Project scope management practices and challenges in the off-grid energy sector of Ethiopia: The case of GIZ Energizing Development (EnDev) Ethiopia Project

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GSE/0067/08

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF ARTS DEGREE IN PROJECT MANAGEMENT

Advisor: Dr. Solomon Markos

March 2023

Addis Ababa, Ethiopia

ADDIS ABABA UNIVERSTY

SCHOOL OF COMMERCE

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DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of my advisor Dr. Solomon Markos. All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

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Date: _____

STATEMENT OF CERTIFICATION

This is to certify that Haimanot Berta Solomon has carried out her research work on the topic entitled with “Project scope management practices and challenges in the off-grid energy sector of Ethiopia: The case of GIZ Energizing Development (EnDev) Ethiopia Project”. The work is original in nature and is fit for submission for the award of Master Art Degree in Project Management.

Advisor: **Solomon Markos (Ph.D)**

Signature: _____

Date: _____

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Abstract

Good intentions, substantial sums of money, and tremendous work are the foundation of many project initiations. Most of them, however, are not very successful. Lack of understanding or definition of the project and product scope at the outset of the project plays a significant role in projects' failure. Delivering a high-quality product to the stakeholders within the allotted time frame and budget is the result of a properly defined and managed scope. Even though the requirement to complete a project successfully is well understood, surprisingly little information has been published regarding the importance of scope. This research paper examines the need for adequate scope definition and management, as well as the main causes of scope management problems and solutions. The research is of both qualitative and quantitative type and has used interviews and questionnaires for primary data collection and reviewed various publications for secondary data. Upon analysing the data, it was found that the project's scoping efforts have not been performed to the expected levels and in turn, the project's performance has been limited to only a moderate level. The major factors that have been affecting the project's scoping efforts have been found to be lack of stakeholder engagement leading to various scope change requests, lack of effective and clear scope change management tools to avoid high resource wastage during change of scope and lack of skilled workforce who can take accountability to implement the project with in the boundary set at the start. To improve the current performance of the project in the proceeding phases, the researcher suggested that improved stakeholder management should receive great attention along with better internal and external communication strategies. Additionally, use of project management tools and high-level trainings to project team should also be considered for a successful project implementation.

Keywords: *Project, Project Scope, Scope Management*

Acronyms and Definition

APM	Association of Project Managers
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung/ German Federal Ministry for Economic Cooperation and Development
CII	Construction Industry Institute
CO	Country office
CRGE	Climate Resilient Green Economy
CSF	Critical Success Factors
CSFs	Critical Success Factors
DBE	Development Bank of Ethiopia
DGIS	Dutch Ministry of Foreign Affairs
ERP	Enterprise resource planning
EnDev	Energizing Development
GHG	Green House Gas
GIZ	Gesellschaft für Internationale Zusammenarbeit
GoE	Government of Ethiopia's
GoE	Government of Ethiopia
GTP	Growth & Transformation Plan
HQ	Head Quarters
IPMA	International Project Management Association
Logframe	Project Logical Framework
M & E	Monitoring and Evaluation
MNC	multinational corporations
MOWE	Ministry of Water and Energy
NDC	Nationally Determined Contributions
NEP	National Electrification Program
PDRI	Project Description Rating Index
PERIL	Project Experience Risk Information Library
RVO	Rijksdienst Voor Ondernemend/Netherlands Enterprise Agency
SDR	Sidama Region
SNNPR	Southern Nations, Nationalities, and Peoples' Region
SNV	Schweizerische Normen-Vereinigung
SPSS	Statistical Package for the Social Sciences
SWER	South Western and Eastern Region
WB	World Bank
WBS	Work Breakdown Structure

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CHAPTER ONE

Introduction

1.1 Background of the study

The term "scope" describes all the effort and processes that goes into producing the project's deliverables. Project scope management comprises the methods required to make sure the project contains all of the work required—and only the work required—to execute the project successfully. Uninhibited modifications are referred to as project scope creep, and it is the project manager's obligation to make sure that changes are managed without adding to costs and timelines (PMI, 2013).

According to PMI (2013) Product scope and project scope are the two different forms of scope.

- Product Scope: The features and functions that define the product, service, or result that are typically recorded by the business analyst after consulting with the stakeholders.
- Project scope: The effort required to provide a good, service, or outcome with the desired characteristics and functions

Project risks are analysed, and a specific project execution strategy is created as part of the process of defining scope, which is how projects are defined and prepared for execution**.** Therefore, this study tries to focus on the role of scope which influences the project's objectives and consequently affects the performance of a project. The determination of a project's early scope is a crucial process that should be accomplished completely with participation from all stakeholders. In order to avoid significant changes that could adversely influence project performance, the goal of the project statement is to give the necessary information to specify the work to be completed (Gibson et al., 2006). This information is needed before making the decision whether or not to proceed with the project execution. Incomplete completion of this duty leads to costly revisions, delays, rework, cost, schedule overruns, and project failure. Hence, for a project to be executed successfully and to produce a good result, it must have a clear scope (Kähkönen, 1999).

Poor scope management is one of the main reasons' projects fail. This could be because the project manager did not spend enough time defining the work, stakeholders did not agree on the scope, or there was a lack of scope management that resulted in adding work that was not authorized or budgeted for the project. This is known as scope creep. A project's tendency to contain more tasks than were initially defined is known as scope creep, which frequently results in greater project expenditures than anticipated and can extend the project's finish date. Scope change management's goal is to protect the viability of the approved Project Contract (or agreement) and the approved Project Logical Framework (Logframe). And the Logframe, which establishes a causal relationship between the project's inputs, processes, outputs, goals, and

objectives, are defined in the Project Contract. It is not possible to assume there will be no changes during the life of the project (Muddasar, 2016).

The project's scope outlines the goal, the duties of each team member, the deliverables for the customer or stakeholder, and a description of each project phase. Project scope management is the process of developing, overseeing and directing the work involved in a project and it entails the procedures necessary to make sure that the project consists of only the work necessary to properly complete it. The logical bounds of the project should be precisely defined via scope management and agreed upon by all project participants. Scope statements are used to outline the project's parameters and what lies outside of them. The project must be finished in accordance with customer expectations for product functionality and project expectations that are on schedule and within budget. While project managers focus on project integration, scope, schedule, cost, quality, resource, communication, risk, procurement, and stakeholder management, line managers typically oversee and monitor the product scope. This is known as engineering management (PMI, 2013).

Project restrictions are anything that either limits or directs the project team's actions. The project triple constraints are primarily scope, time and cost. Due to the way that the three constraints interact, any change in one directly impacts the other two. Usually, a top management-imposed deadline is used to demonstrate a time pressure. The task is anticipated to be finished. The ability to use finances for the project is constrained by a budget or cost limitation. on the undertaking. It could potentially limit the project's scope. The deliverables are defined by scope items, and the confines within which the project will be carried out. The requirements for the product or service and the anticipated standards are limitations on quality. The availability of resources (both internally to the project team and externally to various supports required for project execution) in terms of the necessary quantities, skills, expertise, and other factors is referred to as a resource constraint. (Mulcahy, 2009)

Project definition is crucial in the development sector because projects are primarily focused on serving communities, and their comfort and satisfaction are the primary concerns, along with a parallel focus on meeting the needs and requirements of donors and project planning and implementation stakeholders. The most crucial step in defining and designing a project is defining its scope and it is how all stakeholders see the project. As a result, the scope development should take into account their needs and specifications. And this cannot be accomplished without incorporating all stakeholders in the project's definition from the inception. It is unreasonable to ask stakeholders for their thoughts on the project's results after it has been completed when their engagement was minimal (Mohammed & Ajibade, 2012).

When the input of one or more stakeholders is either intentionally or accidentally left out while information from other stakeholders predominates, an incomplete project description might result (Sharma & Lutchman, 2006). A project's extreme risks may be overlooked if stakeholders' expectations and concerns are not taken into account and clarified at an early stage of the project.

This could also cause issues in project management, which would ultimately result in poor project performance (Atkinson et al., 2006).

One of the main requirements for scope management is that all changes to the project scope must be approved by management and the donor. This is not to argue that the goal of scope management is to prevent any modifications to the original agreement; development initiatives, by their very nature, are usually started on broad hypotheses. As the project advances, it is anticipated that fresh facts and new insights will arise that call for the project to modify its strategy and its plans. The goal of scope management is to create a procedure that will permit the adoption of changes by ensuring that the changes support the project's overall objective, are accepted by stakeholders, and are given management and donor approval (Muddasar, 2016).

1.2 Background of the organization

Energising Development (EnDev) is an international flagship programme for providing energy access. To date, 733 million people worldwide live without electricity and about 2.4 billion people lack access to clean cooking solutions. This has a dramatic impact on social development, economic opportunities, health, education and the environment. Thus, EnDev's involvement focuses on providing access to affordable, reliable, sustainable, and modern energy as a means to deliver social, economic, and environmental change.

During the 2002 World Summit on Sustainable Development in Johannesburg, the Dutch Government announced to provide access to sanitation and clean drinking water for 50 million people, and to modern energy services to 10 million poor people in developing countries by 2015. In order to accomplish the energy goal, the Dutch Ministry of Foreign Affairs (DGIS) joined forces with the German Federal Ministry for Economic Cooperation and Development (BMZ). The partnership called EnDev began in 2005 with the initial purpose to provide sustainable energy access to 3 million people in its first three years. Today, EnDev is a well-established programme, having reached over 25 million people.

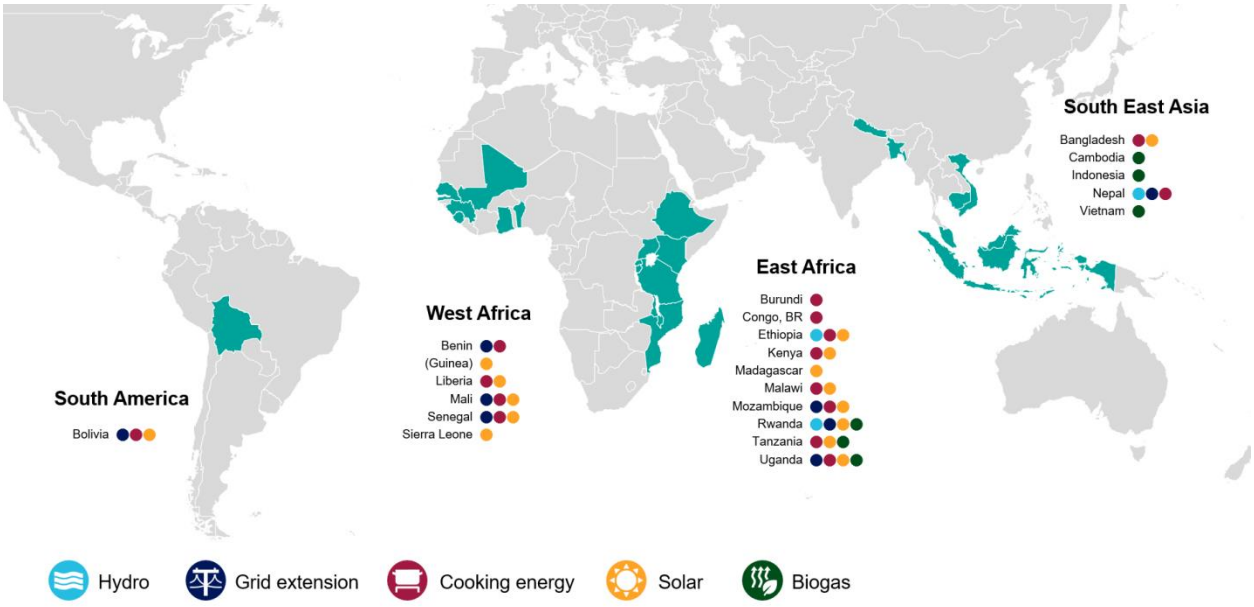
Dedicated donors, partners, and practitioners in the field of modern energy access work together in this global partnership. Thro1ugh EnDev, they are united to support social and economic development in more than 20 countries around the globe. The driving force behind EnDev is the partnership of Germany, the Netherlands, Norway and Switzerland: donors who are committed to accelerating energy access. The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the Netherlands Enterprise Agency (RVO) coordinate the programme.

Ethiopia's strong economic growth since the turn of the millennium has brought with its population growth and an ever-increasing demand for energy, both trends expected to continue at a high rate. At peak times the energy demand is higher than the generation capacities. While only about a quarter of the country's population has access to electricity (92% in urban areas and 12% rural) almost 90% of the electricity comes from hydroelectric plants. This dependency on water resources makes the country's electricity supply highly vulnerable to the increasing risk of

drought and rainfall shortages. At the same time the rural population, almost entirely without access to the grid, depends on fuel wood and other biomass for energy production decreasing their availability and creating a strain on the nation's forests. This further increases the demand for electricity access and electricity.

Currently, EnDev is implemented in 22 developing countries of Africa, Asia and Latin America. EnDev promotes access to modern energy services that meet the needs of the poor, is long lasting, affordable, appreciated by users, and creates positive economic, social and/or environmental impacts. Since its initiation in 2005, EnDev has attained an increasingly prominent position in the international process promoting energy access. As one of the first outcome and performance-based programmes in the energy sector, EnDev pioneers innovative approaches, develops new markets for proper energy access and scales-up successful programmes in many countries with a broad spectrum of technologies and a variety of different project concepts and instruments.

Figure 1-1: ***Regional Distribution of EnDev Projects – 22 countries globally 16 in Africa, 5 in Asia, 1 in Latin America***

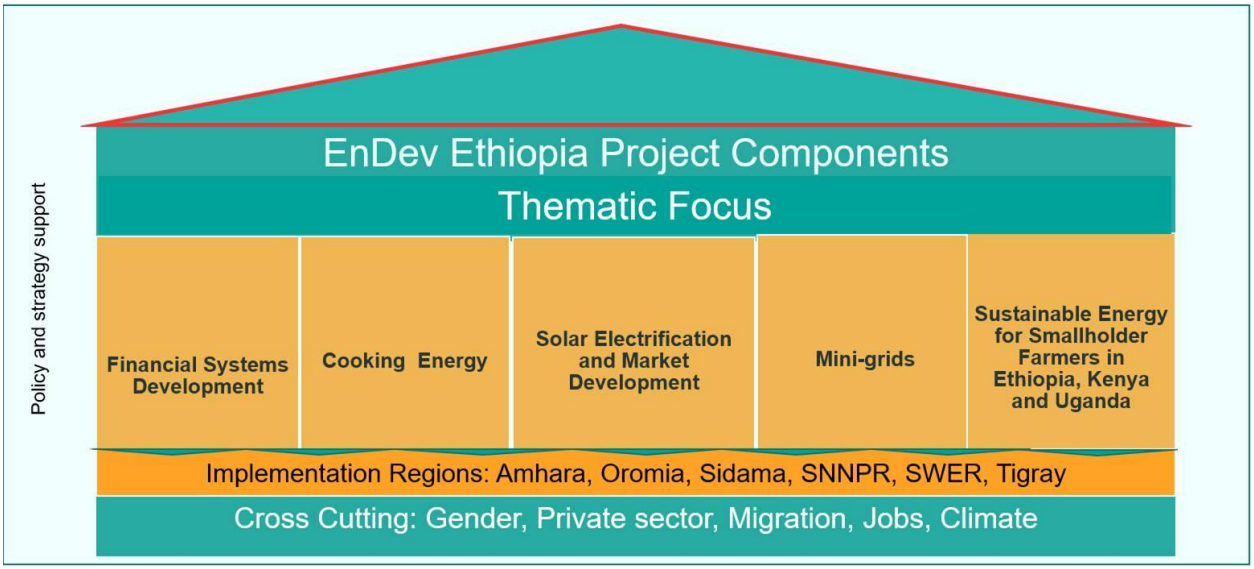


Energising Development (EnDev) promotes sustainable access to modern energy services for households, small and medium enterprises, and off grid social infrastructure such as schools, health centres and community centres in developing countries as a means to achieve inclusive low-carbon economic development. In Ethiopia, EnDev assists in deploying modern energy technologies and services, and contributes to Ethiopia's national strategies (Growth & Transformation Plan, Climate Resilient Green Economy). Even though the government has a stated goal to have universal electricity access by 2025, the traditionally off-grid rural population keeps increasing. That by itself will make universal access a rapidly moving target. With an

access rate of 44 percent, the country faces the second highest electricity access deficit in Africa (over 60 million people without access), posing a binding constraint to economic growth and social development. In order to expand the reach of electricity access to as wide a user-group as possible, non-grid systems must be encouraged and supported. Similarly, 18 million households in Ethiopia use unsustainably harvested solid biomass for cooking which has adverse effects on health for end-users and their households, local natural resources, climate change, and gender. To curb this situation, Ethiopia's Climate-Resilient Green Economy (CRGE) strategy aims to reach 17.7 million households with clean and improved cook stoves by 2030, with a potential GHG emission reduction of 51.2 MtCo2e. However, given the current growth rate in the clean cooking sector in Ethiopia, it becomes clear that the CRGE target will not be reached unless measures are put in place. To ensure energy solutions are accessible and affordable, the rural electrification strategy and the promotion of clean cooking solutions need to complemented by efficient and inclusive financial services and payment mechanisms.

EnDev Ethiopia has continued to provide supports to the development of a commercial improved cookstove sector by improving the technical and business skills of private stove producers as well as small & medium-sized enterprises engaged in cook stove manufacturing sector. This is accomplished through key collaboration with the public and private sector actors in Ethiopia. The program works closely with the key political partner in Ethiopia, the Ministry of Water and Energy (MOWE). Within this Ministry, EnDev supports and contributes to the Government of Ethiopia's plans to increase access to renewable energy options for cooking, lighting and productive use of energy. EnDev Ethiopia operates by focusing on the below thematic areas

Figure 1-2: ***EnDev Ethiopia project components Thematic focus***



GIZ Endev Ethiopia operates based on the below objectives.

General Objective of EnDev Ethiopia Project: Supporting MOWE in deploying modern energy technologies and services in Ethiopia, and contributing to Ethiopia's national strategies (Growth & Transformation Plan, Climate Resilient Green Economy)

Specific Objectives of EnDev Ethiopia Project:

- Supports sustainable supply of energy services to **lower-income** households, social facilities and SME's with a focus on **rural areas**;
- Creates sustainable **markets** for renewable energy technologies in cooperation with public and private sector stakeholders;
- Supports the **private sector** in the Ethiopian energy sector and promotes **investments** in off-grid renewable energy and energy efficiency.

1.3 Statement of the problem

Project success can be negatively impacted by a lack of clarity regarding what will be provided and the project's boundaries. Uncertainty over the scope of the project and its logical bounds might have an impact on its success. A project's logical boundaries should be clearly described in order to bring all parties involved into alignment. Scope statements are used to specify what is included and excluded from the project's boundaries. (Wysocki, 2009).

In the energy sector of Ethiopia as in all projects in the world a project's success depends on the successful implementation of a project within the schedule set, the budget agreed upon and the quality delivered within the scope set. hence all energy projects are and should be created to fulfil a specific set of criteria, such as raising efficiency, streamlining processes, lowering operational and project expenses and boosting outreach within the bounds of the schedule set, the estimated budget and quality putting a special emphasis on achieving the quality expectations of the project's donors and beneficiaries. Due to issues like cost overruns, time overruns, poorly defined scope, and failure to meet expected outcomes and deliverables to satisfy project stakeholders, the delivery of energy projects, in particular the provision of solar home systems and improved cookstoves to Ethiopia's off-grid society, is failing to meet the needs of the private sector and beneficiaries. For instance, if the stakeholders of the project are not involved in the scope development and they request extra deliverables when the project is being implemented, the initial budget and schedule estimations may no longer be valid. Hence, the project manager would have to work to amend the budget and deadline (often extended) to reflect this additional work only if the donor agrees to incorporate the new work in the project scope. This updated scope will result in new expected cost, effort, and duration which creates extra resource allocation than planned.

The impact of energy solutions like solar and improved cookstoves is highly dependent on local contextual factors such as policy changes and social norms. Hence, energy projects need to give

a through focus on the stakeholder engagement in the development of project scope and need to have a thorough analysis of policy and strategies of the country to make sure the activities planned can really be achieved. The scope of a project may need to be changed as a result of revised or new legislation. This would affect how the deliverables need to be produced. For example, per Ministry of Water and Energy (MOWE) government regulations around Solar system assembly sheds is coming into effect soon. For Endev supported enterprises with capacity development projects, changing the scope at the earliest stage to match the new laws will not have such an impact as leaving it until later in the project. This change in scope will benefit the enterprises as it will mean they do not have to do the changes either later in the project or after the project has been completed which will have more of a cost impact.

It may also be a requirement to amend the scope of a project if the project is overrunning. This could be due to unforeseen circumstances, like the COVID 19 pandemic which have had a significant impact on the project implementation of EnDev or the project contractor is delayed on his work, for example the digger for the Mini Grid energy distributor foundation is delivered a week later, breaks down and there is no other available digger for a couple of weeks causing a few weeks delay. In order to complete the project on time there would be a need to de-scope the work on the project. The Project Manager would assess the need and scope change will need to go through the formal change process and the donor will need to approve the changes.

Therefore, if we want to see a successful and sustainable project in the off-grid energy sector that is well planned from the start, we need to focus on creating a clear and detailed Scope which incorporates revaluated potential risks and the feedbacks from all expected stakeholders. The more aspects of scope that are clearly identified, the more the project will succeed. Several studies have been carried out with an aim of determining the critical success factors (CSFs) which contribute to project success. Project success is linked to project implementation in the boundaries that are set in the scope of the project.

