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PROJECT MANAGEMENT STRATEGIES AND PERFORMANCE OF ELECTRICITY GENERATION PROJECTS IN KENYA

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ABSTRACT

Electricity generation projects are critical to Kenya's economic growth and energy security, with the Kenya Electricity Generating Company PLC (KenGen) playing a leading role in electricity production and infrastructure development. Despite continued investment in electricity generation projects, challenges related to schedule delays, cost overruns, and quality performance persist, raising concerns about the effectiveness of project management strategies. This study examined the influence of project planning and stakeholder engagement on the performance of electricity generation projects at KenGen. A descriptive survey design within a mixed-methods approach was adopted. The target population comprised 1,200 employees involved in electricity generation projects, from which a sample of 112 respondents was selected using stratified random sampling, while purposive sampling was used to select key informants. Primary data were collected using semi-structured questionnaires and key informant interviews. Quantitative data were analyzed using descriptive statistics, Pearson correlation analysis, and multiple linear regression with the aid of SPSS Version 28, while qualitative data were analyzed thematically. The findings revealed that project planning has a positive and statistically significant influence on project performance ($\beta = 0.238$, $p = 0.001$), indicating that effective planning, realistic scheduling, and structured planning tools improve project delivery outcomes. Stakeholder engagement also exhibited a positive and significant influence on project performance ($\beta = 0.267$, $p < 0.001$), making it the strongest predictor among the variables studied. The study concludes that strengthening project planning practices and institutionalizing effective stakeholder engagement mechanisms are essential for improving project delivery in terms of timeliness, cost efficiency, quality, and stakeholder acceptance. The study recommends greater adoption of integrated project planning systems, enhanced use of digital planning tools, and structured stakeholder participation throughout the project lifecycle to improve the performance and sustainability of electricity generation projects in Kenya.

Keywords: Project planning, stakeholder engagement, project performance, electricity generation projects, Kenya Electricity Generating Company (KenGen), Kenya

Background of the Study

Project management has emerged as a foundational discipline for executing complex infrastructure initiatives worldwide, particularly in the energy sector. The increasing complexity, scale, and strategic significance of energy projects have compelled organizations to adopt more agile, results-oriented, and technologically integrated approaches. In response, the concept of "gymnastic enterprises", highly adaptive organizations capable of balancing flexibility with disciplined governance, has gained prominence, especially amid the volatility of global disruptions such as pandemics and climate-driven crises (Project Management Institute [PMI], 2021). These enterprises exhibit advanced maturity in project benefits realization, stakeholder alignment, and PMO (Project Management Office) performance, resulting in significantly reduced investment waste compared to traditional, rigid models (PMI, 2021).

The global shift toward digital tools, data-driven decision-making, and value-based delivery cultures is redefining project execution in the energy domain. These approaches enable enhanced planning, real-time risk tracking, and strategic alignment, thereby improving the likelihood of delivering projects on time, within budget, and at expected quality standards. Nonetheless, the energy sector continues to face multifaceted pressures. The global push for renewable energy transition, the expansion of universal access to electricity, and the need for greater operational efficiency have collectively raised the stakes and complexity of energy infrastructure delivery.

Sub-Saharan Africa exemplifies the region where these challenges are most acute. Over 600 million people in the region lack reliable access to electricity, underscoring a vast infrastructure deficit that represents both a development imperative and an investment opportunity (Financial Times, 2025). According to the African Development Bank (AfDB, 2022), the continent experiences an annual infrastructure financing gap exceeding USD 100 billion. This shortfall, compounded by institutional weaknesses, regulatory bottlenecks, and limited technical capacity, frequently results in costly delays, scope creep, and quality failures in energy infrastructure delivery (ISS-Africa, 2025).

Kenya provides a microcosm of this regional dynamic, highlighting notable progress in energy development alongside enduring project performance challenges. The Kenya Electricity Generating Company PLC (KenGen), a state-owned utility, contributes over 60% of the nation's installed electricity generation capacity, with a portfolio spanning geothermal, hydroelectric, wind, and solar projects (KenGen Annual Report, 2023). Flagship projects such as the Olkaria geothermal series and wind farms in Meru and Turkana underscore the government's commitment to clean and sustainable energy.

However, despite these investments, KenGen continues to experience project execution setbacks. The Olkaria V geothermal project encountered significant delays due to procurement inefficiencies and contractor-related issues, while wind energy initiatives in Meru have been hindered by land acquisition disputes and community resistance (KenGen Annual Report, 2022). A 2021 audit by the Office of the Auditor-General reported that approximately 35% of KenGen's capital projects initiated between 2016 and 2020 were completed behind schedule, and nearly 25% exceeded their original budgets. These findings point to persistent weaknesses in project planning, risk management, stakeholder engagement, and performance monitoring.

Such challenges suggest a misalignment between existing project management strategies and the execution realities of large-scale energy infrastructure. While formal frameworks may exist, inconsistent application and poor institutional integration limit their impact. These shortcomings highlight the need for an empirical assessment of how project management

strategies influence key performance outcomes within KenGen's electricity generation portfolio. Therefore, this study seeks to investigate the relationship between project management strategies and project performance at KenGen. It focuses on strategic domains including project planning and scheduling, risk management, stakeholder engagement, and performance monitoring. By examining how these areas contribute to or hinder project outcomes in terms of cost, time, and quality, the study aimed to generate actionable insights for improving project delivery in Kenya's energy sector.

