IMPACT OF ENVIRONMENTAL MANAGEMENT ON PROJECT PERFORMANCE: A CASE OF THE MENENGAI GEOTHERMAL PROJECT, KENYA

Anne Wangui Mwangi
Geothermal Development Company
P. O. Box 17700, 20100 Nakuru
KENYA
awangui@gdc.co.ke

Key words: Environmental management, Impacts, Performance, Menengai geothermal project

ABSTRACT

Environmental management is proving vital in development. Gone are the years when projects were carried out without environmental impact assessments and audits. Today, the World Bank, International Finance Corporation and ISO Standards e.g. ISO 14001:2015 are utilized to deem a project fit before it is implemented. Environmental management has its pros and cons. Many individuals consider its downsides as requiring a large amount of resources, labour intensive and time consuming towards projects. The positive impacts of this practice include attracting donor funds, good public outlook, increased project acceptance, environmental conservation, mitigating negative environmental impacts that emanate from project development, just to mention a few. In the Menengai geothermal drilling project, environmental management is ongoing and with it has derived many incentives. These include acquisition of donor funds, conservation of the environment, community harmony as a result of accrued benefits and data collection for future use. This paper details the impact environmental management has had on the performance of the Menengai geothermal drilling project regarding its successes and setbacks as not much has been documented on the same.

1.0 INTRODUCTION

During the last few years, the awareness of people for the protection of the environment in society has been gradually increasing. Various types of pressure groups are acting in defense of the environment. The governments are also promoting more and more regulations to protect the environment and the community in general (Chakrabarti and Mitra, 2004). Geothermal development is budding in Kenya's energy sector. Its immense potential saw to it that a Special Purpose Vehicle (SPV), the Geothermal Development Company (GDC) was formed to fast track the exploration, development and exploitation of geothermal resources in Kenya so as to contribute to the injection of 5000 MW into the National grid by the year 2030 (African Development Bank, 2011). The Company's first project is the Menengai Geothermal Drilling Project (MGDP) in Nakuru County. Several other projects followed thereafter having learnt lessons from the pilot project, these include the North rift (Baringo, Silali, Arus, Chepchuk) and South rift (Suswa) projects.

Cascading from international, bilateral/multilateral and national legislation such as the US National Environmental Policy Act (NEPA) (1970), World Bank safeguards and others; Environmental Impact Assessment (EIA) has been adopted to balance the three tenets of sustainable development; the economy, society and environment (Ogola, 2008.) Oduor (2010) stated that in order for the geothermal resource to achieve popularity, as a renewable energy alternative, there was need to clearly identify the social and environmental impacts of its development. This is achievable through environmental and social impact assessments/monitoring from project initiation to the operation phase.

According to the Environmental Impact Assessment and Audit (EIA/EA) Regulations (2003), no proponent shall implement a project that is likely to have negative environmental impacts or for which an EIA is required under the Environmental Management and Coordination Amendment Act, 2015, unless an EIA has been concluded and the study report approved in accordance with these Regulations. The EIA/EA Regulations (2003), also state that an EIA study report shall develop an Environmental Management Plan (EMP) with mechanisms for monitoring and evaluating the compliance and environmental performance which shall include the cost of mitigation measures and the time frame of implementing these measures. An annual Environmental Audit (EA) is thereafter compulsory following commencement of works. This ensures that the commitments stipulated in the EIA's EMP will be fully adhered to.

Principle 17 of Agenda 21, (1992) also elaborates that an EIA, as a national instrument, shall be undertaken for proposed activities that are likely to have significant adverse impacts on the environment and are subject to a decision of a competent National authority which is the National Environment Management Authority (NEMA) in the Kenyan case.

This paper focuses on the key determinants of project success and the role environmental management plays in defining the ultimate performance of a project with a case of the MGDP.

1.1 Iron Triangle of Project Success

Project success is a vague term that has elicited different interpretations from different people. However, many scholars interpret the concept of project success from the perspective of the iron triangle. The iron triangle interprets project success using three objective measures; project time, project cost, and project quality (Muller and Jugdev, 2012).