The problem of this research is that, despite the knowledge that effective scope management in energy projects is a major contributor to project success, there are still energy project failures in Ethiopia.

1.4 Research Question

In view of these problems, the research tried to answer the following five particular questions to be evidenced from responses of the case organization.

1. What are the scope development practices undertaken by EnDev?
2. How well have project stakeholders been involved in project scope development?
3. What are the major scope change management tools followed by the project?
4. What are the main challenges faced by the project in implementing the project within the scope set at the start?

1.4 Objectives of the research

1.4.1 General Objective

The ultimate objective of this research is to assess the Project scope management practices and challenges in the off-grid energy sector of Ethiopia in the case of GIZ Energizing Development (EnDev) Ethiopia project

1.4.2 Specific Objectives

Given the major questions mentioned above and considering the ultimate objective; the research paper tried to achieve the following particular objectives;

- Evaluate Scope Development practices and techniques at EnDev and to identify improvement areas for better project outcome
- Evaluate the level of engagement of project stakeholders in scope development in energy projects at EnDev
- Investigate if there are any scope change management tools prepared to avoid scope creep
- Examine the challenges of project scope management

1.5 Significance of the study

Contrary to its critical importance in achieving project goals, the idea of project scope management is not a topic that has received much attention. Therefore, this study tried to add to the body of academic knowledge on project scope management approaches, strategies, and difficulties encountered during development in the context of a case organization.

In order to have a shared understanding of how project scope management should be carried out and how to deal with its issues in a cooperative and better way, the study is important to project stakeholders, project Advisors, project managers, and project team leaders. Based on the findings, the research is going to offer some guidance for resolving the current issues in the organization and learn from the best project scope management practices.

Last but not least, this project work is going to support the project management team of EnDev in strengthening the scope development and management aspects of the project and conduct additional research on this concept by creating their own case to guarantee greater project implementation success.

1.6 Scope/Delimitation of the study

The investigation of project scope management challenges and the case organizations' efforts to carry out projects within the developed scope were the main topics of this research paper. The majority of the primary data for this paper's analysis came from the organizations' headquarters and stakeholder organizations in Addis Ababa, and the project management team is primarily

responsible for making choices on project scope management and handling most difficulties. However, various stakeholders participating in project implementation may offer feedback for project scope management. Therefore, the researcher will include the 5 regional office representatives from Amhara, Oromia, SNNPR, SDR and SWER regions to close this gap, Although Tigray region was one of the operational areas of EnDev because of various challenges the regional office has been closed and operations are not being undertaken at this moment hence it was not included in the research area to be covered for this research.

The research also focused its efforts on only understanding what the scope management practices undertaken by EnDev are in relation to challenges of project scope development and management, Project stakeholder engagement in scope development & tools for follow up on project implementation in the boundaries set by the scope if any. Additionally, the research did not extend its exploration to other projects of Energy Programme of GIZ Ethiopia, as the other projects do a completely different activity which follows a different project scope management based on its activity and donor's recommendations.

1.7 Limitation of the study

A research requires various resources, where out of the main resources tight schedule and time constraints are seen as a significant barrier to this paper's completion. However, the researcher tried to identify both delimitation and limitation difficulties at the preliminary stages and designed and implemented contingency plan and made the project work go as smooth as possible.

1.8 Organization of the study

This research paper is organized into five chapters together with the abstract, references and appendices. The first chapter is the introductory part of the paper and it comprises of background of the study, statement of the problem, objectives of the study and scope of the study. The second chapter focuses on review of literatures related to the topic of this study. Following the review of the literature in the third chapter, the research design is presented in detail, this chapter provides important information about how the study was conducted which includes; research design type, study area, data type; collection instruments and way of data analysis. The fourth chapter of the study is the implementations of research design. Accordingly, secondary data and the primary data collected from different instruments are present and analysed. Lastly, chapter five is presentation of findings, conclusion and recommendation of the study.

CHAPTER TWO

Review of related Literature

2.1 Introduction

The Project scope topic is clearly explained in this chapter using both theoretical and empirical evidence. Examining all pertinent and current advancements on a specific topic is the major goal of a literature review, as is creating baseline findings for comparison analysis of a single case study. Theoretical reviews of the concept were done in enough detail first, and empirical literature was found, focusing especially on project scope management and challenges. Followed by summary of literature and research gap of the topic under study. And finally, the conceptual framework was developed and presented.

2.2 Theoretical Literature

2.2.1 Project

The PMI (2013) defines a project as a brief undertaking started with the intention of producing a special good, service, or outcome. Projects' transient character suggests that they have a clear beginning and end. The project's end occurs when its goals have been met, when it is abandoned because its goals won't or can't be realized, or when there is no longer a need for it.

Projects may also have effects on society, the economy, and the environment that last for a very long time (PMI,2013). According to the International Project Management Association (IPMA), a project is an activity with time and financial constraints that aims to produce a number of specified deliverables that meet quality standards and specifications. The Association of Project Managers (APM), on the other hand, defines a project as a special, temporary activity carried out to attain a targeted objective.

According to Wysocki's (2014) definition, a project is a series of distinctive, complicated, and interconnected operations with a single objective that must be finished on schedule, on budget, and in accordance with specifications. The same author, Wysocki (2014) defines a project as a series of discrete, interdependent operations that, upon successful completion, offer the anticipated business value that served as the project's justification. According to Gary R. H. (2002), a project is a brief undertaking started with the intention of achieving a specific goal. A project is actually a need that is being met or an issue that is being resolved. It's also a solution that guarantees a reward, usually a monetary benefit. For the majority of projects, making money or saving money is the primary goal.

A project has a fixed beginning and end because by definition it is transient in nature. A project is a clearly defined group of smaller tasks that typically results in the creation of a final product or goods (deliverables). There will be a preferred order in which the project's duties should be completed (the schedule). A project is an original, one-time endeavour that will never be completed in precisely the same manner, by the same people, or in the same setting twice (Gary R. H., 2002).

According to (Rory B. and Steve B., 2007), a project may have a variety of unique characteristics, such as:

- A project has a distinct beginning and end.
- There are several unique phases that a project goes through (initiation, design, implementation, and handover).
- Projects frequently have a time limit (they must finish by a certain date).
- Projects have a distinct budget that is often divided into a budget for each work package.
- Activities are essentially one-of-a-kind and non-repetitive; there is only one chance to get it perfectly.
- Resources could come from many contractors and functional areas; thus they need to be coordinated.
- The successful completion of the entire project is the responsibility of the project manager in her capacity as project leader.
- To oversee the project, multidisciplinary project teams are formed. The project team would likely operate within a matrix organizational structure in major businesses.

2.2.2 Project Management

Applying knowledge, skills, tools, and procedures to project activities in order to achieve project requirements is known as project management (PMI, 2013). The efficient management of the project management processes is necessary for this application of knowledge. A process is a collection of related steps taken to produce a predetermined good, service, or outcome. The inputs, tools, and procedures that can be used, as well as the outputs that are produced, all serve to define each process. The proper implementation and integration of the 47 logically grouped project management procedures, which are divided into five Process Groups, is how project management is carried out. These are the five Process Groups:

- Initiating,
- Planning,
- Executing,
- Monitoring and Controlling, and
- Closing. (PMI, 2013).

Initiating Process Group: The processes used to define a new project or a new phase of an existing project by securing permission to begin the project or phase fall under the heading of initiating process groups.

Planning Process Group: The planning process group consists of the procedures needed to define the project's parameters, hone its goals, and decide on the best course of action for achieving the goals it was started with.

Executing Process Group: Processes used to carry out the tasks outlined in the project management plan in order to meet project requirements are referred to as the "executing process group."

Monitoring and controlling Process Group: Group of procedures responsible for monitoring and regulating the project's performance and progress; identifying any areas where plan modifications are necessary; and implementing the necessary modifications.

Closing Process Group: Processes carried out to complete all tasks across all Process Groups in order to formally finish the project or phase are known as the Closing Process Group.

The definition of project management provided by Wysocki (2014) is intended to be a working definition and contains the litmus test of six questions that can be used to evaluate the term's validity. The following six questions are addressed by the tools, templates, and procedures of project management: What business situation is this initiative trying to solve? What action does the company need to take? How will you proceed? What method will you use? How can you be sure you did it? And how did you perform?

The planning, organizing, directing, and control of corporate resources for a relatively short-term purpose that has been formed to achieve certain goals and objectives is known as project management. Project management also makes use of the systems approach to management by allocating functional staff to a particular project (Kerzner H., 2009).

2.2.3 Project Scope

The process of defining a project's scope entails listing all the tasks that must be completed for the project to reach its end result. The work entails the tasks listed in the Logframe as well as those that the project team has determined are essential to the project's success. These tasks include activities like team capacity building, stakeholder management, meetings, and project presentations, as well as all other significant tasks that will use up project resources. (Muddasar, 2016)

The process through which a project is established and made ready for execution is called project scope definition. It aids in deciding whether to move further with the project or not. A common source of difficulty in the development of projects is an incomplete scope specification at the beginning of the project's life cycle. Scope planning is the process of developing a written scope

statement and scope management plan, which serves as the basis for future project decisions. (Mohammed K. & Ajibade A. 2012)

2.2.3.1 Project Scope Statement

A scope statement offers a recorded foundation for future project choices and helps stakeholders validate or establish a shared understanding of the project's scope. The project's objectives, deliverables, and requirements are listed in the scope statement as a reference point for future project choices. As the project develops, it could need to be adjusted or improved to reflect changes in the project's scope. By outlining both the project goals and the main product deliverables, the scope statement serves as the framework for an agreement between the project team and the project customer. If all the parts of the scope statement are already in place (e.g., the primary deliverables may be identified in a request for proposals, and the project objectives may be defined in the project charter), this method may only require writing the paper down. One can make a reference to the project charter in the scope statement if the product description is included there. (Chung and G. Edward 2001)

According to Chung and G. Edward (2001) The scope statement is supposed to include either directly or by reference to other documents:

1. Project justification- the business need that the project was planned to address
2. Project product- a brief summary of product description

Key project stakeholders utilize the project scope statement to establish and validate a shared understanding of the project scope. The project justification, a brief description of the project's outcomes and its intended benefits, a brief summary of the project's major constraints, assumptions, and dependencies with other projects or external initiatives, as well as a statement of what constitutes project success, should all be included in the scope statement. This document is used as a tool for communication with all project stakeholders to ensure that everyone has a similar understanding of what the project is and what it is not. It is also used to discuss any changes to the project that have been accepted. (Muddasar, 2016)

The earned value method was employed by Kaufmann et al. (2007) to estimate the scope change size for cost modifications. Chan and Kumaraswamy (2002) cited surveys and identified unworkable designs, workforce shortages, subpar performance, unforeseen circumstances, and inadequate communication. Shenhar (1993) divided technological uncertainty into four categories and related each degree to the length of the project as a whole. Levy and Globerson (1996) applied techniques from queuing theory to lessen the effect of crucial work package waiting times on the completion times of concurrent projects. The project team's actions are guided by two guiding principles: scope and objectives. They decide if a project will succeed or fail. Ward (1995).

The goals of information system development can be hazy without a clear scope, and people may begin to lose focus on what they are attempting to construct. Clarke (1999). One of the most

crucial responsibilities in new or development projects is the division of large projects into sub-projects or work packages.

Figure 2-1: ***The combination of project and product scope having impact on project success*** **(Nabeel 2013)**

2.2.4 Project Scope management

The processes that are absolutely necessary to ensure that the project is reduced to only the work that is necessary to produce a necessary good or service are all included in scope management. The project's boundaries are described in terms of scope. It outlines both the project's objectives and its limitations. A definition of the project's boundaries, scope is how all stakeholders see the project. Project scope management entails the procedures necessary to guarantee that the project includes all of the work necessary and none more in order to succeed. Determining and regulating what is and is not included in the project are the main goals of project scope management. Poor scope management is one of the main reasons' projects fail. This could be because the project manager did not spend enough time defining the work, stakeholders did not agree on the scope, or there was a lack of scope management that resulted in adding work that was not authorized or budgeted for the project. This is known as scope creep. A project's propensity to contain more tasks than were initially defined is known as scope creep, which frequently results in greater project expenditures than anticipated and an extend of the project's finish date. (Muddasar, 2016)

The project must be finished in accordance with customer expectations for product functionality and project expectations that are on schedule and within budget. While project managers focus on project integration, scope, schedule, cost, quality, resource, communication, risk, procurement, and stakeholder management, line managers typically oversee and monitor the product scope. This is known as engineering management. In some businesses, project managers are required to execute both tasks. In these instances, there is a risk that the project manager will focus primarily on his or her technical skills and neglect project management in favour of engineering management (this is called halo effect). Plan Scope Management, Controlling the Plan's Scope is a procedure that falls under the planning process group and is the initial step in this knowledge area. This procedure entails the creation of a scope management strategy that

outlines how the project scope will be established, verified, and managed. It offers direction on how scope will be managed as well as suggestions. (PM1, 2008)

Protecting the viability of the approved Project Contract (or agreement) and approved Project Logical Framework (Logframe) is the goal of scope change management. In other words, the Project Contract establishes the overall project scope and the Logframe, which establishes a causal relationship between the project's inputs, processes, outputs, outcomes, and objectives. It is impossible to presume there won't be any adjustments during the course of the project. For instance, if the beneficiaries want extra deliverables, the original budget and schedule estimations may no longer be accurate. The project manager has the right to assume that the present budget and deadline will be amended (often extended) to reflect this additional work if the donor agrees to incorporate the new work in the project scope. Now, the approved target is the revised projected cost, effort, and duration. One of the main requirements for scope management is that management and the donor must both authorize any changes to the project's scope. This is not to argue that scope management's main goal is to keep the original agreement from changing; development initiatives, by their very nature, are frequently started with broad assumptions. It is anticipated that as the project moves forward, fresh information will reveal insights that call for the project to modify its strategy and its plans. The goal of scope management is to create a procedure that will allow the adoption of changes by ensuring the changes contribute to the project's overall goal, are accepted by stakeholders, and are approved by management and the donor. (Muddasar, 2016)

Table 2-1 ***The Project Scope Management knowledge area includes 6 of the 47 process groups recognized by PMBOK (FME, 2014)***

Process	Project Group	Key Deliverables
5.1 Plan Scope Management	Planning	Scope Management Plan
5.2 Collect Requirements	Planning	Requirements Document
5.3 Define Scope	Planning	Project Scope Statement
5.4 Create WBS	Planning	WBS, WBS Dictionary
5.5 Validate Scope	Monitoring & Controlling	Acceptance Deliverables
5.6 Control Scope	Monitoring & Controlling	Change Requests

These processes interact with one another and with procedures in other fields of knowledge. Effective project scoping is both a science and an art. (Wysocki, 2009).

As mentioned above, Project Scope Management has six processes in PMI (2013), each of these processes associated with a set of inputs, tools & techniques and outputs as shown in the Figure below:

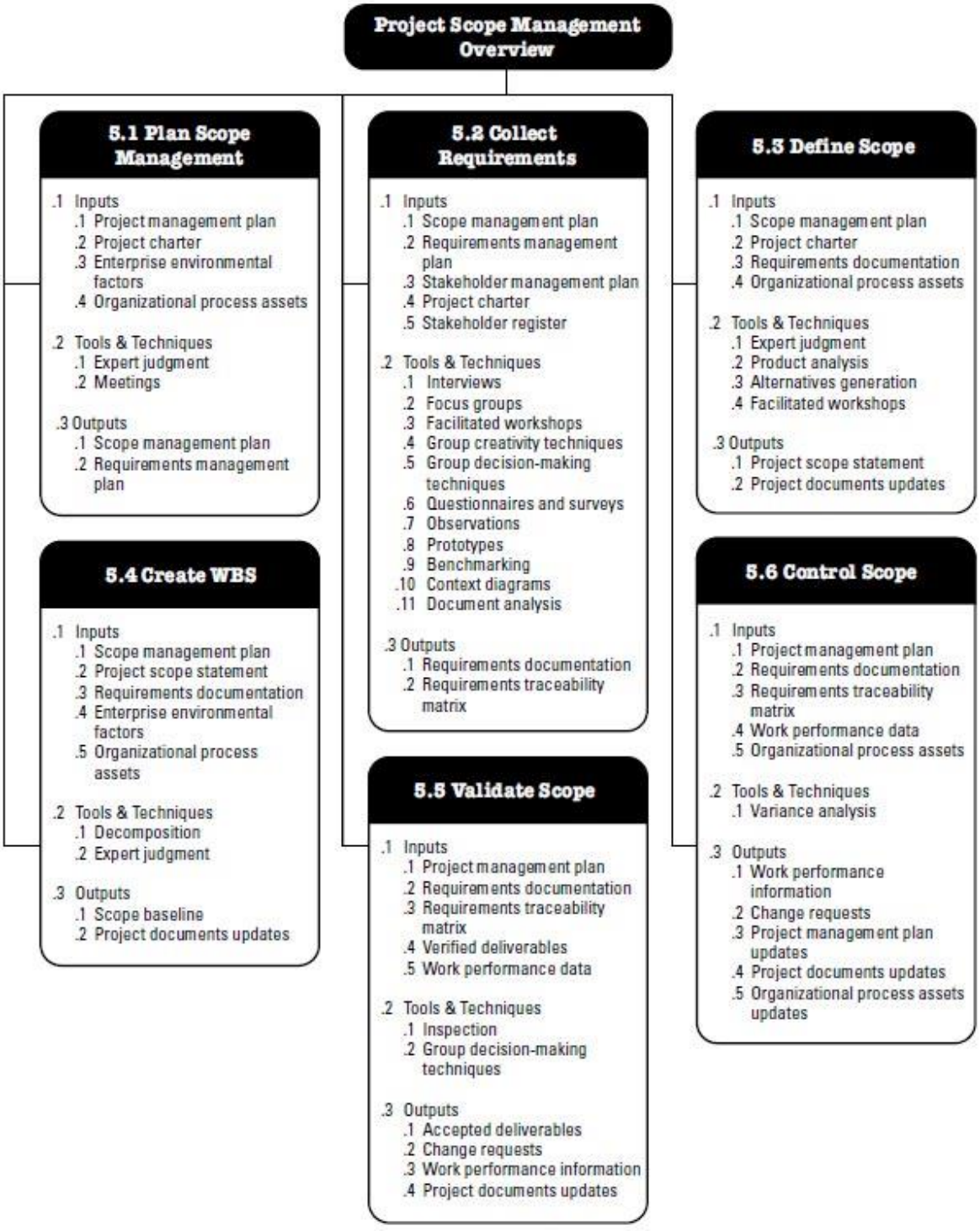


Figure 2-2: ***Project Scope Management has six processes (PMI 2013)***

2.2.4.1 Plan Scope Management

This process will create the following outputs

i. Scope Management plan: This summarizes what the other five scope management processes' contents are. That is, the method used to define, develop, monitor, control, and verify the scope.

ii. Requirements Management plan: The sponsors', customers', and other stakeholders' demand and expectations are quantified and documented in the requirements. This plan outlines the scheduling and monitoring of requirements activities. (FME, 2014)

2.2.4.2 Collect Requirements

The IEEE defined requirements in 1990 as:

a) A condition or capacity that a user must have in order to complete a task or achieve an objective.
b) A precondition or capacity that a system or a component of a system must meet or possess in order to satisfy a contract, standard, specification, or other formally enforced document.
c) A representation of a state or capacity that is in writing (Schwalbe, 2008).

The process of gathering requirements involves documenting what the client and other stakeholders want from the project and is called collect requirements. The information that has been captured has to be elicited and thoroughly examined. The need becomes the cornerstone of the work to be done and acts as a benchmark for the project's quality and cost timeline. Project requirements, which include project management requirements among others, and product requirements, which contain technical information about the product, such as the security and performance requirements, are the two categories into which requirements are typically divided. (Schwalbe, 2008).

The project charter acts as a foundation for gathering requirements since it contains written information about the expectations and needs of stakeholders and customers. Typically, requirements are gathered through led workshops, focus groups, and interviews. Other approaches might involve team creation exercises like brainstorming, among others. Additional requirements can be gathered by surveys, questionnaires, and observations. Feedback on prototypes is another contemporary technique for getting outcomes. This makes it easier to get an early impression of the product. The main result of gathering requirements is the creation of requirement documentation, which explains how data gathered qualifies the project's business need. The requirement management strategy, which concisely outlines how requirements will be managed and assessed, is another product of this process.

2.2.4.3 Define Scope

The act of creating a thorough documentation and description of the project and its outcome is known as defining scope. Major deliverables assumptions and initial restrictions are often qualified by the define scope process and recorded during the project commencement stage or phase. High-level papers like the project charter and the requirement documentation are essential for defining the scope because they fundamentally broaden the project specifics. In this method, the scope is essentially defined through the use of expert opinion, product analysis, and guided workshops. The project scope statement and updates to other papers like the project charter and requirements document are among the main outcomes of this process, although they are not the only ones.

2.2.4.4 Work Breakdown Structure (WBS)

This technique involves breaking down the project's objectives, deliverables, and tasks into smaller, more manageable components. The scope description, required documents, and organizational process assets are necessary for creating the WBS. Decomposition is a technique used to separate tasks and deliverables into smaller chunks. The WBS, which divides goals and tasks by establishing milestones, cost estimates, schedule activities, and other factors, is the end result of this process. (PMI, 2013) There are numerous established methods for developing the WBS. Organizations occasionally already have formulated and implemented policies. It is crucial to adhere to these recommendations when creating the WBS. A different strategy is analogy, in which a project's beginning point that is similar is used.Another strategy is to work top down, where the biggest project components are divided into smaller ones. The bottom-up strategy, in which the team initially specifies tasks linked to the project, is another alternative (PMI, 2013).