Statement of the Problem

Electricity generation projects are central to Kenya's economic development as they provide essential energy for households, industries, and the service sector. Kenya Electricity Generating Company PLC (KenGen), as the country's leading ,. power producer, accounts for over 75% of installed electricity capacity (EPRA, 2023). Despite this strategic role and continued investment in renewable energy projects, KenGen still experiences persistent challenges in the performance of its electricity generation p rojects, particularly in relation to time, cost, and quality outcomes.

Between 2016 and 2020, approximately 35% of KenGen's generation projects exceeded planned timelines, while about 25% experienced budget overruns (Office of the Auditor-General, 2021). These inefficiencies have slowed infrastructure expansion and increased financial pressure on project implementation. For instance, the Olkaria V geothermal project experienced delays attributed to procurement inefficiencies and contractor performance issues (KenGen, 2022), while wind energy developments in Meru have faced setbacks linked to land acquisition disputes and weak stakeholder engagement (Ministry of Energy, 2023).

These challenges suggest weaknesses in the translation of project management strategies into effective project execution. Issues such as inadequate integration of modern project management tools, insufficient risk management practices, weak stakeholder coordination, and limited effectiveness of monitoring and evaluation systems continue to affect project outcomes. As electricity demand in Kenya is projected to grow at approximately 7% annually through 2030 (EPRA, 2023), such inefficiencies threaten the country's ability to achieve its energy security and development goals.

Regionally, the African Development Bank (2022) reports that over 70% of energy infrastructure projects in Sub-Saharan Africa experience delays or cost overruns, largely due to weak governance structures and ineffective project management practices. In Kenya, the World Bank (2023) further attributes similar inefficiencies to procurement challenges, limited risk planning capacity, and institutional weaknesses in project delivery systems.

Although KenGen has adopted various project management frameworks such as project charters, work breakdown structures, and performance monitoring tools, there is limited empirical evidence on the effectiveness of these strategies in improving project performance outcomes. Existing studies highlight persistent gaps in risk management and stakeholder engagement (Kariuki & Wanyoike, 2021; Munyoki et al., 2023), while others note that bureaucratic constraints in public utilities hinder the adoption of more adaptive and efficient project management approaches (Ouma & Githae, 2022). However, few studies have specifically examined how key project management strategies—namely project planning and scheduling, risk management, stakeholder engagement, and monitoring and evaluation collectively influence the performance of electricity generation projects in Kenya.

This study therefore addresses this gap by evaluating the effect of project management strategies on the performance of electricity generation projects in Kenya, with a focus on

KenGen. The findings are expected to provide evidence-based recommendations to improve project delivery efficiency, enhance accountability, and strengthen infrastructure development in Kenya's energy sector.

General Objective

To assess the effect of project management strategies on the performance of electricity generation projects in Kenya.

Specific Objectives

i. To evaluate the effect of project planning and scheduling on the performance of electricity generation projects in Kenya.
ii. To determine the effect of stakeholder engagement on the performance of electricity generation projects in Kenya.

LITERATURE REVIEW

Theoretical Review

Project Management Theory

Project Management Theory provides a foundational framework for understanding how structured processes can be used to initiate, plan, execute, monitor, and close projects effectively. The theory originated in the 1950s, evolving out of operational research and engineering management practices developed during World War II and the subsequent rise of large-scale defense and construction projects (Morris, 2013). Early contributions from the Critical Path Method (CPM) and Program Evaluation and Review Technique (PERT) laid the groundwork for systematic project planning and scheduling. As the discipline matured, the development of standardized bodies of knowledge, such as the Project Management Body of Knowledge (PMBOK) by the Project Management Institute (PMI), brought coherence and global adoption of formal project management principles. A significant advancement of the theory came with the work of Kerzner (2017), who reframed project management not just as a technical activity but as a strategic organizational capability. Kerzner emphasized the integration of project management into corporate structures and the use of metrics, earned value analysis, and stakeholder-driven objectives. This shift broadened the theory's relevance beyond engineering and construction into sectors such as energy, IT, and public infrastructure. The theory has since incorporated flexible models, including Agile and hybrid approaches, allowing for increased adaptability in uncertain environments (Turner, 2016; PMI, 2021).

In infrastructure-intensive sectors like energy, the theory has proven particularly valuable due to the long timelines, high capital investments, and diverse stakeholder involvement inherent in such projects. Electricity generation projects demand rigorous coordination of technical, environmental, and regulatory aspects. Project Management Theory facilitates the alignment of these elements through detailed planning, resource scheduling, risk analysis, and performance monitoring (Meredith & Mantel, 2017). Empirical studies have confirmed the positive impact of applying structured project management frameworks on infrastructure delivery. For instance, Joslin and Müller (2015) found that mature project governance structures are strongly correlated with improved project performance in public utilities and infrastructure projects.

Despite its widespread use, the theory has been critiqued for its prescriptive nature. Critics argue that traditional project management models tend to adopt a linear, one-size-fits-all approach that may not suit complex, evolving, or politically influenced environments, such as

those found in public-sector projects in developing countries (Williams, 2005; Cicmil et al., 2006). Moreover, the theory assumes a relatively stable and predictable project context, which may not reflect realities where community resistance, policy shifts, or procurement hurdles introduce unpredictability. Such criticisms have led to the emergence of more dynamic approaches like Adaptive Project Frameworks (Wysocki, 2014), yet the core principles of Project Management Theory remain applicable when contextualized appropriately.