Project time refers to the period it takes for a project to be completed. One of the defining characteristics of projects is that they have a definite time-line. For a project to be deemed successful, it should be completed within an acceptable timeline. Exceeding the completion time for a given project often has significant implications such as escalating the costs and delayed benefits. Sometimes, prolonged delays in the project completion time make a project obsolete. Implementation of environmental management at the MGDP occurs hand in hand with development activities thus may not be seen to prolong project time. Delays may however be experienced in the decommissioning stage due to land rehabilitation and restoration of project sites. Any project delays thus far however, cannot be attributed to environmental management due to its simultaneous occurrence with geothermal development activities at the MGDP.

Project cost refers to financial resources that a given project consumes. Another defining characteristic of projects is that they consume resources in order to deliver the expected outcomes (Prabhakar, 2008). Project management principles emphasize the need to estimate project costs before the project begins in order to enable stakeholders to determine the viability of the project. A project is considered viable when estimated cost does not exceed expected benefits. Therefore, for a project to be considered successful, it must be completed within the projected cost hence environmental management costs must be considered prior to the onset of a project. For the MGDP, the aforementioned was reflected upon thus saving the GDC finances that would have been paid into fines and penalties as a result of not executing environmental management due to inadequate/not allocating funds to its activities. This is supported by Oduor (2010) who highlighted that internalizing the cost of social and environmental benefits in the overall project cost is one way of enhancing the competitiveness of geothermal energy against other alternative sources. Cost overruns may lead to losses when the excess costs go beyond the expected benefits of the project.

Project quality refers to the extent to which the project meets the specifications or the requirements defined by the client. For instance, if the project entails coming up with a computer program, the quality of the project will be defined by the extent to which the program meets the technical and functional specifications that the client provided. This dimension of project success also focuses on

the impact of the project on the intended beneficiaries (Howsawi, Eager, Niebecker, 2014). Project quality is a critical determinant of project performance and eventually success. For a project to be considered a success or to be of high performance, it must meet the purpose for which it was created. It must satisfy the client's expectations and requirements. From the regular monthly EA's conducted by GDC for the MGDP, several aspects are considered. These include; resource consumption, resource efficiency and regulatory compliance. The EA reports provide recommendations in cases of resource misuse and noncompliance which have an ultimate effect on the quality of the MGDP.

2.0 MENENGAI GEOTHERMAL DEVELOPMENT PROJECT

The Menengai Geothermal Development Project (MGDP) is situated in Nakuru town, about 180 km Northwest of Nairobi (see Figure 1). The aim of the project is to meet the Country's increasing demand for power supply by developing the Country's geothermal potential which is consistent with Kenya's green growth vision. Specifically, the project aims to develop the Menengai geothermal steam field to produce enough steam for 400 MW of power. The project proponent is the Government of Kenya while the project implementing agency is the Geothermal Development Company (GDC). The expected completion time of this project is June, 2017 and it is estimated to cost USD 746 million (African Development Bank, 2011).