2.2.4.5 Verify/Validate Scope

Scope verification/validation entails the client or other stakeholders' formal approval of the project scope as accomplished (Schwalbe, 2008) This procedure is necessary to formally accept the project deliverables. In order to ensure that the scope is in line with the sponsor's initial intentions, reviews are conducted with the customer regarding deliverables and the sponsor. This method may involve the usage of a project management strategy, requirements documentation, and validated deliverables, among other papers. This process is primarily accomplished through review and inspection.

2.2.4.6 Control Scope

This process involves keeping an eye on and making adjustments to the project and product scope. As changes actually take place, control is employed to track them and incorporate them into the change management process. Many initiatives struggle with scope control (Schwalbe, 2008).

2.2.5 Project scoping and project performance

The parameters of the solution are determined by the product's scope. Which of the business needs (keeping in mind the constraints) could be fulfilled by the solution is what the decision on the product scope is all about.

There is little chance of success without an established and defined vision. Each project must properly identify and record its scope in order for the project to advance in a coordinated manner and for the project's requirements to be stated. Since scope is the product and the practical means by which strategy is implemented, achieving scope goals may be viewed as the most crucial factor in project management effectiveness (Muhammad et al, 2013). The next measures can be taken to achieve that:

Identify Stakeholders

Prior to formulating requirements, stakeholders should be taken into account and taken into consideration. Some of the most crucial stakeholders in the product are the consumers and users (Muhammad et al, 2013). The success of the project depends on understanding the needs of the users and customers. The identification of key stakeholders and their participation in the definition of the project scope are crucial to the success of the project.

Identify Project Drivers

Regulations, standards, rules, and other factors are only a few of the external forces that shape projects. The collection of existing hardware, software, or procedures is a key motivator for many organizations. Security and safety concerns are other motivators. Any project should pay close attention to drivers early on (Muhammad et al, 2013). It is necessary to identify each driver, assign them to be tracked, and incorporate them in the analysis of what the project is and is not.

Examining the Scope Statement

The scope statement outlines the high-level deliverables, justifies the project's existence, and quantifies its goals. Several research initiatives focusing on pre-project planning of capital facility projects were funded by the Construction Industry Institute (CII), according to Chung-Suk Cho and G. Edward Gibson Jr. (2001). They also compared total prospective cost and schedule performance. The study came to the conclusion that a thorough scope definition prior to project execution is essential to project success because of the 10 large savings connected to better project predictability.

According to studies, the majority of projects fail because the project and product scopes are not clearly defined and are not managed properly. Scope has been used as a criterion or factor since it is a quantifiable concept. In reality, some researchers have confirmed that a project scope with specific goals and objectives is a factor in project success. According to Collins & Baccarini (2004), a strict scope is a crucial component for satisfying the owner's needs and succeeding. According to Shenhar, A.J. & Dvir (2007), projects show a great deal of heterogeneity, and their

unique management approaches appear to be different. All participants, or stakeholders, who must make decisions throughout the project, according to Ward, must be aware of the project's scope.

According to Agarwal & Rathod (2006), the project team and the customer both concur that the most crucial objective is to produce the desired product. The project is a failure if this objective is not achieved. Time, money, specifications, customer happiness, and maintaining the status quo inside the company are all factors that are taken into account when evaluating a project's success according to Kerzner. He underlined the necessity to control scope adjustments if at all possible because they have the potential to kill an entire project as well as the team's morale.

Improving Project Success with Better Scope Management

The features and functionalities that will be included in a product or service are referred to as its product scope by the Project Management Institute. The effort required to deliver a product's features and functions is referred to as the project scope in this definition.

Tom Kenderick's analysis was based on the (PERIL) database, which is used to analyse the risk of high-tech project. Changes and faults were the two main scope risk categories in PERIL. Poorly executed scope changes were to blame for the vast majority of damage. 64, or little over half, of the 127 risks in the (PERIL) database that were the most harmful were scope concerns.

2.2.6 Project Scope Change Control Plan

According to Muddasar (2016) The scope change control plan, which specifies the procedure to submit any changes to the project's scope, names the individuals responsible for approving changes, and assigns the manager the duty of evaluating the effects of the requested changes on the schedule and budget, is a crucial part of scope management. This plan's goal is to reduce scope creep, a natural propensity for all projects to expand their scope without addressing other project restrictions.

The purpose of change management processes is to formally document requests for changes made throughout the course of an implementation project, such as those involving the project's scope, product functionality, and deliverables that could significantly affect its budget and schedule. A proposed modification's impact, cost, benefit, and risk are evaluated as part of the project scope change management process. Once a modification is asked for, the Project Steering Committee will discuss it to comprehend the request and its justification, look at other possibilities if they are available, and decide whether or not the change has to be submitted. (CCSD 2013)

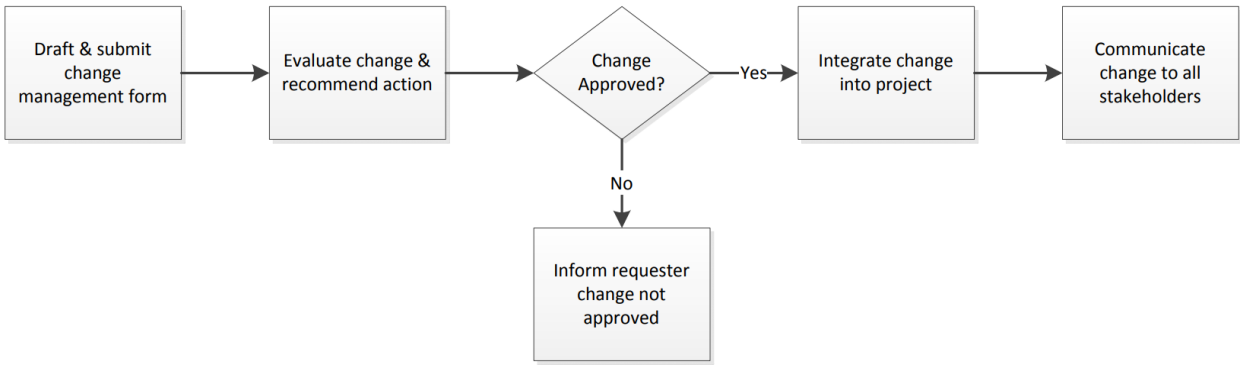


Figure 2-3: ***Project Change Management Process (CCSD 2013)***

Similarly, according to Nokes S., & Kelly, S. (2007) Project Scope Change control plan's components are as follows:

- Project Change request form: This form is intended to track any requests for changes to the project scope made by any project stakeholders, particularly the funder or the beneficiaries.
- Scope Change analysis: The analysis is performed to determine the impact of the change on the project.
- Scope change approval: The key stakeholders for the project must approve and alterations before any work is done as there might be resource implications.
- Update project scope statement and projects plans: Following approval of the change, the project must update any pertinent project plans.
- Communicate changes to scope: The project manager must inform the project team, stakeholders, and management of the modifications and their ramifications once all plans have been updated.

2.3 Empirical Literature

2.3.1 Problems with Project Scope

Project failure has been connected to poor scope specification. It has long been acknowledged as a serious issue that inadequate or bad scope definition negatively corresponds to project performance. If boundaries are not established, modifications that disrupt project rhythm, require rework, lengthen project duration, and impair productivity and morale of the field staff often result in higher project expenses in the end. The shortcomings of ERP deployment in Taiwan-based MNCs were the focus of Charlie C. et.al (2009) research. due to the two years of testing that five different vendors underwent. They came to the conclusion that strong scope management was necessary to limit the level of modification. The number of user requests was gradually reduced thanks to good scope management.

It is recommended to incorporate stakeholders because of the substantial contribution they can make to the scope document, which fosters relationships, boosts buy-in, and commitment. Fichter (2003) conducted study on web project failure. She noted that a hatred of planning is a key factor in project failure. The foundational work of the project is absent when planning is neglected at any of the project phases. One unclear definition of scope, two incomplete or partial scopes, three unfinished scope documents, and four not sharing the scope statement are potential issues with the project scope.

2.3.2 How to Overcome Scope Issues

Without a clear definition of the project's scope, the project team may also encounter issues arising from disagreements with suppliers regarding material costs, quality, and delivery. Even a product description like a blueprint can be a source for defining scope and placing limitations on scope creep. A higher quality scope will also define boundaries within the scope of work, which in turn will act as alarms in the event of extra works. Finally, the process of defining a project's scope at the pre-planning stage would take into account stakeholders and their requirements or duties. Before deciding on a scope, it is important to keep the following in mind: defining real requirements, being practical when writing requirements, proving requirements, and being accountable for specific requirements.

Using input from all stakeholders to define the project's scope is a crucial activity that must be properly carried out early on. In order to avoid significant changes that could adversely influence project performance, the goal of the project description is to give the necessary information to specify the work to be completed (Gibson et al, 2006). Before deciding whether or not to move forward with the project execution, these information are required (Kähkönen, 1999). Inadequate project planning and unclear scope definitions can result in costly adjustments, delays, rework, cost overruns, schedule overruns, and even project failure. On the other hand, adequate front-end project planning and precise project scope definitions can reduce the possibility of cost overrun. During the project's early stages, changes frequently reflect the uncertainties that exist (Assaf & Al-Hejji, 2006). Because each stakeholder has a unique viewpoint on the project, changes are frequently requested. As a result, for a project to be executed successfully and to produce a good result, a clearly defined project must be established during the pre-project planning phase.

Project description is extremely important in the public sector since projects in that sector prioritize the needs and comfort of communities, as opposed to private sector initiatives, which frequently have the interests of investors or owners in mind. As a result, they ought to take into account their needs and demands. And this cannot be accomplished without incorporating all stakeholders in the project's definition from the outset. It is unreasonable to ask stakeholders for their thoughts on the project's results after it has been completed when their engagement was minimal.

When one or more stakeholders' input is purposefully or accidentally left out of the project definition while input from other stakeholders predominates, an incomplete project definition might result (Sharma & Lutchman, 2006). A project's extreme risks may be overlooked if stakeholders' expectations and concerns are not taken into account and clarified at an early stage of the project. This could also cause issues in project management, which would ultimately result in subpar performance (Atkinson et al., 2006). Because of this, defining the project's scope is essential for increasing stakeholders' satisfaction and ensuring the project's successful execution (Heywood & Smith, 2006).

In facilities projects, extensive pre-project planning can reduce cost and time by up to 20% and by 39%, respectively (Cho & Gibson, 2001). The Construction Industry Institute (CII) of America has created a scoring tool called the Project Description Rating Index (PDRI) to address the issue of inadequate project definition. The tool can be used to assess a project's definition completeness. The goal of the PDRI tool is to give a project planning team the ability to choose the appropriate level of detail for each component listed in the project definition list. The project team, owner, and/or contractor assess each item on the list. The final step is to determine the project's overall score; the lower the number, the more clearly defined the project is. (Cho & Gibson, 2001).

The level of project definition is less reliably assessed by the Project Definition Rating Index (PDRI), despite its use as a tool. External stakeholders' opinions and comments are not taken into account during the review process. The term "external stakeholders" describes people or organizations that are impacted by a project but are not formally a part of the project team or actively involved in the project; rather, they are a part of the project's surrounding environment. Neighbourhood, community, general public, and/or industry connections are some examples (Olander, 2007). The Project Definition Rating Index (PDRI) further implies that the project team's impact and input are equal across all aspects of project definition.

When defining each item on the project definition list, different stakeholders are expected to participate and contribute at varying levels. Therefore, in order to determine stakeholders' relative engagement and contribution to the various project definition parts, a more trustworthy rating technique must take into account stakeholders' value to a project. According to Olander and Landin (2005), if stakeholders are not effectively engaged and their worries and expectations are not addressed well, conflict and controversies concerning the execution of a building project may develop. Project managers must involve all stakeholders in project defining choices in order to prevent this from happening. They must take into account the worries of all interested parties and balance alternate views. The impact of a project might be impacted by any bad perception among stakeholders of the project concept.

The effective execution of a project within the anticipated time, cost, and quality constraints depends on a clearly specified project scope. In the field of project management, scope definition takes place during the pre-planning phase, a time when a significant amount of time and

resources must be invested in activities leading to the final investment choice. This approach has been shown to be a successful means of raising project success rates while dramatically lowering project implementation risks. Additionally, it is wise to factor in the time required for this preliminary planning when estimating project length, particularly for public infrastructure projects. This can help manage public expectations for delivery times and, in certain ways, favourably impact the outcome of the project. (Olander and Landin, 2005)

The goal of project pre-planning is to define a project in sufficient detail to make it clearer what needs to be done to satisfy the needs of the recipients of project deliverables. At the same time, it is important to avoid spending too much time on project definition because end users demand speedy service or product delivery. According to conventional wisdom, projects with a clear scope during pre-planning are less likely to experience unforeseen events like scope creep, timetable slippages, cost overruns, and subpar deliverables. All potential risks are recognized through detailed project definition, which enables proactive action to be taken to either lessen the possibility of the risk occurring or to lessen its effects if it does. Therefore, project scope specification is acknowledged as a risk management strategy. On the other hand, one might consider allowing enough contingencies, a measure also used in fast-track projects, if it is determined that the project has somehow been insufficiently specified in pre-planning. (Heywood & Smith, 2006).

Understanding project management and subsequently evaluating its effectiveness present additional challenges when defining project success. It is generally acknowledged that a project's technical goals can be met while adhering to the three constraints of scope, time, and cost, as well as its usefulness as perceived by its beneficiaries, sponsors, and project team members. Additionally, a project's performance can be used to determine whether it was successful or not (Kerzner, 1992, 2001, 2003).

A project's success or failure can only be accurately assessed after it has been completed, according to this definition. This is supported by Baccarini's (1999) definition of project success, which gauges accomplishment or failure using the project log-components frame's and, consequently, the efficient application of the project's output. Poor planning, frequent changes to the scope, which affects the budget and deadline, as well as a lack of monitoring and control, are the main causes of project failure. Boyd (2001) introduced five guiding principles for measuring project satisfaction, regardless of the project's scope, size, or duration. These principles are: delivering the product the customer wants or needs; delivering quality that is consistent with price; delivering the project within the customer's specified timeframe; delivering the desired level of feedback; and having a system of conflict resolution that is fair to both the client and the development team.

De Wit (1988) made a distinction between project success, which is determined by how well it accomplishes the project's overall goals, and project management success, which is determined by how well it performs in terms of the more common and established performance metrics of

cost, time, and quality. Pinto and Slevin (1988) published a list of best practices for project management that were thought to help projects succeed.

Project Mission's initial clarity of objectives and broad direction is one of them. Support from senior management refers to their readiness to commit the required funds and power to a project's success; a full description of each individual action step necessary for the project's implementation in the project schedule or plans; Communication, consultation, and attentive listening to all parties affected by the client; Personnel - the hiring, vetting, and training of the required project team members; Technical tasks - the ability to complete the precise technical action steps using the knowledge and technology needed; Client acceptance is the process of "selling" the finished product to the target market; Monitoring and feedback - timely delivery of thorough control information at each stage of the implementation process; For the project's implementation, communication refers to providing the essential data and a suitable network to all important actors. Troubleshooting, on the other hand, refers to the capacity to respond to unforeseen crises and deviations from the original plan. The effectiveness and success of project management are assured by these methods, according to a number of researchers throughout the years, including Cooke-Davies (2001) and Cleland and Gareis (2006).
The development of various tools for ensuring the project is on track, including the critical path methodologies, Gantt chart, and other computer-based techniques, is a result of the complexity of project management, particularly monitoring and control and continuous demand on the time of the project team. Unfortunately, relying on these technologies will only be effective if the project management team is able to recognize the crucial success elements at each stage of the project life cycle from the beginning. The team is able to pinpoint the crucial factors that determine whether a project succeeds or fails by continually assessing if it satisfies the needs of the client, has the backing of management, is supported by the necessary knowledge and expertise, and solves the right problem.

A group of project variables or characteristics that are closely associated to project success and whose maximizing or minimization, depending on whether they are positive or unfavourable, will lead to project success, are generally referred to as important success factors. Frese and Sauter (2003) draw the general conclusion that project leadership, governance, and communications, as well as good planning, clear responsibility and accountability, and schedule control, are crucial components of successful projects. This indicates that the key success components for project management are a clear project plan, a plan for risk management, and the commitment and support of stakeholders. By outlining sets of crucial success variables for the various stages of the project life cycle, Khang and Moe (2008) expand on this further.

Drawing judgments on the causes of a project's success or failure is as difficult as project management itself, despite the different definitions of what constitutes success and failure factors. It is important to note that the legendary "iron triangle" of project management is not the only yardstick for determining whether a project will succeed or fail based on the definitions of crucial success indicators provided by different writers. Fortune and White (2006) conducted a

survey of 63 articles that concentrate on critical success factors (CSF) and concluded that there is little consensus among authors regarding the variables that affect project performance. They describe the top three mentioned characteristics as being: the significance of senior management support for a project; having clear and attainable objectives; and establishing an effective plan.

2.4 Summary of literature and Research Gaps

2.4.1 Summary of literature

Various books, Journals, articles, published research papers and online references were revewed by the researcher. Out of which 63 references were made to build understanding regarding Project scope management practices and challenges

Table 2-2: ***Summary of literature reviewed***

Year of publishing	Number	Percentage
1988-1999	9	14%
2000-2010	40	63%
2011-2021	14	22%
Total	**63**	**100%**

The success of a project is greatly influenced by the right specification and definition of its stakeholders' expectations, which is mostly accomplished through effective scope management. Establishing project goals and success begins with a scope statement that clearly describes the project's objectives and product deliveries. It turns into a helpful tool for communicating with all parties involved, including team members, users, and sponsors. A clearly defined project scope is crucial because it will enable effective resource allocation and budgeting. It will also save time and effort by removing elements that add little value to the project's goals. If the process of establishing scope is not well handled, it could lead to really serious issues. Too wide of a project definition could drag the team into a web of interconnected problems that are beyond their capacity to solve. Too-limited project scopes may prevent teams from identifying the underlying issues. But usually the tendency is to overestimate the extensiveness of an endeavour rather than underestimating it (Mulcahy, 2009).

Scope may also be further specified in terms of cost budget numbers in order to be clear about the intent or reach of different systems. Such budgetary data must be provided in sufficient depth to serve as the foundation for a cost management system and to assess any ensuing adjustments to that scope. Due to the increased competition and sector dynamism, as well as the need to increase cost savings and maximize profits, projects are now faced with the challenge of ensuring success in projects execution through the implementation of effective project scope management, which is the most important factor that affects success and failure. Where the scope

is not properly defined at the beginning of projects, the likelihood of failure is high (Avison and Torkzadeh, 2009).

2.4.2 Research Gaps in Renewable energy sector of Ethiopia

Despite Ethiopia's vast renewable energy potential and economic growth, more than 50% of Ethiopia's population of 118 million people still lack access to electricity. More than 87 million people are without access to clean cooking. To curb this situation, Ethiopia's Climate Resilient Green Economy (CRGE) strategy (FDRE 2011) aims to reach 17.7 million households with clean and improved cook stoves by 2030, with a potential GHG emission reduction of 51.2 MtCO2e. The National Electrification Plan (NEP 2, 2019) aims to provide by 2025 every citizen with access to electricity, 65% on-grid and 35% off-grid.

In the updated NDC 2021, Ethiopia aims to reduce by 2030 GHG emission in the range of 10.5 Mt C02 equivalents in the energy sector with support of Development Partners. Reducing biomass use and harvesting electricity from renewable energy have been acknowledged as important instruments in the implementation of Ethiopia's NDC.

In November 2017, the Ethiopian government launched the NEP as an action plan for achieving universal electricity access nationwide by 2025. 65% of access provision is targeted with grid solution whereas 35% are expected to be sourced from off-grid solutions. NEP targets a grid connection roll-out program for scaling up connectivity and complimentary off-grid access program that will provide access to rural and deep rural households without grid connectivity. Both the on-grid and off-grid energy access targets envisage public and private sector participation to be achieved.

To date, however, only a handful of Lighting Global® solar kit distributors exist in the market, and only two mini-grids operators have been licensed to the date of this assessment. The improved cooking sector is not scaling, and energy efficiency measures are not being extensively `promoted across the sector. If the goals set by the NEP (2017) are to be achieved, the sector needs to be reviewed to facilitate scale for the private sector.

The Government of Ethiopia's economic development vision has been historically encapsulated in the government's Growth and Transformation Plan (GTP). The growth objectives of the first phase, GTP I (2011-2015), were revised to formulate GTP II (covering 2016-2020). GTP II lays out a plan for dramatic structural transformation, shifting from an agrarian economy to one more geared towards manufacturing and services, with the overarching goal of making Ethiopia a lower middle-income country by 2025. GTP II envisaged 11% average annual economic growth with an improved trade balance and higher foreign reserves.

In September 2019 the Government of Ethiopia (GoE) unveiled its "Homegrown Economic Reform Plan" as a codified roadmap to implement sweeping macro, structural, and sectoral reform, with a focus on enhancing the role of the private sector in the economy and attracting more foreign direct

investment. As is general to any product and service, the market for solar technologies and improved cook stoves hugely depends on the overall environment of the country and the policies and strategies, institutions, and programs determine the market conditions of ICSs.