In the context of this study, Project Management Theory is particularly suitable for examining electricity generation projects implemented by the Kenya Electricity Generating Company PLC (KenGen). The theory underpins two of the study's specific objectives: evaluating the effect of project planning and examining the role of monitoring and evaluation in project performance. Given the complexity and strategic importance of KenGen's portfolio, which includes geothermal, hydro, and wind energy projects, this theory provides a robust lens for analyzing whether formal project planning, scheduling, and performance tracking mechanisms are being applied effectively. It enables the investigation of whether such strategies contribute to the timely completion, cost efficiency, and quality of energy projects, or whether implementation gaps persist within the public-sector utility framework.

Stakeholder Theory

Stakeholder Theory was originally developed by R. Edward Freeman (1984) in his seminal work Strategic Management: A Stakeholder Approach, as a response to the limitations of the traditional shareholder-centric view of the firm. Freeman argued that organizations do not operate in isolation; instead, they exist within a web of interconnected relationships involving diverse parties who can affect or be affected by organizational decisions. These parties include employees, customers, suppliers, investors, communities, regulators, and others with a legitimate interest in the organization's outcomes. The theory posits that the success of any organization is closely tied to how well it manages and balances the needs and expectations of its stakeholders through inclusive, ethical, and transparent engagement. Since its inception, Stakeholder Theory has undergone significant evolution, broadening its application beyond corporate governance and ethics into areas such as sustainability, public administration, infrastructure development, and project management. Scholars such as Donaldson and Preston (1995) expanded the theory by proposing descriptive, instrumental, and normative perspectives, indicating not only what organizations do with stakeholders, but also what they ought to do, and how stakeholder engagement contributes to performance outcomes. In project management, the theory has been increasingly applied to understand how stakeholder dynamics influence project success, particularly in complex, multi-stakeholder environments such as energy infrastructure development (Aaltonen & Kujala, 2016).

Empirical research affirms the importance of stakeholder engagement in infrastructure and public-sector projects. Yang et al. (2009) found that stakeholder-related issues, such as lack of communication, conflicting interests, and inadequate participation, are among the leading causes of project failure. Similarly, Olander and Landin (2005) demonstrated that early stakeholder identification and participatory planning significantly reduce opposition, cost overruns, and delays in construction projects. In the African context, K'Akumu (2010) observed that ineffective stakeholder consultation often leads to land disputes, community protests, and implementation delays, especially in energy and infrastructure programs. These findings support the argument that engaging stakeholders is not just a social responsibility but a strategic imperative for project viability and legitimacy.

Despite its wide applicability, Stakeholder Theory is not without criticism. Some scholars argue that the theory lacks clear operational guidelines on how to prioritize among conflicting

stakeholder interests (Jensen, 2002). In practical settings, especially within government-owned utilities like KenGen, project managers may face political pressure to favor certain stakeholders over others, potentially undermining the objectivity and fairness advocated by the theory. Additionally, the broad definition of who qualifies as a stakeholder can create ambiguity in stakeholder mapping and engagement prioritization. Nonetheless, the theory remains highly influential, particularly when complemented by structured stakeholder analysis tools such as salience models, power-interest grids, and participatory planning frameworks (Mitchell et al., 1997). Stakeholder Theory is especially relevant to this study as it underpins the third specific objective: assessing the effect of stakeholder engagement on the performance of electricity generation projects at KenGen. Given the public visibility, land-use implications, and environmental sensitivities surrounding KenGen's projects, especially geothermal and wind developments, effective stakeholder engagement is essential for gaining social license, reducing community resistance, and enhancing collaboration with regulators and contractors. This theory provides a lens for evaluating how KenGen manages its relationships with communities, government agencies, and other interest groups, and how these efforts (or lack thereof) influence project cost, timelines, and delivery quality.

Conceptual Framework

A conceptual framework serves as the structural blueprint of a study, outlining the key variables, their relationships, and the theoretical assumptions guiding the research (Figure *0-1*). It helps to systematically explain how specific factors are expected to influence outcomes based on existing literature and empirical findings (Miles, Huberman, & Saldaña, 2014). For this study, the conceptual framework is designed to illustrate the relationship between project management strategies, namely project planning and stakeholder engagement and their influence on project performance in the context of electricity generation projects implemented by the Kenya Electricity Generating Company PLC (KenGen).