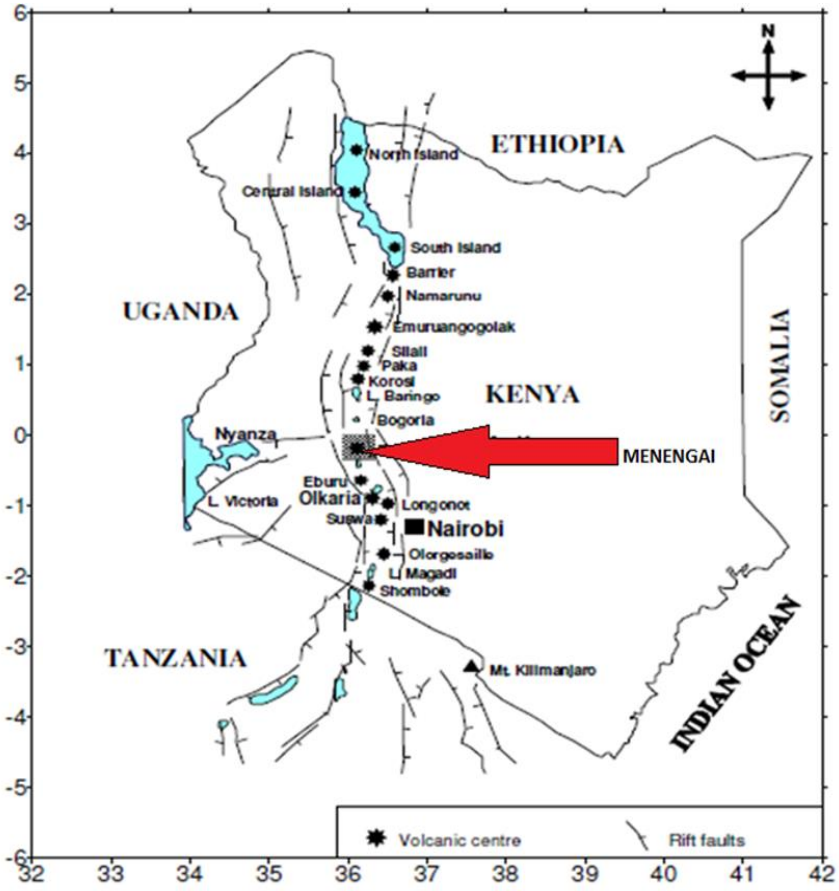

Figure 1: Map of the Kenya Rift showing the location of Menengai Geothermal Prospect (Wetang'ula and Were, 2010)

The Government of Kenya through GDC is the largest financier of the MGDP. Other financiers include the African Development Bank, World Bank, Agence Francaise de Development, and the European Investment Bank. The project has created employment for approximately 900 skilled and 300 unskilled laborers. The project has also benefited local communities through the drilling of boreholes to provide clean drinking water to local communities, repair of roads, creation of business

opportunities, and expansion of the market for local products (Kizambo and Mann, 2014). Besides its core mandate being contributing to Kenya's power supply, the GDC has several success stories as a result of its exemplary performance through encouragement of an influx of people into the project area, comprising the workforce as well as people seeking employment, observable lifestyle changes, improved infrastructure, health and security, easy access to water and increase in the number of social amenities.

2.1 Environmental Management Implementation

Yüksel (2008) identified that the problem they typically came across while implementing the environmental management practices was lack of environmental awareness in all areas including the employees, suppliers and customers. As a consequence, the society did not have sufficient awareness and firms faced many troubles in collecting the components to be recycled. If environmental awareness in the society increased, the success of the environmental plans was expected to rise. The firms also stated that they encountered many troubles on account of the employees lacking education and awareness on environmental issues. The GDC can avoid such cases from occurring through increasing environmental awareness of its employees, suppliers and customers.

He (2010) stated that, the role of environmental management within projects was playing a more and more essential part to the firms and public because of the benefit of its implementation. Different methods were being used to improve environmental management in projects especially in industry. In the modern world, making a high-quality project was playing a more and more essential part in its competitive life. There is no doubt that an initial blueprint of project management in the process of making a perfect project is very significant.

In the case of the GDC MGDP, Wetang'ula and Were (2010) explained that the activities that would be undertaken during implementation of the proposed Menengai geothermal drilling project would involve the following: civil works for construction of access roads, drill sites, drilling of ten (10) water boreholes, drilling and testing of the geothermal wells. Water for drilling was to be abstracted from five (5) water boreholes that were drilled at Wanyororo B area. The main product would be geothermal steam for generation of electricity. The main byproduct would be hot geothermal wastewater. Waste products from the process would include worn out machine parts, used lubrication oil, oil contaminated rags and other solid waste; civil works and drilling debris; emission of gases out of the fuel combustion process (CO_2, CO, SO_2 and NO_2), hydrogen sulphide (H_2S) and other Non-Condensable Gases (NCGs) arising from drilling such as CO_2 and CH_4. NCGs have been linked to global warming, thus making it a global issue.

Wetang'ula and Were (2010) further elaborated that all impacts arising from implementation of the Menengai geothermal drilling project could be mitigated. Issues relating to land access rights and compensation would effectively be handled. Hydrogen sulphide (H_2S) emission related effects from the proposed project would also be insignificant as data on H_2S monitoring for similar projects implemented elsewhere (e.g. Olkaria IV Domes exploratory drilling) had shown that no significant cumulative H_2S emission effects occur during drilling. Noise levels would exceed recommended levels during drilling and well testing around the well sites though this would be temporary and of insignificant effect as the well sites were far from human settlements. Dust emissions would occur during site preparation, road construction, vehicle movement during drilling and also a risk of oil pollution resulting from drilling activities. All these could be controlled.