The main Gaps that lead to continuous scope change request by project stakeholders include

1. Shortage of Raw Materials: Almost all of the producers that are under the EnDev project mentioned raw material problems as their major challenge which usually leads to scope change request.
2. Distribution and logistics in rural areas: households in rural areas of Ethiopia have dispersed settlement. Hence, selling products to rural households requires higher transportation costs and well-developed logistic arrangements. And apart from cost, security situations in rural areas nowadays is also challenge for the distribution of energy products. For small-scale production and the challenges involved in transporting heavy Mirt and Mirt with Chimney stoves typically compels producers to sell their stoves in their local communities. The problem with this is that rural households prefer to buy in their own locality. Thus, large operation area for such small producers; under-developed infrastructure coupled with limitations on the engagement of larger firms have put a considerable challenge to reaching end-users as planned.
3. Limited Financial Capacity: the energy product producers have very limited capacity to produce stoves in mass. None of the producers haven't obtained financing from banks mainly due to lack of collateral, high interest rate, lack awareness on the financial institution products, long bureaucracy, short payment period, market problem, insufficient loan amount, and lateness of loan processing.
4. Awareness and Cooperation among Stakeholders: There is low awareness about energy products by the government officials; urban end users, and institutions working with rural households such as cooperatives and unions.
5. Issues of Product Design and quality enforcement – Last but not least challenge in the production and distribution of ICSs is product design. This is the case for Mirt with Chimney. Producers claim that production of Mirt with Chimney takes long time to produce and install. Unlike Mirt the producer has to go house to house to install the stove. This takes very long time and larger logistical arrangements. However, the demand for this product is very low mainly due to issues relating to compatibility. In urban households, part of the house where the stove is to be planted need to be demolished to accommodate the "T" design in the stove. Many households do not want their walls to be touched let alone demolished. In rural areas the materials with which the kitchens are constructed cannot support these stoves. Therefore, the return from this product is not profitable compared to the effort exerted to produce it.

2.5 Conceptual Framework

Figure 2-4: ***Conceptual Framework (Own source 2023)***

Effective project scope development requires the balanced management of various activities like Development of scope management tools in the organization where the definition, development, and verification of the scope are detailed in the scope management plan. It also outlines who is responsible for managing the project's scope and provides guidelines for scope control. One of the most important and significant factors in a project's success is the project scope management strategy. Additionally, the establishment of clear and attainable objective along with a through initial requirement assessment is an important aspect that needs to be considered for effective scoping. Furthermore, a well-developed Scope change management plan needs a paramount focus by higher management. Established knowledge about the energy sector is needed for the EnDev project as it would help in the scope management aspect of the project. lastly, stakeholder management of both internal and external project teams and effective communication management are mandatory aspects that needs to be considered by project management team for future project successes.

CHAPTER THREE

Research Methodology

This part provides the detailed descriptions of the research methodology that is employed in this research.

3.1 Research design

The broad strategy for how research questions will be answered is known as the research design (Saunders, 2009). In order to achieve these goals, a descriptive research design that allows for the use of mixed data to explain the situation was selected. According to a research technique guide published in 2011 by Kumar, a descriptive study aims to explain a scenario, a problem, or provide information about it while also describing attitudes regarding the problem. Descriptive statistics tell what is. Descriptive research is research used to "describe" a situation, subject, behaviour, or phenomenon. It is used to answer questions of who, what, when, where, and how associated with a particular research question or problem.

The type of question asked by the researcher ultimately determines the type of approach necessary to complete an accurate assessment of the topic at hand. There are three main methods that may be used in descriptive research:

- Observational Method – Used to review and record the actions and behaviours of a group of test subjects in their natural environment. The research typically does not have interaction with the test subject.
- Case Study Method – This is a much more in-depth student of an individual or small group of individuals. It may or may not involve interaction with the test subjects.
- Survey Method – Researchers interact with individual test subjects by collecting information through the use of surveys or interviews.

This research used survey method to collect information and analyse results from test subjects, i.e., project implementers.

3.2 Research Approach

The researcher used deductive research approach and both Quantitative and Qualitative data from the project implementation team and literature reviews was used in this study to support the thesis. By taking the research objectives into account, this study was focused on two major categories of descriptive characteristics. The primary emphasis of the research is project scope development & management and the challenges associated with project execution based on the defined scope. Both of the primary variables were analysed, and the data collection tools

included pertinent questions. As a result, the project scope management practice focused on the project team's scope development and management, scope management tools, and stakeholder engagement as the primary variable while scope change management and challenges on project execution based on the developed scope were considered as the second major variable under this research. Since this research used a mixed research method, there was a use of SPSS software by the researcher.

3.3 Sources of Data/Type of Data

The research used both primary and secondary data to meet its objectives and generate the proper mix of the study purpose

As primary source: The purpose of primary data collection is to obtain first-hand information so that the research team will have the opportunity to validate reports and address vague or confusing data that might have been collected earlier. Individual questionnaire and personal interviews were conducted with members of the project implementation team and related stakeholders like, Gesellschaft für Internationale Zusammenarbeit (GIZ) Energizing Development (EnDev), Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (BMZ), Ministry of Water and Energy (MOWE), Developemnt Bank of Ethiopia (DBE), Schweizerische Normen-Vereinigung (SNV) and World Bank(WB).

As secondary sources: annual reports, final project reports, published materials regarding the project and any related literature was reviewed to have full information regarding the project.

To triangulate the results of each method used, it is helpful to combine many methodologies in a single study. The reliability and validity of the data, as well as the conclusions and suggestions that will be made, might be negatively impacted by relying on a single approach. (Currie, 2005).

3.4 Data collection instruments

The data collection was done from both primary and secondary sources. To explore the proper project scope development and management for project success, Self-Developed questionnaire and personal interviews was used to collect data from members of the project team (GIZ CO and Regional Team), Project donors (BMZ and GIZ HQ)and main project stakeholders (MOWE,DBE,SNV & WB). The self-developed questionnaire was distributed to 57 project team members. The questionnaire which was self-developed by the researcher tried to cover the two main variables of the research which were the project scope management practice focusing on the project team's scope development and management, scope management tools, and stakeholder engagement as the primary variable while the challenges on project execution based on the developed scope as the second major variable under this research. While the interview questions were designed as a a list of guiding questions, so that the interviewer gets an opportunity to explore and have detailed responses from the interviewees. In principle, research interviewees are those whose social positions in a research setting give them special knowledge

about other people, processes or happenings that is more extensive, detailed or privileged than ordinary people, and who are therefore particularly valuable sources of information to a researcher. Accordingly, key informant interview has a vital role to get detail information about the required data in the case project.

To understand theoretical aspects of the topic, past literature was reviewed. To explore the nature of the project and the status it is at, materials published by the Energizing Development (EnDev) and affiliated organizations were reviewed.

3.5 Target population

The population under observation was the whole project team and stakeholders of the project which is composed of 57 people. Hence Census survey was employed and selected team from major stakeholders in the data collection to understand the perspective of all implementation parties was done.

Table 3-1: ***Target Population of the research***

Participant	Team	Position	Number
Donner	**Project Donor**	Project Fund Manager from BMZ	2
		Project Back stoper from BMZ	1
EnDev Project	**Project Team**	Project manager (DV)	1
		Deputy Project Manager	1
		Project supervisors	5
		Regional project Advisors (for Amhara, Oromia and SNNPR, SDR and SWER regions),	10
		HQ Technical Energy Project Advisors	15
		Project Monitoring and Evaluation team	5
Major Project Stakeholders	**Public Partners**	Project Manager from MOWE	1
		Project coordinators from MOWE	2
		External Fund and Credit Management Directorate Energy Coordination Team Manager from DBE	1
		External Fund and Credit Management Directorate Energy Coordination Team member from DBE	4
	Development Partners	Project Manager from SNV	1
		Project Coordinators from SNV	4
		Project Manager from World Bank	1
		Project Coordinators from World Bank	3
Total			**57**

3.6 Method of Data Analysis

In order to identify the issues, the data that was collected through questionnaires and interviews was analysed both quantitatively and qualitatively respectively.

SPSS was used as a tool to analyse the quantitative data collected through questionnaires. And the qualitative data collected through Interview was analysed and presented in a way that enables the researcher to respond to the research questions and meet the set objectives, from which recommendations and conclusions were made. The researcher used frequency, percentages, mean and standard deviations for descriptive analysis.

3.7 Presentation

The findings of the data collected, and analysis findings are presented in two documents. A narrative document that contains the summary of all literature reviewed, data collected and analysis with every reference used and a Power Point presentation of the final narrative report to be presented to examiners.

3.8 Validity and Reliability

The extent to which an instrument measures what it is intended to measure is what validity is all about (Kothari, 2006). Comparing the degree of consistency between various measures of a latent variable can be used to analyse reliability, which is concerned with measurement consistency (Hair et al, 2006). For the study, validity was given considerable consideration, and several tools were used to get the most out of data collection strategies. To provide a legitimate and comparable response, open-ended, closed-ended questions, semi-structured interviews, and a literature review were all constructed. A pre-test of the questionnaire was also undertaken to see if the questions were clear and understood in the context of the respondents, and some preparations were made based on the results of the pre-test to increase the validity of the instrument. Intentionally, two similar closed-ended questions were used to test the validity of the data and results when they were evaluated with the use of SPSS.

Although participation in the study was entirely voluntary, the researcher did make follow-up calls and emails to promote it. Data were gathered directly from primary sources whenever practical. The consistency of the responses was checked, and they were also compared to other contributions.

3.8.1 Reliability and feasibility of the Data collected

To check the reliability and feasibility of the data, SPSS tests of crombach's alpha and cross-checking questionnaire items was done. And as research's show that a Cronbach's alpha score greater than many methodologists recommend a minimum α coefficient between 0.65 and 0.8 (or higher in many cases)

Table 3-2: ***Cronbach's Alpha test - Reliability Statistics table for Research question 1:*** What are the scope development practices undertaken by EnDev?

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
.851	.857

In this research question case that has sub 6 questions 0.851 crombach's alpha for the reliability of the items and 0.857 for standardization of the items are acceptable range and indicates reliability.

Source: Own Survey Data 2023

Table 3-3: ***Cronbach's Alpha test - Reliability Statistics table for Research question 2:*** How well have project stakeholders been involved in project scope development?

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
.724	.699

In this research question case that has sub 6 questions 0.724 crombach's alpha for the reliability of the items and 0.699 for standardization of the items are acceptable range and indicates reliability.

Source: Own Survey Data 2023

Table 3-4: ***Cronbach's Alpha test - Reliability Statistics table for Research question 3:*** What are the major scope change management tools followed by the project?

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
.745	.715

n this research question case that has sub 7 questions 0.745 crombach's alpha for the reliability of the items and 0.715 for standardization of the items are acceptable range and indicates reliability.

Source: Own Survey Data 2023

Table 3-5***: Cronbach's Alpha test - Reliability Statistics table for Research question 4:*** What are the main challenges faced by the project in implementing the project within the scope set at the start?

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
.705	.657

In this research question case that has sub 6 questions 0.705 crombach's alpha for the reliability of the items and 0.657 for standardization of the items are acceptable range and indicates reliability.

Source: Own Survey Data 2023

Additionally, the question "There is a clear/proper scope communication to project implementation team" was provided twice intentionally. The main aim of this item was to cross-check the accuracy of data and attention/concentration of respondents.

Table 3-6: ***Statistical Summary of identical crosschecking questions***

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
There is a clear communication of scope to the project implementation team	52	1	5	3.85	1.274
There is a proper scope communication to project implementation team	52	1	5	3.90	1.209
Valid N (listwise)	52				

Source: Own Survey Data 2023

The result was found to be relatively concise as the project team responded to each item by mean score difference 0.05 and deviations from the mean difference with 0.065 as shown in the table above. This small variation for similar question at different group shows that very small numbers of respondents answered the questioner unintentionally and without concentration. Therefor we can conclude that the reliability of the data collected was proved to be good.

3.9 Ethical Issues

Ethics standards encourage the values that are essential to collaborative works, such as trust, accountability, mutual respect, and fairness, which is evidenced by the fact that research frequently involves a great deal of cooperation and coordination among many different people in different disciplines and institutions (Resnik & David 2015). With the aforementioned issue taken into account, the study is in accordance with the organization's policy on any intellectual property rights and any secret data. Responses from respondents are kept completely private and solely used for academic purposes. Research ethics would be taken into consideration while creating and using the instruments and strategies for collecting data, and all materials and sources are appropriately cited. All essential absolute sensitivity and prudence were used to collect the necessary data.

CHAPTER FOUR

Data analysis Presentation, Interpretation and Discussion

This chapter discusses the presentation, analysis, and interpretation of data gathered through interview, questionnaire, and document review regarding Project scope management practices and challenges in Ethiopia's off-grid energy sector: In the case of the GIZ Energizing Development (EnDev) Ethiopia Project. In order to accomplish the goals of this research, this chapter will analyze and evaluate the survey data gathered by questionnaire and interview, as well as discuss and connect major findings (practice) to theory. The survey data is presented and evaluated using the Project scope management process categories found in the literature, and it is broken down into three sections: general statistics about the data that was collected; respondents' management practices; and respondents' opinions.

4.1 Introduction

To answer the main research objectives a structured interview and questionnaires were developed by the researcher and would be analysed in this section divided into two main categories of variables; the project scope management practice focused on the project team's scope development and management, scope management tools, and stakeholder engagement as the primary variable while scope change management and challenges on project execution based on the developed scope were considered as the second major variable under this research. Each section consisted of related items and selection of these items for assessment was used by both theoretical considerations and descriptions of responses collected in regards to the main question of Project scope management practices and challenges in the off-grid energy sector of Ethiopia in the case of GIZ Energizing Development (EnDev) Ethiopia Project.

Accordingly; on the questionnaire a total of 30 questions were used (Both close ended and open ended); where the first two portion of questions were asked for the first variable while last two portion of questions were raised for the second variable with addition of five open ended questions (the first three were for the first variable while the balance two focused on the second variable). To indicate the extent to which each respondent agrees to the corresponding closed ended statements rated on five-point Likert scale ranging from 1 “Strongly Disagree” to 5 “Strongly Agree”. Where: 5 “Strongly Agree”, 4 “Agree”, 3 “Neutral”, 2 “Disagree” and 1 “Strongly Disagree” are be interpreted as; serious problem; moderate problem; neither problem nor benefits; minor problem and not at all problem. The researcher ranked these challenges from the most challenging to least challenging based on the mean value of respondents’ agreement level. In addition to the questionnaire 9 structured questions were raised in the interview and the feedbacks for both the questionnaire and interview are analysed on the below section.

The primary data analysis is organized in to four main sections which are the Demographic information of respondents which gives a general information of the demographic data of the respondents. The second part is the introduction part that includes the questionnaire and interview return rate for the research. The third part includes the analysis of the firs question which is Scope development & management practices and techniques at EnDev. The fourth part answers question 2 which is the level of engagement of project stakeholders in scope development in energy projects at EnDev. The fifth analysis focuses on answering the third question which is the Scope change management tools prepared to avoid scope creep and the last analysis focuses on the fourth question of the research which is the Main challenges of project scope management faced in EnDev.

4.1.1 Questionnaires Return Rate

Fifty-seven questionnaires were distributed for all the project staff and staff of relevant stakeholder and among them Fifty-two questionnaires were responded and filled properly. Which is 91.23% of the total target population. The 5 non-respondents had various reasons for not participating in the data collection like long field trips and annual leaves. And since the number of non-respondents was very small it had minimal to no effect on the representation of the respondent's thoughts.

Table 4-1: ***Questionnaire response rate (Source own survey 2023)***

Questionnaire			
Target Population	**Respondents**	**Non-Respondents**	**Percentage**
57	52	5	91.23%

Source: Own Survey Data 2023

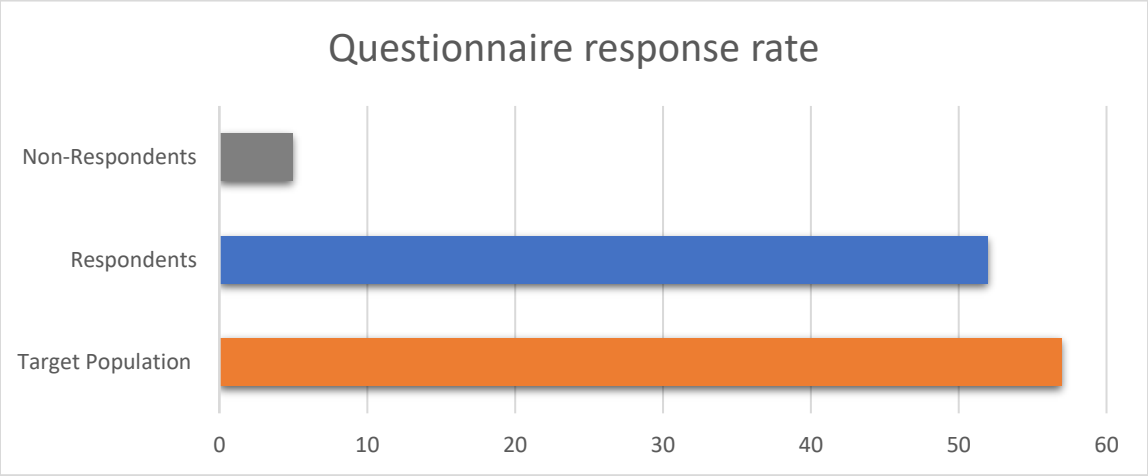


Figure 4-1 : ***Questionnaire response rate (Source own survey 2023)***

Extracting valuable information from all project implementation team proved to be valuable as the researcher was able to get a conclusive data on the personal understanding of the project. This will be seen from the analysis part.

4.1.2 Interview Return Rate

The researcher targeted an in-depth interview with 9 people. Where all 9 of the interviewees were cooperatively responsive to interview and data collection requests. This makes 100% interview response rate by the project team members and stakeholders. The key findings and analysis from these interviews are presented below.

Table 4-2: ***Interview response rate (Source own survey 2023)***

Interview			
Target Population	**Respondents**	**Non-Respondents**	**Percentage**
9	9	0	100%

Source: Own Survey Data 2023

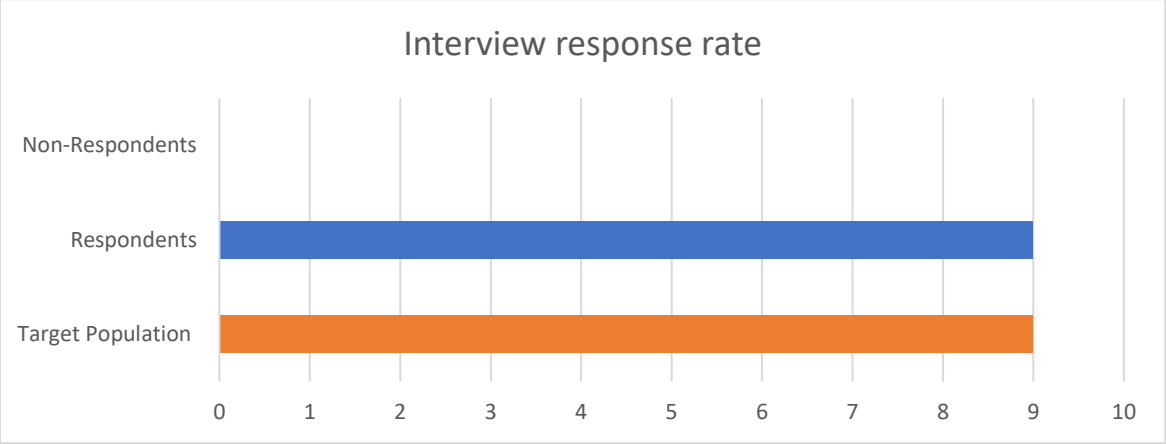


Figure 4-2: ***Interview response rate (Source own survey 2023)***

As was seen from the literature review part Project Scope management practices need high level management engagement and control and during this research responsible high level managers were willing to respond to the interview as easy as the project implementation team members which helped on understanding of the management side on the scoping activities of the project.

4.2 Demographic information of respondents

This section is all about the general demographic information data. The researcher has done the interviews and data collections directly from the total team members of the project.

Table 4-3: ***General demographic information of respondents (Source own survey 2023)***

		Count	Column N %	Column Valid N %
Sex of respondents	Male	38	73.1%	73.1%
	Female	14	26.9%	26.9%
Age of respondents	<25	3	5.8%	5.8%
	25-34	11	21.2%	21.2%
	35-44	23	44.2%	44.2%
	45-54	9	17.3%	17.3%
	>55	6	11.5%	11.5%
Educational Qualification of respondents	High School	0	0.0%	0.0%
	Diploma	0	0.0%	0.0%
	Degree	16	30.8%	30.8%
	MA/MSc	33	63.5%	63.5%
	PhD	3	5.8%	5.8%
Work Experiance (In Years)	0-5	4	7.7%	7.7%
	5-10	6	11.5%	11.5%
	10-15	11	21.2%	21.2%
	15-20	23	44.2%	44.2%
	20+	8	15.4%	15.4%

The above composition of the respondents is presented to show their demographic backgrounds. The table have shown the characteristics of respondents; in terms of sex, age, educational qualification and years of work experience. And the organization, department and specific roles of respondents were left out because respondents were afraid it will reveal who they are.

The respondents' gender profile indicated that; 73.08% (38) of the participants are male and the rest 26.92% (14) are female (N=52). This could be evidenced that; the overall staffing composition of the company is highly dominated by male employees. Concerning age distribution of the respondents, the highest percentage of the participants was 44.23% participants from 35 to 44 and 21.15% aged 25-34 which indicates that the project is staffed with young and energetic employees. About educational qualification in the project, 61.54% of the participant have specialization at a masters' degree level and above 32.69% of the total participants are first degree holders. Therefore, majority of the employees have a good status of human resource profile in terms of educational background. As for the work experience in years

44.23% of team members have 15-20 years of experience and 21.15% of team members have 10-15 years of experience, Which implies that the project has team members who have ample experience they can bring to the project implementation.

