used as primary data for this research believing that your frank and genuine responses will contribute vastly to the quality of the findings of this study. The researcher would like to ask you to kindly complete this questionnaire, as truthfully as possible as the responses you provide will be kept confidential and will be used only for the study under consideration.

Thank you for your highly Valuable time and co-operation

With Regards

Haile Getachew

Mobile (+251) 0911177964
Email hagetmg@gmail.com

Instruction: Please respond to the following questions either by ticking the appropriate box or by writing your answer in the space provided

Survey question

Section I. Demography and Background data of responders

1. Gender ☐ Male ☐ Female

2. Your Education Level

☐ Diploma ☐ BA /BSc ☐ Masters ☐ Ph.D. ☐ Other

3. Field of Specialization (The field you have studied) _____

4. Experience: Years of Experience

☐ Under 5 years ☐ 5-10 years ☐ 11-15 years ☐ more than 15 Years

5. Age:

☐ Under 25 years ☐ 25-30 Years ☐ 36-40 years ☐ 41-50 years ☐ more than 50

6. Your role in the project/company

☐ Top Management ☐ Project Team Leader ☐ M&E Expert

☐ Senior Management ☐ Project coordinator ☐ Support Staff

Section II. General Issues

1. Is there separate project management office for Repi in EEPCO? ☐ Yes ☐ No

2. In Your opinion what are the major internal challenges of the Project

   A. Lack of clarity in the scope of the project ☐
   B. Time, cost and quality ☐
   C. Resources ☐
   D. Policies and procedures ☐
   E. Other (please specify) _____

3. In Your opinion what are the major External challenges of the Project

   A. Organizational culture ☐ B. Government ☐ C. Environment ☐

   Other (please specify) _____

4. What is the status of your project in terms of success

   Very successful ☐ Successful ☐ Fairly Successful ☐ Not Successful ☐

<u>Section III.</u> Assessment of Project Management practice Based on Knowledge Areas of Project Management according to PMBOK

Based on your knowledge and experience of the practice of project management in the Repi Waste to energy project, please answer all the questions listed under each project management knowledge areas.

S/No	Processes of Project Scope Management	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		5	4	3	2	1
1	Project's Scope Management Planned					
2	Project's Requirements were Collected					
3	Project's Scope Defined					
4	Project's WBS (work breakdown structure) Created					
5	Project's Scope was Validated					
6	Project's scope Changes was controlled					
S/No	Processes of Project Time Management	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		5	4	3	2	1
1	Project's Schedule management planned					
2	Project's activities defined					
3	Project's activities sequenced					
4	activity resources requirements estimated					
5	activity duration estimated					
6	Project's Schedule/timeline developed					
7	Project's Schedule Controlled					
S/No	Processes of Project Cost Management	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		5	4	3	2	1
1	Project's cost management plan defined					
2	Project's cost was estimated					
3	Project's required budget was determined					
4	Changes to the project budget were controlled					

S/No	Processes of Project Quality Management	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		5	4	3	2	1
1	Project's Quality standards were identified					
2	Project's Quality standards were reviewed					
3	Project performance was evaluated on regular basis					
4	Results were monitored to check if they comply with the quality standards identified					
S/No	Processes of Project Resource Management	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		5	4	3	2	1
1	Project's resource management Planned					
2	Project's activity resources estimated					
3	Project's resources acquired					
4	Projects team developed					
5	Project's team managed					
6	Project's resources controlled					
S/No	Processes of Project Communication Management	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		5	4	3	2	1
1	Project's Communications Management Planned					
2	Project's Communications Planned					
3	Project's Communications Controlled					
S/No	Processes of Project Risk Management	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		5	4	3	2	1
1	Project's Risk management plan developed					
2	Project's Risks identified and registered					
3	Project's qualitative and quantitative risks analyzed					
4	Project's Risk response plan developed					
5	Project's Risk response implemented					
6	Project's risks were monitored					

S/No	Processes of Project Integration Management	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		5	4	3	2	1
1	Project Charter Developed					
2	Project management plan Developed					
3	Perform Integrated Change Control					
4	Project management plan, documents and process assets updated					
5	Project Work monitored and controlled					
6	Integrated change control performed					
7	Close Project or Phase					
S/No	Processes of Project Recruitment Management	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		5	4	3	2	1
1	Projects procurement management planned					
2	Requirements of the project materials and technology selected					
3	Potential sources were identified					
4	Contract quotations, bid, offers or proposal were obtained					
5	Potential contractors selected					
6	Relationship with the contractor was managed					
7	Contract was controlled and monitored properly					
S/No	Processes of Project Stakeholders Management	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		5	4	3	2	1
1	Project stakeholders were identified					
2	Stakeholder management plan was defined					
3	Stakeholder engagement managed					
4	Stakeholders engagement Monitored/ Controlled					

Thank you for your highly Valuable time and co-operation

JIMMA UNIVERSITY
FACULTY OF BUSINESS AND ECONOMICS
DEPARTMENT OF ACCOUNTING AND FINANCE
GRADUATE PROGRAM IN PROJECT MANAGEMENT & FINANCE

Dear Participants

The sole purpose of this Interview is to gather data for a thesis, partial fulfillment of master's degree, which is titled "Assessment of Project Management practice in Repi Waste-to-Energy Plant Construction Project." You are kindly requested to answer the following Questions Based on your knowledge of the practice of project Management in Repi waste to Energy Project.

I would like to appreciate your effort for taking part in this questionnaire

1. Does work results reviewed or inspected to ensure or verify that all scope of the work is complete
2. Does Your Organization have defined or standard or generic procurement process?
   If your answer is yes, do those standards followed?
3. Was there a Proper attempt to monitor and control the project cost?
4. Do you think detail feasibility assessment was conducted?
5. What are the challenges of project monitoring & evaluation process in the handling of the Repi WtE construction project?
6. Does the Standard quality control process implemented in your project? (determining whether project products and activities comply with relevant quality standards/plans, Technology specifications throughout the project life cycle
7. Was there any effort of managing project procurement to ensure delivery of desired power generating capacity as per the standards in the contract?
8. Does the project completed within the planned time frame?
   If No what are the main reasons and causes for the delay
9. Does Risk Monitoring and control implemented in the project?
10. Does EEPCO provided project management training and support for the Repi WtE project management team?
11. Do the Project team members have fundamental knowledge about the technologies selected for the waste to energy power generation project?
12. Do you think there was a clear contract agreement between the project office and the contractor?
13. Are you satisfied with regards to the realization of benefits, goals, and/or objectives of the Project (overall performance of the project output?)

Thank you for your highly Valuable time and co-operation

For any queries, you can contact me via phone (+251) 0911177964 or Email hagetmg@gmail.com

APPENDIX B:

Reliability Test Tables

Scale: Reliability test table for the overall questions based on the ten project management knowledge areas

Processes of Project Scope Management

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.726	0.737	6

Processes of Project Time Management

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.757	0.765	7

Processes of Project Cost Management

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.704	0.712	4

Processes of Project Quality Management

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.719	0.718	4

Processes of Project Resource Management

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.743	0.736	6

Processes of Project Communication Management

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.714	0.746	3

Processes of Project Risk Management

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.863	0.862	6

Processes of Project Integration Management

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.712	0.720	7

Processes of Project Procurement Management

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.898	0.915	7

Processes of Project Stakeholders Management

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.728	0.740	4