According to the EIA/EA Regulations, 2003 s.45 states that: Notwithstanding any license, permit or approval granted offences, under any written law, any person who commences, proceeds with, executes or conducts or causes to commence, proceed with, execute or conduct any project without approval granted under these regulations commits an offence and on conviction is liable to the penalty prescribed under the EMC (Amendment) Act, 2015. Any person who fails to prepare and submit a project report to the Authority is in breach of the regulations and is liable to imprisonment or a fine of not less than one year but not more than four years, or not less than two million shillings but not more

than four million shillings respectively. Both the fine and imprisonment can also be invoked. Due to GDC's compliance to relevant National laws and regulations, the Company has avoided hefty fines, imprisonment and stop orders that would have been issued following noncompliance causing project delays.

Shen and Tam (2002) were however of a different view, there findings were that a large number of project managers' that had been interviewed suggested that there was a net cost increase in implementing environmental management as a consequence of the investment in equipment, staff training, human resources and technology such as water treatment and the application of noise-barrier materials. Industrial project managers' practice demonstrated that the cost of implementing environmental management is far more than the worth of the cost savings speculated which is very harmful for implementing environmental management in projects.

2.2 Stakeholder Analysis

Consultation and Public Participation is a vital process in environmental management. Consulted stakeholders including state agencies and the local community felt strongly that the MGDP was of national interest and should override all other concerns (Wetang'ula and Were, 2008). Despite this, the project took into consideration the already identified needs and concerns of the stakeholders.

Stakeholders that were involved prior to the project onset at Menengai included the prominent local communities who would be directly impacted by the project. Stakeholders are best suited to give knowledge on a proposed development site. The MGDP EIA study involved interviews with communities, stakeholders and project-affected people. It also made an adequate analysis of the project's environmental, social, and economic impacts and of the consultations with the public. The project benefited from insights of various stakeholders during project preparation, design and implementation modalities that were conducted as part of the ESIA study.

He (2010) undertook an investigation that suggested that improving the stakeholder's awareness of environmental management is very essential and that there is no doubt that much work remains to be done if we are to recognize how to improve environmental management in projects.

2.3 MGDP Benefits From Environmental Management Implementation

African Development Bank Group (2011) stated that the positive environmental impacts of the project would emanate from the fact that it was a clean energy project. It would assist Kenya in expanding the use of renewable energy and would displace expensive and environmentally hostile thermal generation. It would provide reliable power supply as opposed to the existing hydropower which had been negatively affected by droughts in the recent past. Carrying out an Environmental and Social Impact Assessment (ESIA), which is a requirement by law, led to the approval of the MGDP by NEMA failure to which geothermal development of the Menengai field would have been a myth to date.

Shen and Tam (2002) stated that there are noticeable benefits to the companies that put environmental management into the practice of project management, such as reducing the production of waste, and decreasing the use of materials and techniques that could have hurtful effects on the environment. They also noted that benefits to the owners of these firms could be in a number of ways, for instance, cost savings due to the reduction of fines connected with confidences as a result of going along with environmental legislation. Newman and Breeden (1992 cited Scanlon, 2007) imply that the acceptance of an environmental management program by a Company would have the following benefits, just like a competitive advantage for green marketing as a reply to consumer expectations, media recognition of environmental efforts, the minimization of risks, future costs and positive recognition of environmental efforts by stakeholders. Mrayyan and Hamdi (2006) stated that in the competitive world, firms that wanted to get much more benefits had to pay for much more efforts than before. Finding an effective way to improve environmental performance in projects especially in industry was very important.

3.0 CONCLUSION AND RECOMMENDATIONS

3.1 Conclusion

The concept of environmental management in projects has gained popularity in recent years. It has necessitated issuance of permits and licenses in in order to kick start any development in Kenya. According to an article on ("Environmental Management Accounting", 2015) businesses have become increasingly aware of the environmental implications of their operations, products and services. Environmental risks cannot be ignored, they are now as much a part of running a successful business as product design, marketing, and sound financial management. Poor environmental behaviour may have real adverse impacts on the business and its finances. GDC has sought to comply with existing/emerging Laws, Regulations and Policies relevant to the Company. Non-compliance may lead to the GDC being imposed on punishments which include fines, increased liability to environmental taxes, loss in value of land, destruction of brand values, and loss of sales, consumer boycotts, and inability to secure finance, loss of insurance cover, contingent liabilities, law suits, and damage to corporate image. For GDC to avoid such penalties and fines, it is imperative that it continues allocating funds towards environmental management.