4.3 Scope Development & Management practices and techniques at EnDev

Table 4-4: ***Statistical summary Scope Development and management practice questions***

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
I understand how project scope is developed and Managed	52	1	5	4.10	1.241
There is a clear step developed for scope management at EnDev	52	1	5	4.17	1.043
There is a strong link between proper scope management and project success	52	4	5	4.63	.486
I am involved in scope development and I manage my task within the boundaries of the scope developed	52	1	5	3.25	1.399
There is a clear communication of scope to the project implementation team	52	1	5	3.85	1.274
There is enough engagement of stakeholders in the scope development and management of projects	52	1	5	3.15	1.349
Valid N (listwise)	52				

Project management can be challenging. Budget issues, low stakeholder engagement, and poorly defined goals are just a few problems that can impede progress. Based on the literature review if the project manager found him/herself running into these problems frequently, the real problem may involve project scope. The project scope of EnDev is observed to be developed and managed by the project managers with minimal involvement of the project implementation team. It was observed that the project manager tries to refer back to the scope statement frequently but fails short to check whether the implementation is within the scope because they are usually busy and are engaged with other associated projects in the energy portfolio. Hence it was clear that the project management of the project should involve the implementation team in the scope management process so the team can frequently refer back to this document to ensure the project

is always moving in the proper direction. With this document in hand everyone will know what to expect, every necessary action will be taken, and the project will be successfully finished on time and within budget if the scope is well defined. Additionally it was observed that the scope statement should be created by the project manager in collaboration with the team managers and stakeholders and the project's objectives, deliverables, features, functions, tasks, dates, and expenses should all be listed in the scope statement along with other pertinent information.

To understand the data collected in detail the researcher will go question by question ad discuss the implications of the data collected on the scope Development practices and techniques at EnDev and identifying improvement areas for better project outcome. To answer this question the researcher raised six questions which will be analyzed in two parts. The first part of the questions was directed to answer the understanding of scope in the project and the scope development steps in EnDev if any, where the respondents provided their answers unbiased as their names were not included in the document and the confidentiality of their responses will be protected as promised. As presented in table 4-6 below; regarding the question on how project scope is developed and Managed (mean score 4.10) as seen from the data collected one of the key things the project team can do to ensure a successful outcome is to understand how project scope is developed and managed. The main focus of project scope management is determining what is and is not included in the project. It is essential in assisting project managers, coordinators, and supervisors to concentrate on what is truly vital for the project and assign the appropriate amount of work to team members who can actually contribute to the project's successful completion.

For the question on a clear step developed for scope management at EnDev (mean score 4.17); according to PMI (2013) Project scope management requires a number of steps to ensure the correct processes are put in place. In general, there are 6 steps, which are Planning scope management, collecting requirements, defining scope, creating the Work Breakdown Structure, validating scope and controlling scope. The EnDev project has been using simple process to create the project scope which is initial internal scope planning, presentation of internal plan to stakeholders and collecting the stakeholders feedback on the plan, incorporate the feedback on the plan and present it again for final go ahead to the next step, finalize the scope and circulate to all stakeholders, have a stakeholder meeting to discuss on specific operational plan and action plan development and endorsement by all stakeholders and once this is finalized the monitoring and evaluation team will take over the follow-up and checking of activities implementation with in the scope developed by the team and collect feedback from stakeholders once the project is completed so that lessons learned can be taken and kept aside for suture project management. However, the researcher did point out that, in addition to the EnDev steps, the use of the proper project management software can boost cross-functional teams' productivity and effectiveness. It facilitates decision-making and speeds up and simplifies communication.

In regards to the strong link between proper scope management and project success (mean score 4.63) Without a defined project scope, the project manager is leaving too much to chance.

According to Muhammad (2013) Project failure has been associated with inadequate scope definition. It has long been understood that inadequate or bad scope definition is a serious issue because it has a negative correlation with project performance. If boundaries are not established, changes that disrupt project rhythm, require rework, extend project duration, and decrease project productivity and field worker morale sometimes result in higher final project costs. Even if the project does produce a somewhat positive outcome like EnDev, there will likely be a lot of resources wasted. Which generally shows that the project management and implementation team should and do understand the value of scope development and how it should be managed for a success of a project. Hence, it has been observed that both the management team and the implementation team of EnDev project have a clear understanding on the linkage of project success and working within the scope developed.

The second part of the questions were planned to assess the communication of the scope developed to the implementation team and their involvement in the development of the scope where the project team responded to the question I am involved in scope development and I manage my task within the boundaries of the scope developed (mean score 3.25); If the project scope is established, it indicates that the team's expectations are clearly understood, and the repercussions of each member's actions will foster the environment of accountability necessary for a project's success. However, as the mean score indicates, the project team's participation in scope development of EnDev project needs to be increased for the project to be more successful as the scope management process is crucial for ensuring that a project is pertinent, realistic, and able to achieve the objectives set. Scope management benefits both project managers and project teams and serves to meet the key performance indicator. The project scope serves as a framework to direct the anticipated pace and content. While staying within the project's scope is excellent, it's important to keep in mind that it might vary as the project progresses. This could occur as a result of a time restriction or the shifting needs of the stakeholders. In either scenario, implementing the project with a baseline scope helps in teamwork by explicitly defining each objective and stage.

For the question there is a clear communication of scope to the project implementation team (mean score 3.85) according to many researchers like Cooke-Davies (2001) and Cleland and Gareis (2006) Project management depends on effective communication since it enables projects to move forward smoothly and on schedule. Project management success is impacted by effective communication. Project management teams can disintegrate without it. Translation errors, deadline omissions, and overlooking crucial project components are all possibilities. Since teamwork is essential to project management, poor communication can result in conflict and a subpar product. If the project manager is not careful, the project's completion may come off far worse than it did in the beginning. Despite the variety of the project manager's responsibilities, excellent communication is a critical ability for their success. All project management teams depend on it to function, and it supports all of the abilities required to deliver successful projects. Effective communication requires being distinct, transparent, and clear. It

guarantees that team members are clear on the objectives of the project and know exactly what is required of them. Additionally, it fosters trust so that teamwork is improved from the beginning to the end of a project. Building trust and enhancing project collaboration both depend on effective communication. It's critical to provide a setting where team members may exchange expertise and cooperate to solve problems.

For the question on enough engagement of stakeholders in the scope development and management of projects (mean score 3.15) stakeholders' engagement is another important factor in determining a project's success. A project is successful when it achieves its objectives and meets or exceeds the expectations of the stakeholders. But who are the stakeholders? Stakeholders are individuals who either care about or have a vested interest in the project. They are the people who are actively involved with the work of the project or have something to either gain or lose as a result of the project. It's crucial to think about working together with the project stakeholders and management team before starting a project and the subsequent scope management procedure. As the project management team outlines the objectives of the project, this stage aids in reducing any likelihood of misunderstanding or poor communication. This stage can be repeated by the project team at any time during the scope management process, which helps the team stay focused on its primary objective. The project manager will interact and communicate with project stakeholders through the project engagement process. This results in the creation of a stakeholder communication plan that specifies the modes of communication and frequency for each project stakeholder. If there is a communication plan template available, the project manager can utilize it to get started. Relationships need to be established and maintained for stakeholder engagement. It also entails maintaining the stakeholders' active participation in and dedication to the delivery of the project that will bring about change. Understanding a stakeholder's objectives and goals makes it feasible to positively impact the change process and deal with problems that could pose obstacles to change if any. Stakeholder engagement aims to gain a greater knowledge of the interests of all the people and organizations whose lives will be affected by the proposed change.

Table 4-5: ***Overall Min, Max, Mean & Std. Deviation of questions under scope development and management sub variable***

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ScopeDevelopment	52	2.67	4.50	3.8590	.47644
Valid N (listwise)	52				

The overall mean score for the questions under the sub variable of scope development came to be 3.8590 which shows that the respondents gave an aggregate positive response in the practices and tools that are employed by EnDev project. This implies that the project management team of the project has been doing their duty. And this is a main issue because out of the ten knowledge areas in the PMI (2013), project scope management is the main area that contains the processes necessary to ensure that the project includes all of the work necessary, and only the work

necessary, to finish the project successfully. Project scope management can assist the project manager in understanding what the project's stakeholders are looking for as deliverable. The scope management process is crucial because it affects how well employees perform their jobs, how effectively they work, and how well a team is feeling overall. The scope issues are one of the primary causes of project failures. All projects absolutely require a scope management plan. Project stakeholders frequently believe the project is working in their favour without a scope management plan, which leads to unanticipated results. The project manager's primary goal is to make sure the project works well, and in order to achieve this, they must clearly define and set the project's scope. EnDev's management works hard to ensure knowledge transfer about scope management to the team they hire which is a good base as it will lead to sustainable project implementation and through further strengthening of better scope management there will be successful project implementation.

4.4 The level of engagement of project stakeholders in scope development in the energy projects at EnDev

Table 4-6: ***Statistical summary the level stakeholder engagement questions***

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
I/My team is involved in the project scope development and Management	52	1	5	3.15	1.377
There are frequent meetings of the stakeholder team to check if project implementation is within the scope developed	52	1	5	3.33	1.133
There is a detailed and continuous report to management about the project implementation within the scope developed	52	1	5	4.10	1.053
There is strong link between my team's engagement in project scope development and successful project implementation	52	3	5	4.44	.608
EnDev's M & E team reaches out to me for my opinion on the project scope management aspect	52	1	5	2.60	1.176
I/My team give Project closing feedbacks in relation to proper project scope management	52	1	5	3.25	1.135
Valid N (listwise)	52				

Defining and documenting project scope is crucial for keeping project stakeholder aligned. Outline important limitations and constraints that may derail timelines, budgets, and deliverables. Defining these parameters of a project helps alleviate unforeseen issues. Team leaders should also map out a procedure for project changes within the scope statement. If a change is needed, stakeholders should inform the team and follow the guidance in the project scope statement to make sure the impact is minimal. And keeping all stakeholders included in the planning phase helps everyone stay aligned on project goals and deliverables. Getting stakeholder buy-in will also help alleviate scope creep and ensure everyone understands the overall vision of a project.

Here the researcher tried to review the effort of the stakeholder engagement and project closing feedback collection is analyzed in this section. Accordingly, the respondents were asked the following questions I/My team are involved in the project scope development and Management (mean score 3.15) In a project, there are both internal and external stakeholders. Internal stakeholders may include top management, project team members, project managers, and resource manager etc. External stakeholders may include external implementation partners, government etc. Stakeholder engagement entails asking project stakeholders for their support and comments in order to make sure that the project's goals are realized. A competent stakeholder analysis using a stakeholder registry to identify their needs is a necessary component of good stakeholder management. And to actively shape the project and provide feedback, the project manager needs to invite the project stakeholders to the project management activities.

Additionally, a question on the frequency of meetings was raised as there are frequent meetings of the stakeholder team to check if the project implementation is within the scope developed (mean score 3.33) the EnDev project managers need to make sure that he/she involves all internal and external stakeholders in the project planning process and set up regular meetings with all parties involved and handle any issues that arise. The type of overall stakeholder communication will determine how frequently stakeholders meet. A meeting may only be required for an annual progress report or to cast a vote on a particular issue if stakeholders are kept informed via email and periodic reports. Meetings must also be organized when it's necessary to inform stakeholders of a change or get their input on a problem. Stakeholder-based standing committees may be established to meet regularly and act as advisory boards or decision-making bodies for the different project partners.

Regarding the question there is a detailed and continuous report to management about the project implementation within the scope developed (mean score 4.10) For a successful implementation follow-up, it is crucial for a project manager to devise a method of quantifying project progress through the establishment of project milestones and the collection of reports when each deadline is reached. The project team must report to the project manager, clients, and stakeholders on how the project is progressing in relation to the anticipated budget and timeframe during implementation. Any areas where the team needs to make adjustments to keep the project within its scope and budget must be explained in the report. The pertinent information about the project's budget, timeframe, and resources is included in these reports. This step allows projects

the ability to evaluate their achievements and pinpoint any future changes that are required, which can be advantageous for the project management cycle in the long run. As seen from the data collected the management team at EnDev receive regular reports on project progress because these reports must be submitted to the project's donors in order to secure additional funding.

In regards to the question raised to clarify if there is a strong link between the stakeholder's team's engagement in project scope development and successful project implementation (mean score 4.44) it was seen that one cannot work in silos on a project team. Depending on how well each team member works with the others to complete tasks, a project's execution success can be determined. In order to achieve this, the findings showed how crucial it is for the team to use a single, accessible portal for all project-related communications. Project management tools, which are frequently used as project collaboration tools, make it simpler for managers to perform their duties while also promoting greater project transparency and team accountability. Hence, a project management tool purchase is recommended for the EnDev project to enhance teamwork.

To answer the engagement of stakeholders in the project implementation the researcher raised two main questions which are: EnDev's M & E team reaches out to me for my opinion on the project scope management aspect (mean score 2.60) and I/My team give Project closing feedbacks in relation to proper project scope management (mean score 3.35) Where it has been seen that stakeholder engagement typically increases at the beginning of a project and declines as it moves along. It's crucial to stay in constant contact with stakeholders using collaboration tools, remote communication tools, and other means in order to prevent this. EnDev project management team need to Establish an environment where team members and stakeholders can engage in fun learning activities by being transparent with one another. And as seen from the data because of the low number of M&E project team in EnDev compared to the project size the engagement of project stakeholder after projects end is minimal.

Table 4-7: ***Overall Min, Max, Mean & Std. Deviation of questions under stakeholder engagement sub variable***

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
StakeholderEngagement	52	2.50	4.50	3.4776	.55526
Valid N (listwise)	52				

The overall mean score for the questions under the sub variable of stakeholder engagement came to be 3.4776 which shows that the respondents gave an aggregate positive response in regards to the engagement of stakeholders engagement in the development and management of scope in the EnDev project. Managing stakeholders effectively is arguably the most crucial component of completing a project on schedule and under budget. On many project managers' to-do lists, these elements are frequently relegated to the bottom of the list. Even worse, they are given to a team member with less expertise, which is a tremendous mistake. The fact is that a project's success is

directly related to and dependent on individuals who are really working on it. These participants are responsible for making any necessary adjustments along the route and for generating the project's intended benefits. After all, the project is intended to do something important and valuable to a variety of stakeholders, including clients, vendors, business partners, and a large number of other people. If at all possible, the project manager should be involved in the stakeholder management and avoid passing this duty off to other team members. For starters, stakeholder management should be a continuous process where the project team and stakeholders regularly express their views and opinions with all parties concerned. Giving this task to someone else would be very unproductive. Second, team members might not be able to accurately communicate the project's vision, mission, purpose, scope, risks, and methods. This is especially crucial in the beginning phases since it could cause unneeded uncertainty or even stress. Last but not least, the project's success is all on the project manager. It's preferable if the project manager handles these engagements. In EnDev project there is a dedicated partners relations manager who focuses on the stakeholder management but is usually under a lot of pressure because he is involved with all stakeholders in the Energy Programme of GIZ.

4.5 Scope Change Management tools prepared to avoid scope creep

Table 4-8: ***Statistical summary Scope change management questions***

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
There is a scope change management tool prepared collaboratively with stakeholders	52	1	3	1.54	.609
The scope change management tool developed is communicated with all stakeholders	52	1	3	1.54	.609
There is a strong involvement of the leadership to steer the project implementation to be within the scope developed to avoid scope change	52	1	5	3.00	1.400
If scope change is inevitable are stakeholders involved in the decision making of resource reallocation	52	1	5	2.94	1.227
Control measures are developed to prevent potential risks of scope creep	52	1	4	2.37	.950
Replacement plans are developed that can be used if the project change is inevitable	52	1	5	2.83	1.248
Extra time is built into your deadline to account for potential obstacles	52	1	5	3.48	1.321
Valid N (listwise)	52				

A project scope is never set in stone and the project manager may run into unanticipated issues. But the more clearly a scope statement is designed, the easier it'll be to pivot and address obstacles. Scope creep occurs when unforeseen changes in scope alter the project plan without a formal request. It's common for stakeholders to add or alter project goals after the project has been defined, increasing the likelihood of scope creep. Budget issues, missed deadlines, and increased stress are commonly associated with scope creep. For this the project manager needs to Include all stakeholders in project planning, Detail possible roadblocks in the project scope statement and communicate potential project setbacks to stakeholders and devise strategies to help avoid them.

To address the questions on the scope change management tools prepared by the EnDev project to avoid scope creep the researcher raised seven questions. And these questions are:There is a scope change management tool prepared collaboratively with stakeholders (mean score 1.54) It is crucial for project managers to make sure that all of the project's stakeholders are in agreement with one another and have a clear understanding of the project's risks and potential challenges. It is possible that a project manager will need to make changes during implementation for any kind of project, for example, to accommodate new stakeholder request or maintain the project's boundaries. And the project manager would need to use the project plan to discover solutions and make these revisions as needed and also he/she needs to ask questions to the team and keep in touch to find out where they need extra assistance. If a project deviates from the original plan the project manager should be prepared to devote more personnel or resources. For many projects, change is inevitable, and the way a project manager handles such changes can have an impact on the final result. Hence, Stakeholder feedback should be taken into account while creating change management tools in the EnDev project and stakeholders should be kept informed at all times during the project because an uninvolved stakeholder might cause significant issues in the project's final stages.

The scope change management tool developed is communicated with all stakeholders (mean score 1.54) was another question raised where it was noted that one of the keys to finishing a project successfully is effective communication. A project manager who has strong verbal and written communication abilities can provide directions, acquire data, and update stakeholders with ease. If not, as seen from the data the team of stakeholders involved in the project's implementation may become confused, which could cause delays as there will be multiple requests for scope change. There are still a few crucial steps to be taken after the team has finished the project deliverables. Gathering feedback from the project team, clients and stakeholders about the project's outcome, assessing what parts of the project went according to plan and what areas the team could help to improve any problems in the future. To acquire this feedback, the project manager can speak with those who are directly involved in the project directly, or he or she may find it useful to send out a brief survey asking for comments. This phase can support ongoing project improvement to guarantee future projects are successfully completed. The inclusion of stakeholders in project resource updates can make or break the

project. Hence, Stakeholder meetings are crucial for aligning the feedback of these important members.

Additionally, the researcher tried to answer the involvement of management team in various activities and raised questions to get feedback from respondents. Accordingly the respondents were asked if there is a strong involvement of the leadership to steer the project implementation to be within the scope developed to avoid scope change (mean score 3.00) The project's management team of EnDev are responsible for guiding the project to stay within the planned scope, but as observed from the data they frequently encounter a scheduling conflict in which two or more priorities fight for the project manager's time and attention. The project management team may run into scheduling conflicts if several projects are being worked on simultaneously. As a result, delays and issues with resource allocation may affect one or more projects. But as leadership is about taking charge and using resources effectively, both human and material, to effect change and advance society, for all leaders who want to inspire change, transformational leadership is crucial. Leaders in all spheres, including those in business, law enforcement, politics, and administrative positions, are in charge of promoting change by fostering teamwork. Change can be seen in the way that employees perform their jobs more effectively, how well their teams work together, and how their morale has improved. Different teams have different levels of participation in team activities and different leadership philosophies. Hence although the project management team of EnDev do have scheduling conflicts they should take the leadership concept into consideration and lead their team to success.

Additionally the respondents were asked If scope change is inevitable are stakeholders involved in the decision making of resource reallocation (mean score 2.94) it was understood that stakeholder participation in decision-making is crucial since their suggestions can direct the project toward its ideal conclusion. The process of allocating resources calls for careful consideration of all project stakeholders, at all levels. It is critical to recognize that each stakeholder views the decision-making process and its purpose differently. When the stakeholders aren't sufficiently involved, a number of other difficulties that projects run into, such as disagreements over the choice of change management strategy and unclear goals following change management, appear. Involvement begins with understanding the stakeholders' interests and needs. Once the project managers knows the positions of key stakeholders, he/she then needs to define which decisions need to be made, who should participate in making them and how to appropriately involve them.

To understand the contingency plans that need to be prepared by the project manager in order to tackle the unexpected and unforeseen circumstances the respondents were asked questions like Control measures are developed to prevent potential risks of scope creep (mean score 2.37) Change requests affect the direction of a project, making it harder to complete it within the restrictions of time, money, and quality. If change requests are not appropriately managed, the project will run behind schedule and cost more than was originally anticipated. When a project manager is managing a project, he/she will inevitably run into unforeseen difficulties and

obstacles. What matters is that the project manager has the skills and resources necessary to overcome these obstacles and finish the job successfully. which was all observed from the data collected. To help with this the researcher emphasizes the significance of using a project management tool to increase the effectiveness of project management.

Replacement plans are developed that can be used if the project change is inevitable (mean score 2.83) was another question raised where it was observed that a calm voyage could suddenly become a storm, and the entire mission could be put on hold if the project management team are not equipped to resist it. Replacement planning is the act of locating temporary or permanent backups so that organizations have resources that can be used in case of unexpected scenarios that the project might fact. Hence the researcher recommends that the EnDev project should have various contingency plans that can help the project management team of EnDev to get ready to handle unforeseen circumstances successfully.