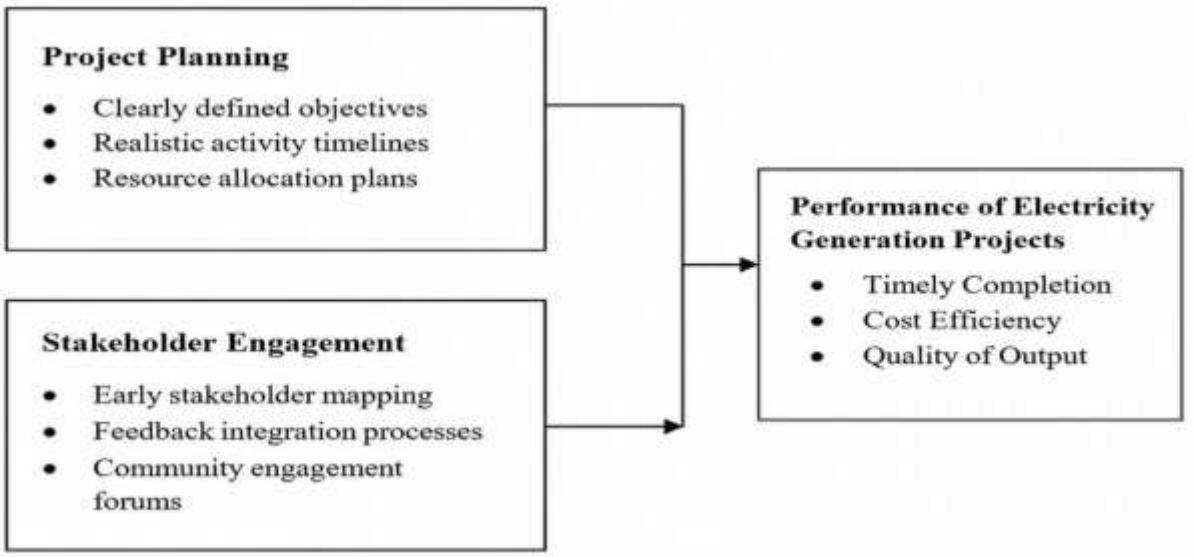

Figure 0-1: Conceptual Framework

Project Planning

Project planning involves defining project objectives, scope, deliverables, resource requirements, budgets, and implementation schedules to guide project execution. In electricity generation projects, effective planning facilitates efficient resource allocation, realistic scheduling, regulatory compliance, and proactive management of project risks and stakeholder expectations (Papke-Shields & Boyer-Wright, 2021; PMI, 2021). Comprehensive planning

minimizes scope changes, cost overruns, and schedule delays through activities such as feasibility studies, budgeting, scheduling, stakeholder mapping, and environmental assessments (Nzekwe et al., 2021; Njenga & Ngugi, 2022). The use of planning techniques such as Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), Gantt charts, and digital project management tools further enhances project coordination and delivery (El-Sabek & McCabe, 2020). Consequently, effective project planning contributes significantly to improved project performance through timely completion, cost efficiency, and delivery of quality outputs.

Stakeholder Engagement

Stakeholder engagement refers to the systematic identification, analysis, communication, and involvement of individuals or groups affected by or capable of influencing project outcomes (Aaltonen & Kujala, 2021). In electricity generation projects, stakeholders include government agencies, financiers, contractors, employees, local communities, and environmental organizations. Effective engagement promotes transparency, trust, collaboration, and conflict resolution while reducing project delays and implementation challenges (PMI, 2021). Early stakeholder mapping, continuous communication, participatory decision-making, and structured grievance management enhance project acceptance and social legitimacy, particularly in projects involving land acquisition and environmental concerns (Bourne, 2022; Yang et al., 2021). For KenGen, strengthening stakeholder engagement is essential for improving project implementation and achieving sustainable project outcomes.

Project Performance

Project performance refers to the extent to which project objectives are achieved within the expected cost, schedule, and quality requirements (Kerzner, 2022). In electricity generation projects, performance is commonly evaluated using timely completion, cost efficiency, and quality of output. Timely completion reflects adherence to project schedules, cost efficiency measures the optimal utilization of financial resources, while quality of output assesses compliance with technical, operational, and regulatory standards (PMI, 2021). These dimensions collectively determine the effectiveness of project management practices and the overall success of electricity generation projects.

Empirical Review

Project Planning

Empirical evidence consistently demonstrates that project planning is a significant determinant of infrastructure project performance. In Australia, Nguyen and Chileshe (2021) found that inadequate feasibility planning and scheduling contributed to delays and cost escalations in renewable energy projects, whereas comprehensive planning enhanced project success. Similarly, Khamooshi et al. (2021) reported that predictive planning models significantly improved delivery timelines in electricity grid modernization projects in the United States by integrating procurement schedules, regulatory approvals, and resource planning.

Within Sub-Saharan Africa, Agyekum et al. (2021) established that inadequate feasibility studies and poorly defined project scopes were major contributors to cost overruns and implementation delays in electricity infrastructure projects in Ghana. Likewise, Tesfaye and Endris (2022) observed that planning deficiencies related to land acquisition, stakeholder engagement, and environmental assessment contributed to delays and disputes in Ethiopia's hydropower projects.

In Kenya, Muthee and Wanyoike (2022) found that unrealistic scheduling, weak project scoping, and inadequate integration of regulatory approval processes significantly delayed geothermal energy projects. Similarly, Mwangi and Otieno (2021) reported that inadequate incorporation of community concerns during project planning resulted in prolonged land disputes and delayed implementation of wind energy projects. Collectively, these studies demonstrate that effective project planning through realistic scheduling, comprehensive scoping, regulatory alignment, and stakeholder integration enhances project performance by reducing delays, controlling costs, and improving implementation efficiency. However, limited empirical evidence exists regarding the influence of project planning on electricity generation projects at KenGen, presenting the gap addressed by this study.

Stakeholder Engagement

Previous studies indicate that stakeholder engagement plays a critical role in the successful implementation of energy infrastructure projects. Wolsink (2020) found that early community participation significantly improved acceptance and reduced legal disputes in renewable energy projects in Germany. Similarly, Reed et al. (2021) established that active involvement of indigenous communities and regulators improved project legitimacy while reducing implementation conflicts in Canadian hydropower projects.