There are a number of environmental management practices that are outlined to ensure improved performance of projects. Stakeholder involvement has ultimately had a positive significant effect on the performance of the Menengai Geothermal Development Project (MGDP). Poorly conducted stakeholder involvement in projects in the past has led to stalling of the same, case in point, the Kinangop wind power project. More emphasis should be granted to make certain that the GDC's stakeholders are aware of changes in the MGDP development and that their input is sought whenever required. Further, annual review of GDC's procedures, work instructions and policies should be encouraged so as to align them to amended National Laws Regulations and Policies.

A challenge that is experienced in execution of environmental management of the MGDP is that available legislation governing environmental issues is not specific to geothermal projects which are ranked to be of high risk by the National Environmental Management Authority. There is no information detailing environmental management activities to carry out following the construction and commissioning phases of a geothermal project. For example, the EMC (Amendment) A, (2015) and the Environmental Impact Assessment and Audit Regulations (2003) focus on the need to carry out an EIA for prospective projects that include drilling for the purpose of utilizing ground water resources as well as geothermal energy.

3.2 Recommendations

Though the EMP for the MGDP is currently being implemented, the following notable improvements can be made from the national level and subsequently to the GDC level.

- In Kenya, adequate guidelines/policies on environmental management of geothermal projects should be availed.

- A positive culture on environmental awareness in the GDC, including its stakeholders can be cultivated through the vast opportunities that are available from implementing environmental management.

- The already existing support of spearheading environmental activities in the MGDP should be encouraged to include hefty penalties for noncompliance as well as rewards for effecting environmental best practices both by individuals and collective departments/sections.

- The GDC Environment department should be more empowered to implement environmental management with the strictness it deserves.

- Bodies responsible for implementing environmental laws such as the National Environment Management Authority (NEMA) should be adequately funded by the GOK.

- The environmental bodies should form a consolidated rapport with community stakeholders. This will encourage their effectiveness in implementing environmental regulations.

REFERENCES

African Development Bank Group.: Project Appraisal Report: Menengai Geothermal Development Project, (2011).

Anonymous.: Environmental Management Accounting. Retrieved from http://www.accaglobal.com/an/en/student/exam-support-resources/professional-exams-study-resources/p5/technical-articles/environmenta-management.html on 27th June 2016, (2015).

Chakrabarti, S., and Mitra, N.: Economic and environmental impacts of pollution control regulation on small industries, A Case Study, retrieved from www.sciencedirect.com. on 19th February 2016, (2004).

Council on Environmental Quality Executive Office of the President of the United States.: National Environmental Policy Act, (1970).

Government of Kenya.: Environmental Management and Coordination (Amendment) Act, (2015).

Government of Kenya.: Environmental (Impact Assessment and Audit) Regulations, (2003).

He, Y.: Environmental Management within Projects, International Journal of Business and Management, Vol. 5, No. 1, (2010).

Kizambo, E., and Manan, P.: Impact of geothermal projects on local economies in geothermal prospect areas, a case study of the Menengai Geothermal Project, Proceedings of 5th African Rift Geothermal Conference, (2014).

Mrayyan, B., and Hamdi, M. R.: Management approaches to integrated solid waste in industrialized zones in Jordan, a case of Zarqa City, Waste Management, (2006), 195-205.

Muller, R., and Jugdev, K.: Critical success factors in projects, International Journal of Managing Projects in Business, (2012), 757- 775.

Oduor, J. A.: Environmental and Social Considerations in Geothermal Development, FIG Congress, Sydney, Australia, (2010).

Ogola, P.A.: The Need for Enhanced Environmental Auditing of Geothermal Projects, Case Study of Kenya Electricity Generating Company Ltd, Proceedings, 30th Anniversary Workshop, United Nations University – Geothermal Training Programme, Reykjavik, Iceland, (2008).

Prabhakar, G.: What is project success: A literature review, International Journal of Business and Management, (2008), 3- 10.

Scanlon, N. L.: An analysis and assessment of environmental operating practices in hotel and resort properties, International Journal of Hospitality Management, (2007), 711-723.

Shen, L.Y., and Tam, V.W.Y.: Implementation of environmental management in the Hong Kong construction industry, International Journal of Project Management, (2002), 535-543.

United Nations Conference on Environment and Development.: Agenda 21, (1992).

Wetang'ula, G.N., and Were, J.O.: Menengai geothermal drilling project, Nakuru, Environmental Impact Assessment Study Report, (2008).

Yüksel, H.: An empirical evaluation of cleaner production practices in Turkey, Journal of Cleaner Production, (2008), 50-57.