Finally, the respondents were asked if an extra time is built into your deadline to account for potential obstacles (mean score 3.48) in project management its always wise to set SMART objectives. The next stage is to develop a detailed action plan for achieving these objectives within the project's time frame. A clear knowledge of who is in charge of what will result from having an action plan with deadlines for each activity. However, in order to minimize unforeseen difficulties, a contingency plan that includes additional time in the project action plan deliverable is also necessary. Another project management difficulty that might negatively impact the quality of the finished product is having an unattainable deadline. Because the project management team doesn't account for hiccups, projects have a built-in tendency to underestimate how long a task takes to complete. The team often assumes the best-case scenario for each stage when estimating the amount of time required to finish a task. The team will inevitably run across challenges, and as the workload increases, it will become more difficult for them to fulfil their own deadlines. Based on the data collected the project managers of EnDev usually work on the project timeline with stakeholders by setting deadlines and project tasks in order of importance.

Table 4-9: ***Overall Min, Max, Mean & Std. Deviation of questions under Change Management sub variable***

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ChangeManagment	52	1.14	3.57	2.5275	.70585
Valid N (listwise)	52				

The overall mean score for the questions under the sub variable of change management came to be 2.5275 which shows that the respondents gave an aggregate negative response in regards to the scope change management tools developed and employed in the EnDev project. For the vast majority of projects, change is an inevitability. Throughout the project implementation, changes are unavoidable, and they might happen for a number of reasons. These causes range from technical to procedural to financial to political and to people related. Whether a project manager agrees with the alterations or not, it's critical to consider the reasons behind the requests and how

they could affect both the project's integrity and the delivery process. Projects initially take place over a period of time, and as time goes on, underlying circumstances and situations can and do change. Projects are also finished by people, and people alter their thoughts, come up with new ideas, and acknowledge their errors. It would be foolish, if not impossible, to move forward under these conditions without acknowledging, admitting, and making preparations for the potential of change. The aim of standardized "change management" is to achieve this. According to Schwalbe, (2008) A project's "change" is managed, controlled, and implemented using a set of guiding principles, processes, and tactics known as project change management. The project vision, scope, and associated procedural components are all covered by change management, which is applicable to every aspect of the project and project management process. As part of the project governance phase, change management methods are assessed, applied to a specific project, and carried out as part of project oversight. Not preventing change but rather managing it is the secret to successful project change management. Finding, analyzing, and implementing adjustments to improve project results is the whole goal. To that purpose, a structured method should be used to manage projects in order to accept positive change and prevent bad change.

4.6 Main challenges of project scope management faced in EnDev

Table 4-10: ***Statistical Summary Main challenges of project scope management questions***

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
There is are clearly defined project requirements and goals to avoid scope creep	52	1	5	3.85	1.304
There is sufficient Research done on the possible issues a project or the team might encounter during every stage of the project	52	1	5	2.98	1.306
There is Poor resource allocation for activities leading to scope change requests	52	1	5	1.98	1.111
There is a proper scope communication to project implementation team	52	1	5	3.90	1.209
Accountability is built into the project's workflow, so team members understand their roles and responsibilities	52	1	5	4.13	1.067
The project implementation team has good skill leading to the proper follow of project boundaries set by the scope	52	1	5	3.46	1.434
Valid N (listwise)	52				

A project is successful if it meets all of the agreed requirements, it gets finished on time and its expenses are within budget. As a team strives to complete a project, it's likely to encounter various challenges that may hinder the realization of these success parameters. The major factors that have been affecting the project's scoping efforts have been found to be lack of stakeholder engagement leading to various scope change requests, lack of effective and clear scope change management tools to avoid high resource wastage during change of scope and lack of skilled workforce who can take accountability to implement the project with in the boundary set at the start.

To answer the research objective that aimed at evaluating the main challenges of project scope management faced at EnDev the researcher asked six questions. Accordingly, the respondents were asked if There are clearly defined project requirements and goals to avoid scope creep (mean score 3.85) for any project, scope creep is a common and expected occurrence. The project manager may get the stakeholder's exact requirements and expectations by actively engaging with them during the project planning phase. Accurate resource and talent planning is another essential step. Additionally, from the data collected it was observed that it's crucial to avoid accepting ad hoc change requests while a project is being executed because doing so could cause delays and extra expenditures if the management maintain the original strategy.

As can be seen from Table 4-12, There is sufficient research done on the possible issues a project or the team might encounter during every stage of the project (mean score 2.98) was another question raised by the researcher and an essential component of project management is the ability to anticipate potential "what if" scenarios and create backup plans. Since there are so many factors that might lead to endless possibilities, projects rarely go exactly as planned. Every project manager's responsibility is to develop backup plans that the team could use if things start to get out of hand. The types of risks can be identified and minimized with the aid of a project risk management system. Hence, setting up a backup plan is essential. This strategy ought to list all potential risks and the steps that should be taken if they come to pass.

An additional question raised was asking if there is Poor resource allocation for activities leading to scope change requests (mean score 1.98) the goal of effective resource allocation is to distribute limited resources in the most efficient and effective manner possible. Resource allocation involves a substantial financial outlay, which also carries a sizable amount of risk. Projects attempt to deploy their resources in a way that maximizes both the sustainability of the project deliverables and the reach of the target beneficiaries. Distributing resources inefficiently results in increased costs, delivery delays, and eventual project failure. The project manager is frequently in charge of making sure that each resource is properly allocated and recorded. Even though in EnDev there is no problem with resource allocation due to the ample funding from donors the project management team is aware that project management is about getting more done with less resources.

Additionally the researcher raised a question on communication again at this part to check the accuracy of data and concentration of respondents which was explained at the beginning part of

this chapter accordingly there is a proper scope communication to project implementation team (mean score 3.90) was raised for the respondents again and it was concluded again that for a project to be successful, effective communication in project management is crucial. To guarantee that all parties are involved in the process, the project must have prompt and clear communication channels. Certain critical skills are necessary for successfully managing a project from inception to conclusion. Critical skills include planning, time management, and negotiation skills with both internal and external partners. Critical thinking, risk management, and leadership all rank highly on the list. However, the ability that sits at the core of all these sills is communication skill. Communication skill is possibly the one that project managers need the most. Without great communication abilities, project managers would find it extremely challenging, if not impossible, to manage their teams and coordinate efforts in order to successfully complete a project. Without communication, it's possible that the project's efforts will be duplicated by different individuals or teams, that significant objectives and milestones will be missed, that resources will be misallocated, or that the project's scope will start to stray from what it was originally intended to be. As a result, projects may come to a grinding standstill or, worse yet, fail completely.

To assess the project teams ability and accountability toward the project the researcher raised two main questions which are; Accountability is built into the project's workflow, so team members understand their roles and responsibilities (mean score 4.13) making sure project objectives are understood and team members' tasks are delegated in accordance with those objectives is the first step in maintaining accountability in project management. Once the scope of the project is created and communicated clearly to stakeholders involved, the next step of the project manager is to delegate the tasks within each phase. By providing the team with precise definitions of success and keeping them updated along the way, the project manager can accomplish this task quickly and effectively. By doing this, the project manager may promote cooperation and remove any potential roadblocks to project management. When each team member strives to carry out their assigned responsibilities, the project team performs exceptionally well. An entire project can fail if team members lack accountability. The last question raised was the project implementation team has good skill leading to the proper follow of project boundaries set by the scope (mean score 3.46) when working on a project, the project manager may have never-before-seen difficulties arise. If the project manager is equipped with a team with the required skills to handle them, he or she could be able to address these situations without having a significant influence on the project's development. A chain is only as strong as its weakest link, and project teams' effectiveness is greatly influenced by the quality of each member's skills. Knowing what resources, the project has at the project managers disposal can help him/her execute the scope management strategies more effectively. The values the project manager can employ in the project as assets go beyond their monetary value. They can include time, team members, and other real and imagined things. the project manager can better understand the full picture of the resources the project has at his/her disposal to finish the tasks when the project manager goes through the identification process with his/her team. The project

will fail if the team lacks the expertise to solve the issue at hand, even though the project manager as leader of the project can provide the most optimal atmosphere. At EnDev, this significant project management issue needs to receive due attention.

Table 4-11: ***Overall Min, Max, Mean & Std. Deviation of questions under Main challenges sub variable***

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
MainChallenges	52	1.67	4.17	3.3846	.52346
Valid N (listwise)	52				

The overall mean score for the questions under the sub variable of main challenges came to be 3.3846 which shows that the respondents gave an aggregate positive response in regards to the main challenges scope development the EnDev project faces. Challenges may arise at any point in the project management and implementation process and finding solutions to such problems is one of the primary roles of the project manager. In EnDev project the project's efforts to define its scope have been significantly hampered by a number of factors, including a lack of stakeholder involvement that has resulted in numerous requests for scope changes, a lack of tools for managing scope changes that are both efficient and clear in order to prevent resource waste, and a lack of staff with the necessary skills to carry out the project within the parameters established at the outset.

CHAPTER FIVE

Summary of Findings, Conclusion and Recommendation

This chapter will include a summary of the study's findings, conclusions, and recommendations relevant to the entire subject area as well as recommendations for additional research. The study's overall goal, which was to examine project scope management practices and challenges in Ethiopia's off-grid energy sector in the context case of the GIZ Energizing Development (EnDev) Ethiopia Project, is summarized in this paper's conclusions and research findings. With these goals in mind, this chapter would want to wrap up and sum up its findings as follows:

5.1 Performance of the Project

In Ethiopia, GIZ has been working for more than 40 years in bilateral cooperation on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) and on the commission of the Ethiopian Government and other international donors.

Energising Development Ethiopia (EnDev) Ethiopia (being implemented by GIZ) supports a sustainable supply of energy services to lower-income households, social institutions and small to medium sized enterprises with a focus on rural areas. EnDev is a multi-donor and multi-implementer energy access partnership working to achieve its goals in collaboration with its implementation partners in Ethiopia. These partners vary depending on the type of project that is set out to be achieved.

5.2 Summery of Findings

This study tried to investigate the effect of proper project scoping and the challenges in implementing projects in the boundaries set has on the performance of projects in the case of Energizing Development (EnDev) project Ethiopia. To conduct this research, existing literature relating to project scope management and challenges of project implementation within the scope set was reviewed. To have a deeper understanding of the problem, an in-depth interview was conducted with senior team members, questionnaires were administered and secondary data from existing publications was reviewed. And based on the study that was carried out the major factors that have affected the project scoping efforts of EnDev Ethiopia project were found to be as below per research questions raised at the start:

Summary of finding Findings for the scope development practices undertaken by EnDev

- Limited effort was spent in the development of the project scope hence there were poor scoping practices in the project

- Requirements gathering was inadequate for proper scope development
- Due to improper scope management at the outset, there have been several scope modification requests, which have in turn caused schedule and expense extensions and compromised work quality.
- A project is successful when it achieves its objectives and meets or exceeds the expectations of the stakeholders.
- Understanding a stakeholder's objectives and goals makes it feasible to positively impact the change process and deal with problems that could pose obstacles to change if any.
- EnDev's management wants to ensure knowledge transfer about scope management to the team they hire which can be a good base as it will lead to sustainable project implementation and through further strengthening of better scope management there will be successful project implementation.

Summary of finding Findings for project stakeholders' engagement in project scope development

- Because there was a lack of buy-in from the stakeholders, the necessary inputs from all parties involved were not gathered.
- Due to poor communication among the stakeholders, there were arguments and dissatisfactions over the project's deliverables.
- Minimal engagement of the Monitoring and Evaluation team of EnDev on project implementation monitoring and midterm and closing feedback collection from stakeholders was observed because of capacity challenges of the M&E team compared to the project size.
- The management team at EnDev receives regular reports on project progress because these reports must be submitted to the project's donors in order to secure additional funding.
- In EnDev project there is a dedicated partners relations manager who focuses on the stakeholder management but is usually under a lot of pressure because he is involved with all stakeholders in the Energy Programme of GIZ.
- The inclusion of stakeholders in project resource updates can make or break the project. Hence, Stakeholder meetings are crucial for aligning the feedback of these important members.
- The project's management team of EnDev are responsible for guiding the project to stay within the planned scope, but as observed from the data they frequently encounter a scheduling conflict in which two or more priorities fight for the project manager's time and attention.

Summary of finding Findings for the major scope change management tools followed by the project

- Explicit scope change management tools are nonexistent in the project

- The leadership of the EnDev project are involved in the project scope change management but since there is no tool developed the project team isn't involved in scope change management.
- Using project change management tools effectively will help to increase the effectiveness of project management.
- The EnDev project does not have contingency plans that can help the project management team to get ready to handle unforeseen circumstances successfully.
- For the vast majority of projects, change is an inevitability. Not preventing change but rather managing it is the secret to successful project change management.
- It's crucial to avoid accepting ad hoc change requests while a project is being executed because doing so could cause delays and extra expenditures if the management maintain the original strategy.
- Distributing resources inefficiently results in increased costs, delivery delays, and eventual project failure. And Even though in EnDev there is no problem with resource allocation due to the ample funding from donors the project management team is aware that project management is about getting more done with less resources.
- The project manager may promote cooperation and remove any potential roadblocks to project management. And it was found out that potential risk assessment doesn't get due attention at EnDev project

Summary of finding Findings for the main challenges faced by the project in implementing the project within the scope set at the start

- Shortage of skilled project management staff and shortage of trainings for the employees to advance their skills was a major problem in project implementation of EnDev within the scope developed.
- There is weakness of both internal and external communication in the EnDev project
- Disorganized and improper documentation is also major challenge. Although GIZ EnDev has various document storing facilities like DMS site, Teams app and SharePoint site etc the project implementation team especially the external stakeholders of the project did not use these facilities to store data.
- Uncertainty of the country's situation another major factor in the project implementation within the scope set at the onset of the project.
- In general, the major factors that have been affecting the project's scoping efforts have been found to be lack of stakeholder engagement leading to various scope change requests, lack of effective and clear scope change management tools to avoid high resource wastage during change of scope and lack of skilled workforce who can take accountability to implement the project with in the boundary set at the start.

From this information it was observed that Scope management must be a top concern for the project manager to be successful for three main reasons namely the triple constraint:

1. Cost: Cost, scheduling, and quality are the responsibilities of the project manager. Every scope adjustment has the potential to impact previously completed work. This entails additional fees for work that has already begun or, worse yet, been finished.
2. Schedule: Each scope change may cause valuable project resources to be diverted to tasks that were not included in the original project scope, placing additional strain on the project timetable. The critical path of the project must also be taken into account by the project manager.
3. Quality: Each change must be carefully examined for product quality and incorporated into the design. Changes to the scope often result in hasty modifications that compromise the quality of the final product.

In general scope creep, uncertainty, skill gap and stakeholder's disengagement were observed to be the main challenges for poor project implementation within the scope developed.

5.3 Conclusions

The research provided quantitative and qualitative answers to questions about how well the project's original scope was defined, how well the project has been performing, the significant problems it has encountered and is still encountering, and finally how the scoping and associated problems have impacted the project's performance right now. To accomplish a project that fulfils the necessary quality, timing, and budget requirements, a clear vision and route must be defined, communicated, and agreed upon. Before beginning a project, defined product scope, goals, project drivers, constraints, assumptions, and operational concepts should be completed in order to have active the set goal. With all this in mind the researcher reached the below conclusions based on the four research questions and objectives of the research and presented them as below.

- The scope development practices undertaken by EnDev

It has been established that poor scoping has a detrimental impact on a project's performance, and it can be inferred from the findings of the study that this is the case in this instance. The failure to comprehend or define the project's scope at the outset should not be permitted since a correctly defined and managed scope results in the delivery of a high-quality product or service.

Having a distinct project scope provides a roadmap so that each team member may check the project scope at any time to ensure alignment and a clear understanding of the objectives and manage stakeholder expectations in cases when differing priorities for the project may exist among the stakeholders. Setting the criteria and ensuring that everyone is aware of the exact purpose and objectives and clearly identifying deadlines and restrictions in the project scope before starting the project helps the team plan resources and prevents scope creep. This makes budgeting and scheduling simpler. Additionally, defining the project's bounds in the project scope helps to resolve problems that could cause the project to diverge from the plan's objectives.

The researcher has observed that project management can be challenging with regard to the project Scope Development practices techniques and management. And a few challenges that can hinder successful project implementation are tight budgets, insufficient stakeholder engagement, and unclear goals. From the data collected it was observed that effectively managing a scope is challenging at EnDev, and the project implementation team are trying to have a solid grasp of how it operates by trying to adopt measures and a guide to best practices from management team of the project which can make project scope management much simpler. When determining the project scope, the project manager must decide what outcomes the project wishes to measure. And after that, the project manager needs to discuss with the team on their goals and seek the opportunity to find areas of agreement by identifying potential conflict. This has proved to help understand the goals of the project and how each team can contribute in EnDev project.

- Project stakeholder's involvement in project scope development

The level of stakeholder engagement was found to be a serious issue and of paramount importance in project scope management. The data gathered has shown that it is best to involve stakeholders early on, even before the project defines its scope. This is so because the project scope is, in a sense, a document that has been finished outlining what the project will produce. The project scope will benefit from extensive consultation, and it could be argued that this will secure support from all stakeholders who may be needed for the project's implementation.

It is crucial for project managers to make sure that all of the project's stakeholders are in agreement with one another and have a clear understanding of the project's risks and potential challenges. And for that the project scope is not where project scope management starts. Instead, the project management and implementation team must adhere to the five key planning phases that are involved, which are listed in the literature review. Those are Collecting Requirements: In order to define the project's scope, this procedure entails speaking with the project client, the project team, and other necessary stakeholders. Define scope: In order to do this, the project must be defined, along with the project team's deliverables and outcomes. Creating a work breakdown structure, which is a strategy that breaks down the project's high-level outputs into doable, step-by-step tasks that the project team can follow. Scope Verification: The project team and the client agree on all of the project's deliverables during the procedure known as scope verification. Control scope: This is how the project team manages the change management procedure and keeps an eye on the project's scope. Once the project has started, this prevents scope creep and helps the project team stay focused on completing the project's deliverables. Without the need to change the resources allotted at the beginning, proper application of this process can result in success.

Additionally, Despite the fact that stakeholders actively participate in project development, it is still important to establish how to understand what the stakeholders truly desire and are willing to provide. Which leads us to dividing the stakeholders into two which are internal stakeholders which are internal project implementation team and external stakeholders which are people from different organization who are involved in the project funding and partly implementation so they can account for the target community to be reached in their own projects. From the data collected and the engagement of these two types of stakeholders it was easy to see that although different these stakeholders both have at least one common goal – which is extracting the maximum benefit from their investments in the project and proper reach of the targeted community.

- Major scope change management tools in the EnDev project

For many projects, change is inevitable, and the way a project manager handles such changes can have an impact on the final result. The project manager is in charge of anticipating potential roadblocks, creating backup plans, and putting those plans into action to deal with any challenges that may develop, and things start to get out of hand. The types of risks can be identified and minimized with the aid of a project risk management system. And setting up a backup plan is

essential. This strategy ought to list all potential risks and the steps that should be taken if they come to pass.

Stakeholder feedback should be taken into account while creating change management tools in the project and stakeholders should be kept informed at all times during the project because an uninvolved stakeholder might cause significant issues in the project's final stages. And although the project management team of EnDev do have scheduling conflicts they should take the leadership concept into consideration and lead their team to success. It has been seen that stakeholder engagement typically increases at the beginning of a project and declines as it moves along. It's crucial to stay in constant contact with stakeholders using collaboration tools, remote communication tools, and other means in order to prevent this.

It has also been observed that project stakeholders are less satisfied when scope change requests are rejected. Additionally, it lessens the project manager's ability to effectively advocate for stakeholders. This choice cannot be made in "black and white" and needs careful consideration. And with regard to the objective of determining whether any tools for managing scope change have been developed at EnDev Project to prevent scope creep, the researcher has found that during the early stages of a project, the scope is easily expanded due to shifting stakeholder needs and preferences, misunderstandings, incorrect assumptions, and subsequent small additions to the developed scope. Even though pressure to expand the scope of a project will always exist, scope creep may be a big opportunity for the business if it is well managed, much like managing change. However, it has been observed that the EnDev project lacks explicit scope change management tools that the project implementation team may apply to take the changes as opportunities which is resulting in unsuccessful implementation of the project.

The main purpose of the project Monitoring and evaluation (appraisal) is to provide information on the results, and its purpose is to improve the quality and effectiveness of project management. In relation to the data collected it has been seen that the EnDev project monitoring and evaluation activities are not as strong as they should be. This can be attributed mainly to the capacity of the M&E team where compared to the size of the project the number of skilled team in the M&E team proves to be small. The evaluation of each projects carried out in should have been at certain stages which are during the preparation of the project, at some point after its implementation and after its completion. But this is not being carried out because of the overload on the M&E team of the project and the minimal support from the project partners. Which impends the necessary step to further do sufficient Research on the possible issues a project or the team might encounter during every stage of the project as the feedbacks of stakeholders are not collected, stored and processed properly.

- Main challenges faced by the project in implementing the project within the scope

Regarding the project management challenges the researcher understood that the main challenges listed by the EnDev project implementation team include scope creep which occurs when the project's scope grows beyond its original definition or goals and this usually happens because the

project stakeholders ask for changes to the project as their engagement is minimal at the start. Another pertaining and felt challenge by the project team is uncertainty of situations in Ethiopia. Where all of the project implementation stakeholders face difficulties in predicting the future of implementation areas in Ethiopia, strategic changes in the Ethiopian government policies, continuous restructuring of the government offices etc… Hence, they feel unsure about the project's team ability to meet the goals because when uncertainty arises, it can affect the morale of everyone involved, which can lead to poor project outcomes. The lack of some implementation team members' skill sets to meet the necessary competences to achieve project goals is another difficulty observed from the data collected. If someone in the project is incapable of performing the duties of their role, then it can be expected that a corresponding gap between the project goals and project outcomes will arise.