Evidence from Africa shows similar patterns. Agyekum and Fugar (2021) reported that participatory stakeholder engagement reduced land disputes and enhanced project sustainability in Ghana, while Molefe and Ndaba (2022) observed that inadequate local engagement undermined renewable energy project implementation in South Africa despite strong institutional frameworks.

Within Kenya, Njogu and Kamau (2021) established that inadequate community consultation delayed geothermal projects through compensation and resettlement disputes, whereas Ochieng and Tubey (2022) found that weak communication and grievance management contributed to prolonged delays in wind power projects. The studies recommend institutionalizing structured stakeholder engagement frameworks to improve project acceptance and implementation. Although existing studies confirm the importance of stakeholder engagement in infrastructure development, few have specifically examined its influence on the performance of electricity generation projects at KenGen, thereby justifying the present study.

RESEARCH METHODOLOGY

The study adopted a descriptive survey design within a mixed-methods framework to examine the influence of project management strategies on the performance of electricity generation projects at Kenya Electricity Generating Company (KenGen). The descriptive survey design was appropriate because it enabled the systematic collection of data on existing project management practices without manipulating the study variables. The integration of quantitative and qualitative approaches strengthened the study by combining statistical evidence with contextual insights, thereby enhancing the reliability, validity, and comprehensiveness of the findings through methodological triangulation (Saunders et al., 2019; Creswell & Plano Clark, 2018; Fetters et al., 2013).

The target population comprised approximately 1,200 KenGen employees directly involved in electricity generation projects, including project managers, engineers, procurement officers, finance officers, planners, and monitoring and evaluation personnel. A stratified random sampling technique was employed to ensure proportional representation across the various professional categories, while purposive sampling was used to identify key informants with

extensive project management experience for qualitative interviews. Using Yamane's (1967) formula, a sample size of 112 respondents was determined to provide adequate statistical representation while maintaining feasibility for data collection and analysis (Kothari, 2014; Saunders et al., 2019).

Data were collected using a semi-structured questionnaire consisting of closed-ended items measured on a five-point Likert scale and open-ended questions that captured respondents' experiences and contextual perspectives. The questionnaire was organized around the study variables, namely project planning, stakeholder engagement, and project performance. Additionally, key informant interviews complemented the questionnaire data by providing deeper qualitative insights into strategic and organizational issues affecting project implementation. This combination of instruments enhanced both the reliability and validity of the data collected (Bryman, 2016; Joshi et al., 2015; Saunders et al., 2019; Fetters et al., 2013).

The data collection process adhered to institutional and national ethical requirements. Research approval was obtained from the Graduate School of Jomo Kenyatta University of Agriculture and Technology (JKUAT), the National Commission for Science, Technology and Innovation (NACOSTI), and KenGen management. Questionnaires were administered using both the drop-and-pick approach and official organizational email channels to maximize accessibility and response rates. Respondents were informed about the purpose of the study, confidentiality measures, and voluntary participation, while follow-up reminders were used to minimize non-response. Completed questionnaires were securely stored to safeguard participant confidentiality (Saunders et al., 2019; Kothari, 2014; Dillman et al., 2014).

Quantitative data were processed and analyzed using SPSS Version 28. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize respondent characteristics and the distribution of study variables. Multiple linear regression analysis was employed to examine the influence of project planning, risk management, stakeholder engagement, and monitoring and evaluation on project performance. Model adequacy was assessed using the coefficient of determination (R^2), regression coefficients, and the F-test, with statistical significance evaluated at the 5% level. Qualitative responses from open-ended questions and interviews were analyzed thematically to identify recurring patterns and complement the quantitative findings, thereby providing a more comprehensive understanding of project management practices and project performance at KenGen (Saunders et al., 2019; Kothari, 2014; Creswell & Creswell, 2018).

RESEARCH FINDINGS AND DISCUSSIONS

The study targeted a sample of 112 employees drawn from the Kenya Electricity Generating Company PLC who are involved in electricity generation projects. A pilot test involving 11 respondents was conducted to establish the validity and reliability of the research instrument; these respondents were excluded from the main analysis. Out of the 112 questionnaires administered, 98 completed questionnaires were returned, yielding a response rate of 87.5%. This response rate is considered adequate for survey research, as it exceeds the 70% threshold recommended to ensure representativeness and minimize non-response bias (Mugenda & Mugenda, 2003).

Descriptive Statistics of Study Variables

This section presents the descriptive statistics of the study variables, namely project planning and scheduling, stakeholder engagement and project performance at Kenya Electricity Generating Company (KenGen). The analysis provides the mean and standard deviation for each construct as reported by the respondents. The means were interpreted using a five-point

Likert scale where 1.00–1.80 = Strongly Disagree, 1.81–2.60 = Disagree, 2.61–3.50 = Neutral, 3.51–4.20 = Agree, and 4.21–5.00 = Strongly Agree. Descriptive statistics were computed for all the study constructs, including project planning and scheduling, risk management, stakeholder engagement, monitoring and evaluation, and project performance. The findings provide insight into the prevalence and effectiveness of these project management strategies within KenGen and establish the basis for subsequent inferential analysis examining the relationship between the independent variables and project performance.