The researcher also learned from the information gathered for that there are major signs of scope creep that the project team takes into consideration which include project timing: Timing: Whether Timing starts to slip, the program's expansion should starts to be questioned. Budget: If Budget starts to go over budget for no apparent reason, the project team looks to see if more work than was initially planned and budgeted for is being done. However, although the understanding of how to identify and avoid scope creep is there in the management team of the project the development of tools to avoid scope creep is not present in the project.

In addition to scope creep, uncertainty and skill gap stakeholders disengagement was listed as another challenge in the project where some of the project's stakeholders, those who need to have a vested interest in the project don't and they don't follow the proper implementation of the project which leads to requests that were not covered in the scope at the start of the scope development. This disengagement can be attributed to scheduling conflicts and work overload of all the stakeholders as all stakeholders are working on multiple projects at once because of the developing nature of Ethiopia. As a result, this project and other projects face delays and difficulties concerning resource allocation.

Overall, even though EnDev project has been working in Ethiopia for a very long time the success stories are not as expected hence a better initial scoping that include proper project management, team management, and coordination between the project teams and stakeholders would result in a better system for delivering a successfully implemented project both for Ethiopia and the donors of the project.

5.4 Recommendations

From the above stated findings and conclusions, the researcher recommends the below activities to be carried out by the project management team of GIZ Energizing Development (EnDev) Ethiopia Project.

A proactive management to change: Every project will experience scope changes, so the project manager should actively engage stakeholders in recognizing these changes. The project manager can address the crucial few adjustments that make up most if not all of the complaints and worries of the stakeholders by being proactive.

Seek the sponsors' approval: Before approving any related work when changes are anticipated, the project manager should always acquire the sponsor's consent and buy-in for the change request. Ask the sponsor to examine a group of modification requests if it is difficult to have them all reviewed by the sponsor at once. Alternately, the adjustment could be categorized as routine or as requiring more investigation.

Comprehensive Impact Analysis: Everyone involved in the project would be under time pressure, which could result in a cursory change effect analysis, but the results would not be favorable. All configuration components that will be impacted by the change, as well as related expenses, must be taken into account in an impact study.

Always Inform Others of Changes: Proper change communication between teams and with outside parties must be ensured by project managers. Changes may go unnoticed in a large project team if they are not promptly conveyed. People prefer to be kept in the loop on project choices and the tasks they are working on. Effective team communication is crucial to recognizing and overcoming change resistance.

Prevent or avoid Scope Creep: In project management, the term "scope creep" describes unchecked expansion or alterations to a project's scope over time. When a project's scope is not adequately specified, recorded, or controlled, these phenomena might happen. It is typically viewed as a bad thing to happen and should be avoided. When changes are accepted without doing a sufficient impact analysis or considering their effects on the timeline and budget, scope creep occurs. When recurrent little incremental modifications are made, it's usual for the project budget and schedule to fall behind the work required to implement the changes. There is no way to prevent the runaway project syndrome in this situation. A mechanism must be put in place to track each change and manage how it is implemented because scope creep is a symptom of a process issue.

Use discussion platforms for peer experience sharing: Use platforms like Energy Development Partners Group (EDPG), MOWE Off-grid Taskforce, Talk Energy Ahead (TEA) are an informal discussion platform on energy issues that aims to provide forums for clean energy sector actors/stakeholders/partners where related experiences/knowledge are retrieved, shared, and saved; the work of different actors in the energy sector is promoted; collaborative partnerships are forged through networking; emerging opportunities are revealed; and person-to-person relationships are cultivated among individual attendants. Hence EnDev can use these platforms

to take lessons from the different experiences of partners in relation to project scope management challenges and success stories and incorporate some aspect to the project scope management of the project.

And as there are no scope change management tools developed by EnDev the researcher recommends the below scope control mechanisms to ensure the project remains feasible. The project management strategy, performance measurement margins, standard documentation, and the collection, tracking, and analysis of data should all be subject to a regulated monitoring. Plans for implementing a change in scope should also be in place. These plans may comprise cost analysis and revisions to schedules, requirements, and the scope baseline but might be necessary if stakeholders are not involved in the scope development for the project. The project should also consider the requirement for performance measurement margins, which are the benchmarks by which the project manager can assess the project's success, and Standard documents, which are organizational assets that include templates and tracking tools for noting incidents and maintaining uniformity throughout the project for long-term project implementation success. Moreover, the right project management software or tool can enhance productivity and the efficiency of cross-functional teams. It makes communication faster, easier and assists the decision-making process. To this end, the researcher recommends that there is a need for a purchase of project management tool as it is one of the most important decisions when it comes to conducting a project.

Additionally, Future project planning EnDev project should take into consideration the gender gap that as observed in the data collection. The gender gap is high where the project is dominated by male, this implies that energy projects and products are mostly designed by men to be used by women, often without a sound understanding of women's needs. Since women play a significant role in providing and using energy as part of their domestic and productive roles, they are disproportionally affected by energy poverty. Access to energy can play a transformative role in the lives of women and men by enhancing their productivity and effectiveness at home and at work. Hence the EnDev should work in increasing their female staff and encourage their stakeholders to do the same. And based on the feedback from the interview the researcher was able to find out the EnDev is working on resolving the gender gap by a gender focused strategy both for employees and stakeholders of the project.

Overall, the project manager of EnDev project should focus on accomplishing the below specific list of activities for better project performance and further securing of project fund

- Project documentation should be improved and there should be an organized way to make it available to all concerned stakeholders.
- Stakeholder management system should be in place for the active involvement of stakeholders and avoidance of unnecessary misunderstandings.
- Ways of communication with stakeholders should be improved.
- In the long term, improving the EnDev skill pool should be carefully considered because the currently existing skill gap in the company is a big hindrance.

- The EnDev project managers need to make sure that he/she involves all internal and external stakeholders in the project planning process and set up regular meetings with all parties involved and handle any issues that arise.
- Stakeholder-based standing committees may need to be established to meet regularly and act as advisory boards or decision-making bodies for the different project partners.
- For a successful implementation follow-up, it is crucial for a project manager to devise a method of quantifying project progress through the establishment of project milestones and the collection of reports when each deadline is reached.
- EnDev project management team need to Establish an environment where team members and stakeholders can engage in fun learning activities by being transparent with one another.
- Project management tools, which are frequently used as project collaboration tools, makes it simpler for managers to perform their duties while also promoting greater project transparency and team accountability. Hence, a project management tool purchase is recommended for the EnDev project to enhance teamwork.

This research ends its journey via appointing where future research would be focused. As it shown before; the focus of this paper was basically on the Project scope management practices and challenges in the off-grid energy sector of Ethiopia in the case of GIZ Energizing Development (EnDev) Ethiopia Project. From the finding of the study it has been found out that the case organizations effort and practice under their program is somewhat adequate.

The research recommends further research in the following areas:

- Similar research with a larger sample including all the projects under GIZ, with the current study forming the basis. This would allow validation of the current findings.
- Research into the different factors that drive project complexity in energy projects, and their impact on project performance.
- Research focusing on the application of in-house procedures in scope development and management.
- Investigating the strength and weakness of different scope definition procedures for different projects.

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Annex One: Data collection instruments

Addis Ababa University School of Commerce

MA in Project Management

Questionnaire for Project Work

Dear Sir/Madam Thank you very much for your valuable time and effort in responding to this questionnaire. I would like to say thank you for your willingness to participating in this research process which is being conducted to carry out preliminary research on Project scope management practices and challenges in the off-grid energy sector of Ethiopia in the case of GIZ Energizing Development (EnDev) Ethiopia Project. Your response is highly valuable to the outcome of the research and future improvement of project scope management. Please note that all information, including all results and personal information from participating individuals will be kept strictly confidential and be used only for research purposes.

Sincerely yours

Haimanot Berta Solomon

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Phone Number: 0910222204

By marking in the space provide indicate the extent to which you feel the following aspects of the Project scope management practices and challenges in the off-grid energy sector of Ethiopia in the case of GIZ Energizing Development (EnDev) Ethiopia Project

Rating Scale	**SA**	**A**	**N**	**D**	**SD**
	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**

Please mark 'X' in the box corresponding to your response

The rating should happen considering the level of existence of the parameters and the level of impact those parameters had on project critical success factor Project scope development and involvement of stakeholders in project scoping.

	Part 1: General Information					
	SEX	**Female**		**Male**		
	Age	**<25**	**25-34**	**35-44**	**45-54**	**>55**
	Educational Qualification	**High School**	**Diploma**	**Degree**	**MA/MSc**	**PhD**
	Work Experience (In Years)	**20+**	**15-20**	**10-15**	**5-10**	**1-5**
	Organization Name					
	Department and specific role					
	Part 2: Scope Development practices and techniques at EnDev	**SA**	**A**	**N**	**D**	**SD**
1.	I understand how project scope is developed and Managed					
2.	There is a clear step developed for scope management at EnDev					
3.	There is a strong link between proper scope management and project success					
4.	I am involved in scope development and I manage my task within the boundaries of the scope developed					
5.	There is a clear communication of scope to the project implementation team					
6.	There is enough engagement of stakeholders in the scope development and management of projects					
•	**Part 3: The level of engagement of project stakeholders in scope development in energy**	**SA**	**A**	**N**	**D**	**SD**

	projects at EnDev					
1.	I/My team is involved in the project scope development and Management					
2.	There are frequent meetings of the stakeholder team to check if project implementation is within the scope developed					
3.	There is a detailed and continuous report to management about the project implementation within the scope developed					
4.	There is strong link between my team's engagement in project scope development and successful project implementation					
5.	EnDev's M & E team reaches out to me for my opinion on the project scope management aspect					
6.	I/My team give Project closing feedbacks in relation to proper project scope management					
	Part 4: scope change management tools prepared to avoid scope creep	**SA**	**A**	**N**	**D**	**SD**
1.	There is a cope change management tool prepared collaboratively with stakeholders					
2.	The scope change management tool developed is communicated with all stakeholders					
3.	There is a strong involvement of the leadership to steer the project implementation to be within the scope developed to avoid scope change					
4.	If scope change is inevitable are stakeholders involved in the decision making of resource reallocation					
5.	Control measures are developed to prevent potential risks of scope creep					
6.	Replacement plans are developed that can be used if the project change is inevitable					

7	Extra time is built into your deadline to account for potential obstacles					
	Part 5: Main challenges of project scope management faced in EnDev	**SA**	**A**	**N**	**D**	**SD**
1.	There is are clearly defined project requirements and goals to avoid scope creep					
2.	There is sufficient Research done on the possible issues a project or the team might encounter during every stage of the project					
3.	There is Poor resource allocation for activities leading to scope change requests					
4.	There is a proper scope communication to project implementation team					
5.	Accountability is built into the project's workflow so team members understand their roles and responsibilities					
6.	The project implementation team has good skill leading to the proper follow of project boundaries set by the scope					

Open ended questions

1. Please specify the scope development practices undertaken by EnDev project

_____
_____
_____

2. In your opinion how well have project stakeholders been involved in project scope development of EnDev Project?

_____
_____
_____

3. What are the major scope change management tools followed by the project to avoid scope creep?

_____
_____
_____

4. What are the main challenges faced by the project in implementing the project within the scope set at the start?

_____
_____
_____

5. What do you recommend as a corrective action to solve the above challenges in relation to scope development and management?

_____
_____
_____

Addis Ababa University School of Commerce

MA in Project Management

Interview for Project Work

Verbal Consent

Would you like to participate in this interview?

- Verbal consent was obtained from participant
- Verbal consent was NOT obtained from participant

Background Information, Overview and Qualitative Interview Induction will be given to the interviewee

Primary goal: To get the real perspectives of stakeholders in Project scope management practices and challenges in the off-grid energy sector of Ethiopia in the case of GIZ Energizing Development (EnDev) Ethiopia Project

Estimated Length: 30 – 40 minutes

Invite interviewee to briefly tell me about him/herself: General information of background… Mainly focusing on the below

Background and work experience

What is your educational level? O High School O Diploma O Bachelor's Degree O Master's Degree O PHD or more

How many years of experience do you have? _____

How long have you been working for this organization? _____

How long have you been working on this project? _____

General Information

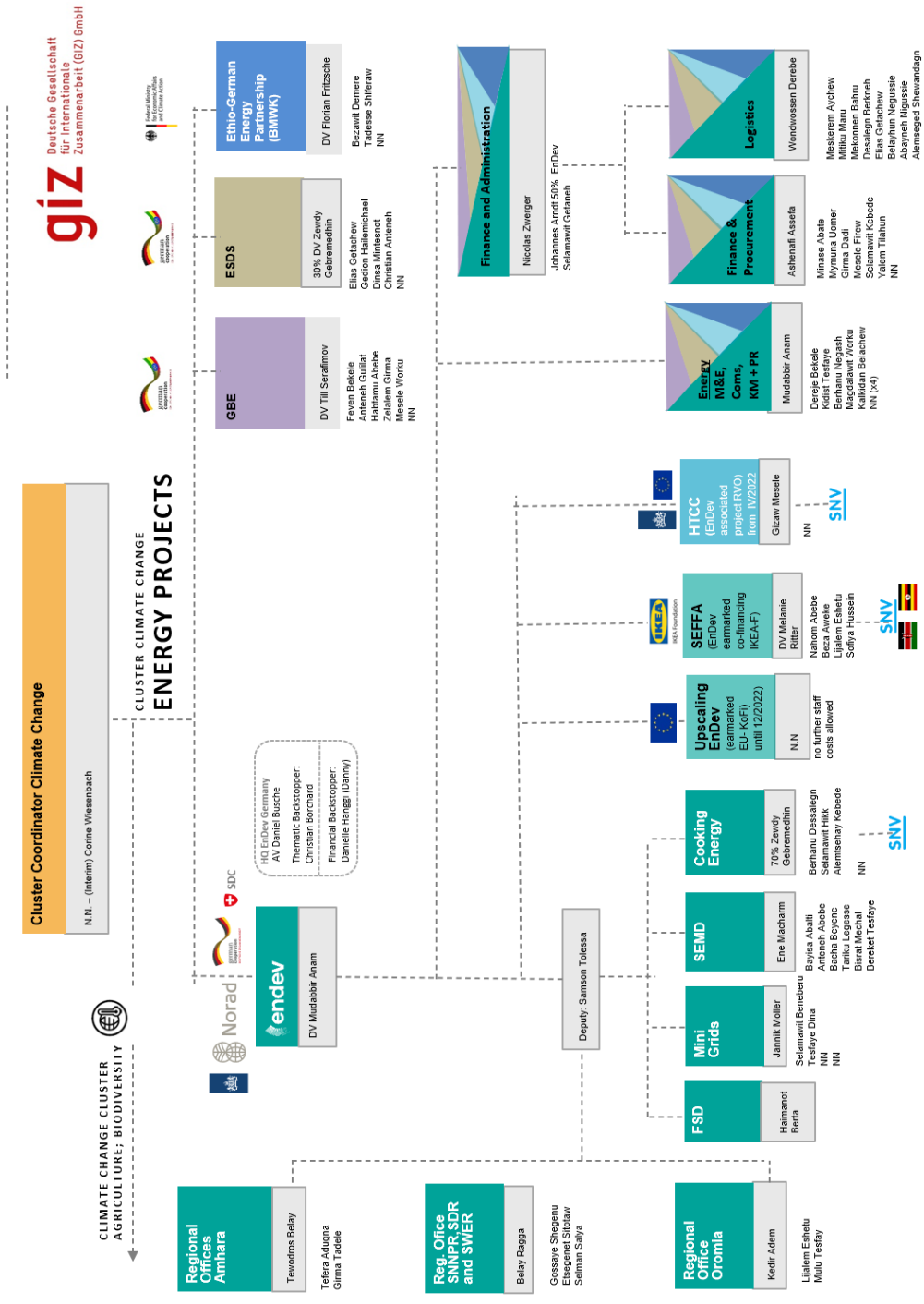
Organization of the interviewee	Location of the Project	Designation of the respondent

General questions during scheduled interviews

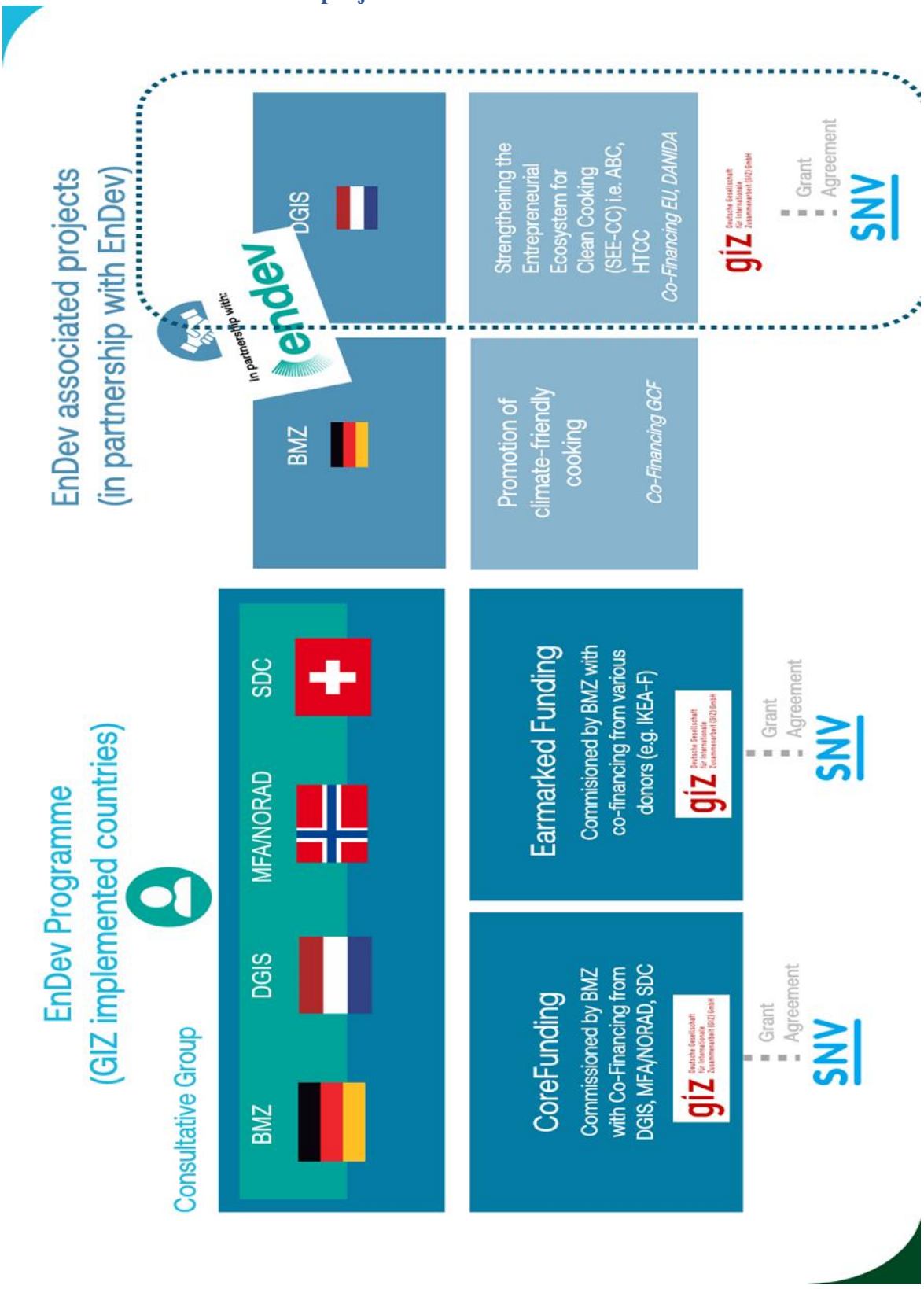
1. Do you believe project scope management has an influence on project success? What do you think about the influence of applying the boundaries set in project scoping on successful project implementation and completion?
2. What were the regular monitoring activities done by the project team to check weather activities were done in accordance with the scope developed and how did it affect project success?
3. How often is you or your team involved in project scope development and management
4. Do you believe the correct amount of stakeholder engagement is there? E.g How often does the stakeholders of the project, if engaged, come together to check the proper implementation of the project within the scope they developed together?
5. Is there a clear Communication of how scope changes might affect deadlines and budgets to stakeholders?
6. Is there proper engagement of management on scope development and management and a clear refusal of project changes that might cause delays or unreasonable costs unless a viable reason is provided?
7. Do you think the project would have been more successful if the team properly followed the set of boundaries set in the scope development?
8. What are the challenges that are usually faced during project implementation within the boundaries set by the project scope?
9. What do you recommend as a corrective action to solve the above challenges in relation to scope development and management?