Project Planning and Scheduling

The first objective of the study was to determine the influence of project planning and scheduling on the performance of electricity generation projects at Kenya Electricity Generating Company (KenGen). Project planning and scheduling were assessed using eight questionnaire items focusing on project definition, timelines, planning tools, financial planning, regulatory compliance, stakeholder integration, digital systems, and control of scope changes and delays. Respondents rated each item on a five-point Likert scale, and the results are presented in **Table** 1.

The findings indicate that respondents generally agreed that project objectives and deliverables are clearly defined during project initiation (mean = 3.874, SD = 0.721), suggesting that KenGen places considerable emphasis on establishing clear project direction at the early stages of electricity generation projects. The inclusion of regulatory requirements and approvals in project planning also recorded a relatively high score (mean = 3.821, SD = 0.706), indicating strong compliance with energy sector regulations and statutory requirements.

The application of project planning tools such as Gantt charts, Critical Path Method (CPM), and Program Evaluation and Review Technique (PERT) was also rated positively (mean = 3.756, SD = 0.694), implying that formal scheduling techniques are commonly used in project implementation. Respondents further agreed that proper planning contributes to minimizing scope creep and project delays (mean = 3.663, SD = 0.754), reflecting the importance of structured planning in enhancing project control and efficiency.

Timelines and milestones were perceived as fairly realistic and achievable (mean = 3.642, SD = 0.768), while stakeholder engagement during planning scored moderately high (mean = 3.614, SD = 0.739), demonstrating that project planning at KenGen incorporates consultations with relevant stakeholders. Financial planning and cash flow forecasting also received favorable ratings (mean = 3.588, SD = 0.781), although the relatively higher standard deviation suggests some variability in respondents' experiences regarding financial adequacy across projects. The use of digital planning tools such as MS Project and Primavera recorded the lowest mean score (mean = 3.547, SD = 0.812), indicating that although digital systems are utilized, there may still be inconsistencies in adoption, training, or integration across departments and project sites.

Overall, the aggregate project planning and scheduling score was 3.688 (SD = 0.747), indicating that respondents generally agreed that project planning and scheduling practices are effectively implemented in KenGen's electricity generation projects. The relatively low standard deviation further suggests consistency in respondents' perceptions regarding planning practices. These findings are consistent with existing empirical literature. For instance, Harold Kerzner emphasizes that effective planning and scheduling are essential for controlling project scope, cost, and time performance. Similarly, studies in infrastructure and energy project management have shown that clearly defined objectives, realistic scheduling, and adoption of planning technologies significantly improve project success rates. The findings also support Project Management Theory, which argues that comprehensive planning provides the

foundation for efficient resource utilization, risk mitigation, and timely project delivery. However, the comparatively lower rating on digital planning tools suggests the need for greater investment in integrated project management technologies and staff capacity building to enhance coordination and real-time project tracking within KenGen.

Table 1: Descriptive Statistics for Project Planning and Scheduling

Statement	Mean	Std. Dev.
Project objectives and deliverables are clearly defined at initiation.	3.874	0.721
Timelines and milestones are realistic and achievable.	3.642	0.768
Project planning tools (e.g., Gantt charts, CPM, PERT) are widely applied.	3.756	0.694
Financial planning and cash flow forecasting are conducted effectively.	3.588	0.781
Planning includes regulatory requirements and approvals.	3.821	0.706
Stakeholder engagement is incorporated into project planning.	3.614	0.739
Digital tools (e.g., MS Project, Primavera) are effectively used.	3.547	0.812
Proper planning minimizes scope creep and delays in KenGen's projects.	3.663	0.754
Aggregate Project Planning and Scheduling Score	**3.688**	**0.747**

Stakeholder Engagement

The second objective of the study sought to examine the influence of stakeholder engagement on the performance of electricity generation projects at Kenya Electricity Generating Company (KenGen). Stakeholder engagement was measured using eight items focusing on stakeholder identification, participation, consultation, communication, grievance handling, feedback mechanisms, and conflict management. Respondents rated their agreement on a five-point Likert scale, and the results are presented in Table 2.

Table 2: Descriptive Statistics for Stakeholder Engagement

Statement	Mean	Std. Dev.
Stakeholders are identified and mapped at the start of projects.	3.652	0.718
Local communities are engaged throughout the project lifecycle.	3.598	0.731
Regulatory agencies (e.g., EPRA, NEMA) are adequately consulted.	3.621	0.707
Communication strategies are clear, consistent, and inclusive.	3.557	0.742
Stakeholder grievances are promptly addressed.	3.433	0.769
CSR initiatives support community relations in project areas.	3.476	0.755
Engagement enhances project acceptance and reduces conflicts.	3.612	0.701
Feedback from stakeholders influences decision-making.	3.421	0.783
Aggregate Stakeholder Engagement Score	**3.546**	**0.736**

The findings indicate that stakeholder identification and mapping at the beginning of projects was rated highly (mean = 3.652, SD = 0.718), suggesting that KenGen places strong emphasis on early stakeholder analysis. Consultation with regulatory agencies such as EPRA and NEMA also scored relatively high (mean = 3.621, SD = 0.707), reflecting strong compliance with statutory and environmental requirements in electricity generation projects. Community engagement throughout the project lifecycle recorded a moderately high score (mean = 3.598, SD = 0.731), indicating that efforts are made to involve local communities during implementation phases. Similarly, stakeholder engagement was perceived to enhance project acceptance and reduce conflicts (mean = 3.612, SD = 0.701), demonstrating recognition of its importance in minimizing project resistance and delays.