Annex Two: EnDev Project documents

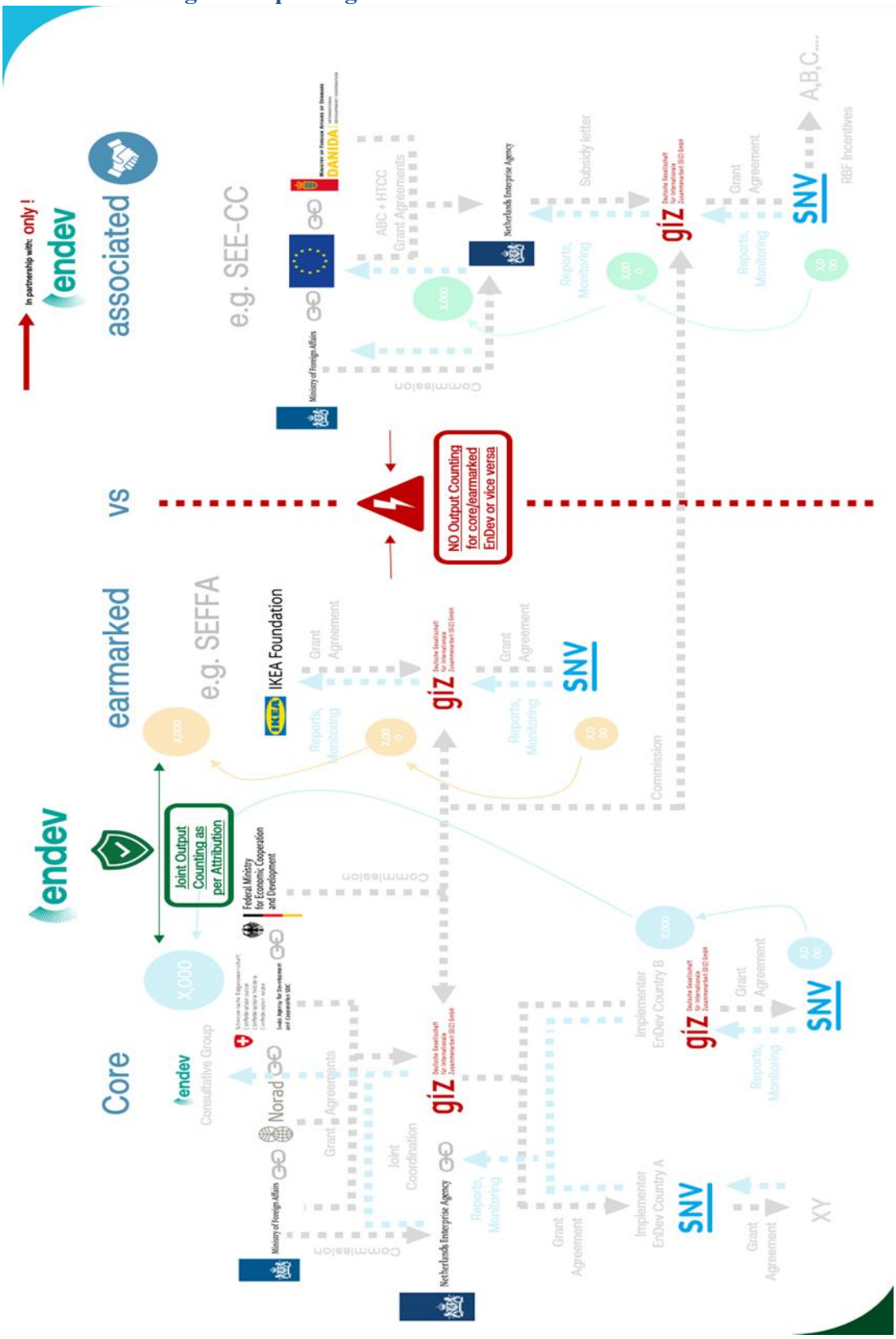
EnDev's Organogram



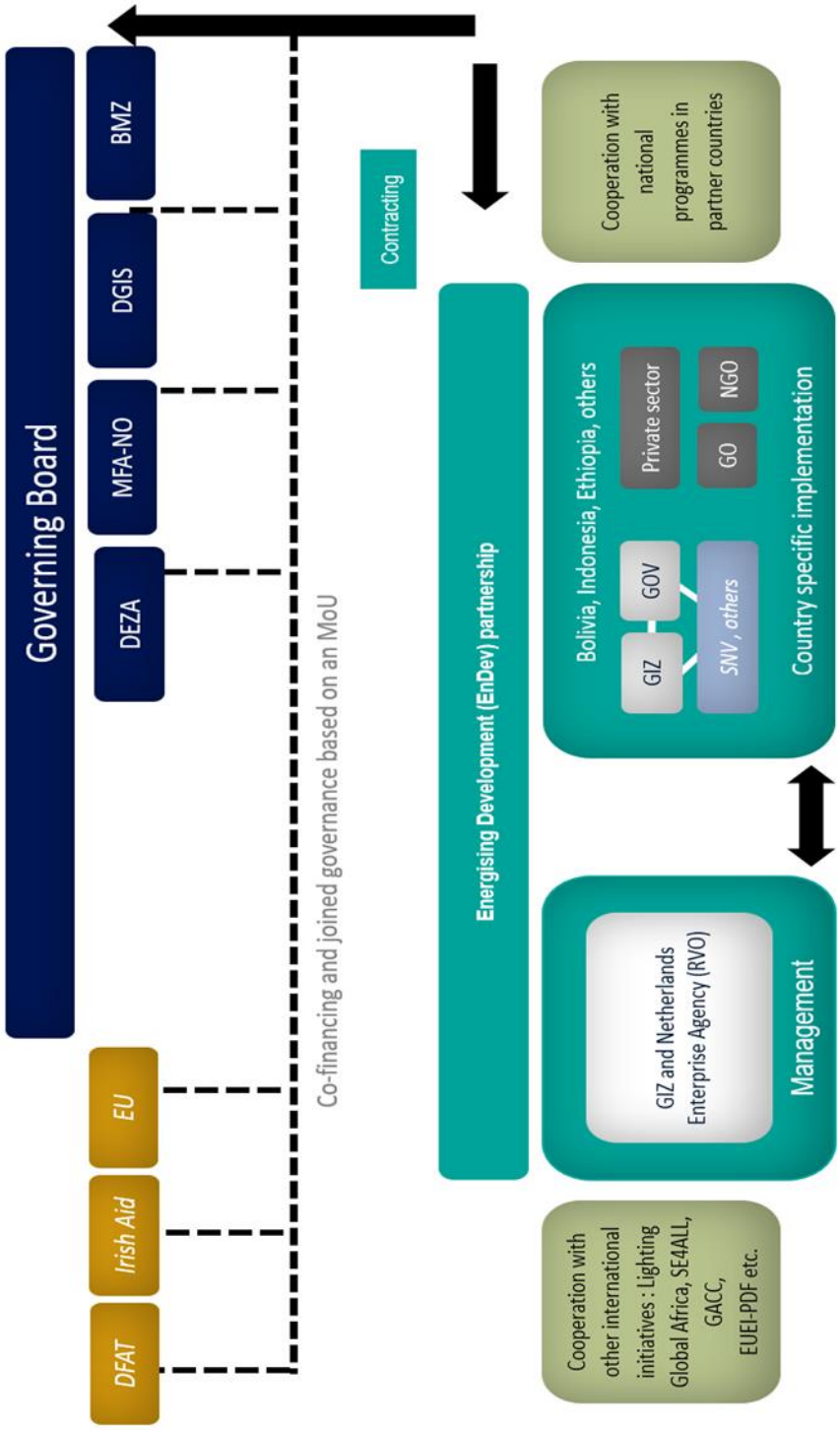
EnDev's Core and associated project



EnDev's Funding and reporting Structure



EnDev Governing Board



EnDev's Mission and Theory of Change

Logical framework and activity matrix (Intervention: D-38370)

	Results chain	*Indicator*	*Baseline (2017)*	*Target (2025)*	*Source and meanof verification*	*Assumptions*
Impact level (Overall objective)	**O.O**.: To expand the use of sustainable and renewable energy in Ethiopia	**OO-I#1** Share of electrification [GTP II], [NEP 2.0]	*44%*	*67%*	*Official reports from Ministry of Water and Energy (MoWE), Ministry of Finance and other governmental bodies* *Academia papers* *Ethiopia's Growth and Transformation Plan I+II, National Electrification Programme 2.0*	NOT APPLICABLE
		OO-I#2 Number of improved cookstoves disseminated [GTP I], [GTP II]	*6,600,000*	*11,450,000*		
		OO-I#3 Numbers of pico-solar systems disseminated [GTP I], [GTP II]	*1,100,000*	*3,600,000*		
Outcome level (Specific Objectives)	**SO1:** Sustainable and efficient cooking solutions for lower-income households (in particular female-headed), social facilities and small-and-medium-sized enterprises are adopted	**SO1-I#1** Number of people using a sustainable energy source for cooking [Contract: Logical Framework]	*0*	*736,931*	*Beneficiaries' and stakeholder feedback through rapid assessment and bi-annual supervision missions, annual reporting*	The private market for pico-PV may develop rapidly if governmental policies will focus more on this segment (e.g. not in GTP II). Electric baking and cooking might take up significantly during the project period, although mainly in urban areas. Key local stakeholders remain committed to green urban agenda, having their individual and institutional interest in mind;
		SO1-I#2 Number of productive use of improved cookstoves [Contract: Logical Framework]	*0*	*687*		
		SO1-I#3 Greenhouse gas emissions avoided [EURF 2.21]	*0*	*7%*		
	SO2: Affordable, high quality solar energy solutions for lower-income households (in particular female-headed), social facilities and small-and-medium-sized enterprises are adopted	**SO2-I#1** Number of people using a sustainable energy source for lighting and electricity	*0*	*400,725*		
		SO2-I#2 Number of mini-grid connections	*0*	*500*		
		SO2-I#3 Greenhouse gas emissions avoided [EURF 2.21]	*0*	*5%*		
	SO3: Clean solar and cooking energy access avoiding greenhouse gas emissions from fossil fuels	**SO3-I#1** Greenhouse gas emissions avoided [EURF 2.21]	*0*	*7%*		

tput level Outputs (for each Outcome)	**OP1.1:** Awareness on improved cookstoves (ICS) is raised	**OP1.1-I#1** Number of conclusions/recommendations resulting from stakeholder workshops [Contract 1.1.3.2]	*0*	*18*	*Quarterly field visits; beneficiaries' and stakeholder feedback through rapid assessment and supervision missions, monthly reporting.*	The staff, participants and key stakeholders remain in their position and committed to the action Participants are allowed to travel abroad as per now, though some restrictions remain due to COVID No total long term COVID quarantine and absolute restrictions to social interactions Stakeholders are willing to cooperate, having their personal & institutional interest in mind
		OP1.1-I#2 Number of communication packages developed and implemented to promote the use of improved cookstoves [Contract 1.1.3.1]	*0*	*150*		
		OP1.1-I#3 Number of conclusions/recommendations resulting from focus group discussions on the benefits of improved cookstoves for indoor air pollution	*0*	*500*		
	OP1.2: Design and manufacturing of low-cost improved cookstoves is enhanced	**OP1.2-I#1** Number of different local improved cookstove technologies selected for commercialization [Contract 1.5.1]	*0*	*4*		
		OP1.2-I#2 Number of performance tests on selected improved cookstoves conducted and reported [Contract 1.5.2]	*0*	*8*		
	OP1.3: Capacity of manufacturers to produce innovative and low-cost cookstoves is enhanced	**OP1.3-I#1** Number of stove producers having adopted modern equipment and materials	*0*	*30*	*Monthly ICS producers and PV retailers and technicians monitoring*	
		OP1.3-I#2 Number of stove producers trained on production techniques and standards [Contract 1.1.1]	*0*	*15*		
		OP1.3-I#3 Number of stove producers having benefited from skills development [EURF 2.15] [Contract 1.1.4.1]	*0*	*110*		

	OP1.4: Efficiency of production systems of local charcoal and carbonized briquettes is enhanced	**OP1.4-I#1** Number of professionals trained on innovative production systems (disaggregated by sex)	*0*	*16*	*Monthly ICS producers and PV retailers and technicians monitoring*	
		OP1.4-I#2 Status of the improved charcoal production awareness campaign (printed and electronic media)	*No action*	*1*		Quality providers of services & works are available Works and services are delivered & commissioned on time No major social and economic political upheaval in Ethiopia.
	OP2.1: Capacities of retailers, installers and associations of solar home systems are strengthened	**OP2.1-I#1** Number of management staff of solar home system retailers/ installers trained on marketing action (disaggregated by sex*)	*0*	*150*	*Quarterly field visits; beneficiaries' and stakeholder feedback through rapid assessment and supervision missions, monthly reporting.*	
		OP2.1-I#2 Number of operational staff of SHS retailers/installers received technical trainings (disaggregated by sex*) [EURF 2.15] Contract 2.3.1.2	*0*	*225*		
		OP2.1-I#3 Number of solar retailers/installers having benefited from skills development [EURF 2.15]	*~~0~~*	*~~120~~*		
	OP2.2: Sustainable standalone solar systems are installed in social institutions	**OP2.2-I#1** Number of standalone solar systems installed in social institutions	*0*	*100*	*Quarterly field visits; beneficiaries' and stakeholder feedback through rapid assessment and supervision missions, monthly reporting.*	
	OP2.3: Environmentally-sound local management of solar batteries is assessed and supported	**OP2.3-I#1** Number of participants in Solar battery stakeholder' events having delivered positive feedback (disaggregated by sex)	*0*	*400*	*Quarterly field visits; beneficiaries' and stakeholder feedback through rapid assessment and supervision missions,*	

		OP2.3-I#2 Number of guidelines for the improvement of the lifecycle recycling of lead-acid batteries adopted	*0*	*1*	*monthly reporting.*	
	OP2.4: Solar-powered mini-grids planning and installation	**OP2.4-I#1** Renewable energy generation capacity installed for all mini-grids in kWp [EURF 2.10]	*0*	*600*	*Quarterly field visits; beneficiaries' and stakeholder feedback through rapid assessment and supervision missions, monthly reporting.*	
		OP2.4-I#2 Number of people with access to electricity through new connections via mini-grids [EURF 2.09]	*0*	*2,500*		
		OP24-I#3 Number of national and regional government officials trained in the design and planning of mini grids (disaggregated by sex)	*0*	*80*		
	OP2.5: Management capacities of cooperatives aimed at community-based management of electricity supply is strengthened	**OP2.5-I#1** Numbers of communities with a cooperative managed operator model.	*0*	*5*	*Quarterly field visits; beneficiaries' and stakeholder feedback through rapid assessment and supervision missions, monthly reporting.*	
		OP2.5-I#2 Number of people involved in Community Workshops on cooperative based mini-grids	*0*	*450*		

Key activities	***Means and Costs***	***Assumptions***
What are the key activities to be carried out to produce the intended outputs? *(*activities should in principle be linked to corresponding output(s) through clear numbering)*	***Means:*** *Project management & financial team; Reports to the EU; the technical staff; premises, experts & trainers & advisors & evaluators, translators & interpreters; procurement, purchases, materials, equipment, works and commissioning; trainings, studies & reports, media materials; arrangements, travels and supplies; public and promotional events; conferences.*	***Assumptions*** *Factors outside project management's control that may impact on the activities-outputs linkage.*
Act OP1.1- Develop capacities on and strengthen promotion of improved cookstoves **Act OP1.2-** Improve the quality/design of local improved cookstoves technology with high market shares **Act OP1.3-** Support the semi-industrial production of improved cookstoves **Act OP1.4-** Improve the local biofuels value chain **Act OP2.1-** Build the capacities of retailers and installers of solar photovoltaic systems **Act OP2.2- E**lectrify social institutions in rural areas through stand alone systems **Act OP2.3- S**upport the local solar battery recycling sector towards environmentally-sound management **Act OP2.4.1-** Identify, select and prepare sites for for mini-grids **Act OP2.4.2-** Tender, procure, install and commission solar power plants for mini-grids **Act OP2.5-** Develop community-based operator model and train cooperatives for sustainable electricity supply management	Costs: 1. Experts: 3,855,172 EUR 2. Travel expenses: 359,320 EUR 3. Construction: 2,897,858 EUR 4. Financing: 148,472 EUR 5. Training of partners: 630,318 EUR 6. Other direct costs: 996,259 EUR 7. Total direct costs: 8,887,399 EUR Indirect cost 7%: 622,118 EUR Total Eligible Costs: 9,509,517 EUR VAT: 9,516 EUR Total Eligible Costs incl. VAT: 9,519,033 EUR Acceptable costs (indirect costs exceeding 7%): 54,985 EUR Acceptable costs (internal administrative services): 702 EUR Acceptable costs (staff costs): 73,982 EUR Total acceptable Costs: 10,350,000 EUR Expected EU contribution: 8,850,000 EUR Co-financing by BMZ: 1,500,000 EUR See budget table for more details.	*The projects appoint relevant and qualified people for capacity building.* *Qualified experts and tutors are available and committed.* *COVID-19 is largely be contained and controlled by 2022, though not necessarily abated (WHO).* *The instalments are transferred on time and the reporting is rolled down on time and in proper manner.* *No vis major: no giant: long terms impact and scale natural or human disaster in Ethiopia, especially in the project area.*

Summary of Data collected through a questionnaire

		Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%	Total Quantity	Total %
	Part 2: Scope Development practices and techniques at EnDev	**SA**		**A**		**N**		**D**		**SD**			
1	I understand how project scope is developed and Managed	**29**	**56%**	**14**	**27%**	**4**	**8%**	**3**	**6%**	**2**	**4%**	**52**	100%
2	There is a clear step developed for scope management at EnDev	**23**	**44%**	**22**	**42%**	**3**	**6%**	**1**	**2%**	**3**	**6%**	**52**	100%
3	There is a strong link between proper scope management and project success	**34**	**65%**	**18**	**35%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**52**	100%
4	I am involved in scope development and I manage my task within the boundaries of the scope developed	**13**	**25%**	**11**	**21%**	**6**	**12%**	**17**	**33%**	**5**	**10%**	**52**	100%
5	There is a clear communication of scope to the project implementation team	**21**	**40%**	**16**	**31%**	**4**	**8%**	**8**	**15%**	**3**	**6%**	**52**	100%
6	There is enough engagement of stakeholders in the scope development and management of projects	**12**	**23%**	**10**	**19%**	**7**	**13%**	**19**	**37%**	**4**	**8%**	**52**	100%
	Part 3: The level of engagement of project stakeholders in scope development in energy projects at EnDev	**SA**		**A**		**N**		**D**		**SD**			
1	I/My team is involved in the project scope development and Management	**11**	**21%**	**13**	**25%**	**6**	**12%**	**16**	**31%**	**6**	**12%**	**52**	100%
2	There are frequent meetings of the stakeholder team to check if project implementation is within the scope developed	**9**	**17%**	**14**	**27%**	**17**	**33%**	**9**	**17%**	**3**	**6%**	**52**	100%
3	There is a detailed and continuous report to management about the project implementation within the scope developed	**23**	**44%**	**15**	**29%**	**8**	**15%**	**4**	**8%**	**2**	**4%**	**52**	100%
4	There is strong link between my team's engagement in project scope development and successful project implementation	**26**	**50%**	**23**	**44%**	**3**	**6%**	**0**	**0%**	**0**	**0%**	**52**	100%
5	EnDev's M & E team reaches out to me for my opinion on the project scope management aspect	**4**	**8%**	**7**	**13%**	**15**	**29%**	**16**	**31%**	**10**	**19%**	**52**	100%
6	I/My team give Project closing feedbacks in relation to proper project scope management	**9**	**17%**	**11**	**21%**	**19**	**37%**	**10**	**19%**	**3**	**6%**	**52**	100%

	Part 4: scope change management tools prepared to avoid scope creep	**SA**		**A**		**N**		**D**		**SD**			
1	There is a cope change management tool prepared collaboratively with stakeholders	**0**	**0%**	**0**	**0%**	**0**	**0%**	**25**	**48%**	**27**	**52%**	**52**	100%
2	The scope change management tool developed is communicated with all stakeholders	**0**	**0%**	**0**	**0%**	**0**	**0%**	**25**	**48%**	**27**	**52%**	**52**	100%
3	There is a strong involvement of the leadership to steer the project implementation to be within the scope developed to avoid scope change	**12**	**23%**	**5**	**10%**	**14**	**27%**	**13**	**25%**	**8**	**15%**	**52**	100%
4	If scope change is inevitable are stakeholders involved in the decision making of resource reallocation	**7**	**13%**	**8**	**15%**	**17**	**33%**	**14**	**27%**	**6**	**12%**	**52**	100%
5	Control measures are developed to prevent potential risks of scope creep	**0**	**0%**	**5**	**10%**	**21**	**40%**	**14**	**27%**	**12**	**23%**	**52**	100%
6	Replacement plans are developed that can be used if the project change is inevitable	**6**	**12%**	**9**	**17%**	**16**	**31%**	**12**	**23%**	**9**	**17%**	**52**	100%
7	Extra time is built into your deadline to account for potential obstacles	**14**	**27%**	**17**	**33%**	**8**	**15%**	**7**	**13%**	**6**	**12%**	**52**	100%
	Part 5: Main challenges of project scope management faced in EnDev	**SA**		**A**		**N**		**D**		**SD**			
1	There is are clearly defined project requirements and goals to avoid scope creep	**21**	**40%**	**17**	**33%**	**3**	**6%**	**7**	**13%**	**4**	**8%**	**52**	100%
2	There is sufficient Research done on the possible issues a project or the team might encounter during every stage of the project	**7**	**13%**	**14**	**27%**	**6**	**12%**	**17**	**33%**	**8**	**15%**	**52**	100%
3	There is Poor resource allocation for activities leading to scope change requests	**3**	**6%**	**4**	**8%**	**1**	**2%**	**21**	**40%**	**23**	**44%**	**52**	100%
4	There is a proper scope communication to project implementation team	**20**	**38%**	**18**	**35%**	**4**	**8%**	**7**	**13%**	**3**	**6%**	**52**	100%
5	Accountability is built into the project's workflow, so team members understand their roles and responsibilities	**23**	**44%**	**21**	**40%**	**2**	**4%**	**4**	**8%**	**2**	**4%**	**52**	100%
6	The project implementation team has good skill leading to the proper follow of project boundaries set by the scope	**15**	**29%**	**17**	**33%**	**5**	**10%**	**7**	**13%**	**8**	**15%**	**52**	100%