Communication strategies were rated moderately (mean = 3.557, SD = 0.742), suggesting that while communication systems are in place, their effectiveness may vary across projects and

stakeholder groups. Corporate Social Responsibility (CSR) initiatives supporting community relations scored slightly lower (mean = 3.476, SD = 0.755), indicating that CSR activities may not always be sufficiently aligned with stakeholder expectations or project needs. Stakeholder grievance handling received a moderate rating (mean = 3.433, SD = 0.769), highlighting some inefficiencies in responding to concerns raised by affected groups. Feedback from stakeholders influencing decision-making recorded one of the lowest means (mean = 3.421, SD = 0.783), suggesting limited institutionalization of feedback loops in project governance processes.

Overall, the aggregate stakeholder engagement score was 3.546 (SD = 0.736), indicating that respondents generally agreed that stakeholder engagement practices are moderately well implemented in KenGen's electricity generation projects. The relatively small standard deviation suggests moderate consistency in respondents' perceptions across projects. These findings are consistent with Stakeholder Theory, which posits that project success is enhanced when the interests of all affected parties are systematically identified and integrated into decision-making processes. Empirical studies by Freeman R Edward emphasize that inclusive stakeholder engagement improves project legitimacy, reduces resistance, and enhances long-term sustainability. Similarly, Olander and Landin (2005) found that effective stakeholder management reduces conflict and improves project performance in large infrastructure developments, while Yang et al. (2011) demonstrated that poor communication and weak feedback mechanisms often lead to delays and cost overruns.

The moderately high scores suggest that while stakeholder engagement practices are relatively well established particularly in identification, consultation, and regulatory compliance weaknesses remain in feedback incorporation, grievance resolution, and CSR alignment. These gaps imply that although engagement structures exist, their effectiveness in influencing decision-making and resolving conflicts is still limited, thereby constraining their full impact on project performance.

Project Performance

The main objective of the study sought to examine the performance of electricity generation projects at Kenya Electricity Generating Company (KenGen). Project performance was measured using eight items focusing on time, cost, quality, reliability, efficiency, and stakeholder satisfaction. Respondents rated their agreement on a five-point Likert scale, and the results are summarized in **Table** 3.

Table 3: Descriptive Statistics for Project Performance

Statement	Mean	Std. Dev.
Projects are completed within scheduled timelines.	3.642	0.721
Projects adhere to approved budgets with minimal cost overruns.	3.605	0.729
Outputs meet required quality standards and regulations.	3.543	0.734
Completed projects reliably supply power to the national grid.	3.506	0.741
Delays significantly reduce project benefits.	3.420	0.713
Cost-efficiency is considered at all stages of project delivery.	3.395	0.768
Quality assurance reduces rework and maintenance costs.	3.358	0.751
Stakeholder satisfaction reflects project success.	3.309	0.702
Aggregate Project Performance Score	**3.472**	**0.733**

The findings indicate that completion of projects within scheduled timelines was the most positively rated performance indicator (mean = 3.642, SD = 0.721), suggesting that KenGen demonstrates relatively good adherence to project schedules. Adherence to approved budgets also scored highly (mean = 3.605, SD = 0.729), indicating moderate success in cost control,

although some variability exists across projects. Compliance with quality standards (mean = 3.543, SD = 0.734) and reliable supply of electricity to the national grid (mean = 3.506, SD = 0.741) were also rated moderately high, reflecting that completed projects generally meet technical and operational requirements. However, cost-efficiency considerations during project delivery scored slightly lower (mean = 3.395, SD = 0.768), suggesting that efficiency optimization is not fully embedded across all project stages.

Quality assurance in reducing rework and maintenance costs (mean = 3.358, SD = 0.751) and stakeholder satisfaction as an indicator of success (mean = 3.309, SD = 0.702) recorded lower means, indicating that post-completion performance evaluation and user satisfaction mechanisms may require strengthening. Overall, the aggregate project performance score of 3.472 (SD = 0.733) indicates a moderate level of project performance at KenGen. This suggests that while electricity generation projects generally achieve acceptable outcomes in terms of time, cost, and quality, challenges remain in cost efficiency, quality optimization, and stakeholder satisfaction. These findings align with project management theory, which emphasizes that performance is multidimensional and influenced by planning, risk management, stakeholder engagement, and monitoring systems.

Correlation Analysis

This section presents the correlation analysis between the independent variables project planning and scheduling, stakeholder engagement, and the dependent variable, project performance of electricity generation projects at Kenya Electricity Generating Company (KenGen). Pearson's product–moment correlation coefficient (r) was used to determine the strength and direction of relationships between the variables. The interpretation of correlation coefficients was guided by the following scale: 0.00–0.19 (very weak), 0.20–0.39 (weak), 0.40–0.59 (moderate), 0.60–0.79 (strong), and 0.80–1.00 (very strong). A positive correlation indicates that an increase in one variable is associated with an increase in another, while a negative correlation indicates an inverse relationship. The results are presented in **Table 0**4.

Table 0: Correlation Matrix

Variable	Project Performance	Project Planning & Scheduling	Stakeholder Engagement
Project Performance	1.000 Sig. (2-tailed) N = 112		
Project Planning & Scheduling	.721** Sig. (2-tailed) = .000	1	
Stakeholder Engagement	.738** Sig. (2-tailed) = .000	.214 .681	1

Note: **Correlation is significant at the 0.05 level (2-tailed).

The correlation between project planning and scheduling and project performance was strong and positive ($r = 0.721$, $p < 0.05$). This implies that well-defined project plans, realistic schedules, and effective use of planning tools significantly enhance project delivery outcomes. This finding supports project management theory, which emphasizes planning as a foundation for cost, time, and scope control.

The relationship between stakeholder engagement and project performance was also strong and positive ($r = 0.738$, $p < 0.05$), demonstrating that involving stakeholders in decision-making, communication, and feedback processes enhances project acceptance and reduces resistance. This aligns with Stakeholder Theory, which argues that project success depends on effective integration of stakeholder interests

Regression Analysis

To determine the combined and individual influence of project management strategies on project performance, a multiple linear regression analysis was conducted. Project performance at Kenya Electricity Generating Company was regressed on project planning, stakeholder engagement.

Table 5: Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of Estimate
1	0.816	0.666	0.648	0.437

Predictors: (Constant), Project Planning, Stakeholder Engagement,
Dependent Variable: Project Performance

The model results indicate a strong relationship between the predictors and project performance, with an R value of 0.816. The R^2 value of 0.666 indicates that 66.6% of the variation in project performance is explained by the four project management strategies. The adjusted R^2 of 0.648 confirms that the model remains robust even after adjustment for the number of predictors, indicating strong explanatory power.

Table 6: ANOVA Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	38.214	2	7.643	29.973	0.000
Residual	19.144	78	0.255		
Total	57.358	80			

Predictors: (Constant), Project Planning, Stakeholder Engagement
Dependent Variable: Project Performance

The ANOVA results show that the regression model is statistically significant, $F(5, 75) = 29.973$, $p < 0.05$. This indicates that the combined effect of project planning, risk management, stakeholder engagement, and monitoring and evaluation significantly explains variations in project performance at KenGen. The model therefore provides a good fit for the data.

Table 7: Regression Coefficients

Predictor	B	Std. Error	Beta	t	Sig.
Constant	0.742	0.214	–	3.467	0.001
Project Planning	0.238	0.072	0.286	3.306	0.001
Stakeholder Engagement	0.267	0.070	0.293	3.814	0.000

Project planning has a positive and significant effect on project performance ($\beta = 0.238$, $p = 0.001$). This implies that clear definition of objectives, effective scheduling, and structured planning tools improve project delivery outcomes at KenGen. Stakeholder engagement has the strongest effect on project performance ($\beta = 0.267$, $p < 0.001$). This shows that involving

stakeholders in planning and implementation improves acceptance, coordination, and overall project success.

The regression model is expressed as:

$$\mathbf{Y = 0.742 + 0.238X_1 + 0.211X_2 + 0.267X_3 + 0.164X_4 + \varepsilon}$$

Where:

Y = Project Performance
X_1 = Project Planning
X_2 = Stakeholder Engagement

Holding other factors constant: A one-unit increase in project planning improves performance by 0.238 units and A one-unit increase in stakeholder engagement improves performance by 0.267 units

Conclusions

The first research objective sought to determine the influence of project planning and scheduling on the performance of electricity generation projects at KenGen. The study concludes that effective planning and scheduling significantly enhance project performance by improving coordination, resource alignment, and execution efficiency. The use of structured planning tools such as Gantt charts, CPM, and PERT contributes to better time and cost control. However, inconsistent use of advanced digital tools and partial integration of stakeholder input limit optimal performance. Overall, project planning and scheduling is a strong determinant of successful project delivery at KenGen.

The second objective focused on stakeholder engagement. The study concludes that stakeholder engagement significantly improves project performance by promoting inclusivity, compliance, and conflict reduction. Early identification of stakeholders and continuous engagement contribute to smoother project implementation. However, limited use of structured feedback mechanisms reduces the extent to which stakeholder input influences decision-making. Despite this, stakeholder engagement remains one of the strongest predictors of project success at KenGen.

Recommendations

Planning and Scheduling

The study recommends that KenGen strengthen the use of integrated and standardized project planning frameworks to improve the consistency and accuracy of project scheduling. Greater emphasis should be placed on the full utilization of planning tools such as Gantt charts, CPM, and PERT across all projects to enhance time management and coordination of activities. In addition, financial planning and cash flow forecasting should be improved through more rigorous alignment with project timelines to minimize delays caused by funding gaps.

KenGen should also invest in the wider adoption of advanced project management software such as MS Project and Primavera, ensuring that all project teams are adequately trained in their use. Furthermore, stakeholder engagement should be more deeply embedded in the early stages of planning to ensure that project objectives, regulatory requirements, and implementation timelines are fully aligned. Strengthening these areas will enhance efficiency, reduce scope creep, and improve overall project delivery performance.

Stakeholder Engagement

The study recommends that KenGen institutionalize structured stakeholder feedback mechanisms to ensure continuous engagement throughout the project lifecycle. Stakeholder involvement should extend beyond consultation to active participation in decision-making processes, particularly in areas affecting project scope, timelines, and environmental considerations.

Formal conflict management frameworks should also be developed to enable early identification and resolution of disputes, especially in community-sensitive project areas. Additionally, stakeholder engagement strategies should be strengthened to ensure that feedback from communities, regulators, and other key actors is systematically incorporated into project decisions. Enhancing stakeholder collaboration will improve project acceptance, reduce resistance, and promote smoother implementation of electricity generation projects.

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