THE NEED FOR ENHANCED ENVIRONMENTAL AUDITING OF GEOTHERMAL PROJECTS. A CASE STUDY OF KENYA ELECTRICITY GENERATING COMPANY LTD (KENGEN).

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ABSTRACT

Increasing legislative, financial and community awareness of environmental issues have led to the rethinking of the role and responsibilities of government and private sector in environmental management in Kenya. Consequently, both private and public organizations are forced to be accountable for their actions. In order to guard against environmental litigation and liabilities, organizations are not only adopting voluntary environmental management systems like ISO 14001:2004 but doing regular environmental audits. The implementation of voluntary standards like ISO is also included in the government performance contracts of all government agencies. Financiers/lending institutions are also insisting on environmental audits to avoid the risk of investing in projects with potential environmental liabilities and public rejection.

In order to increase capacity in power generation, KenGen has opted for geothermal capacity expansion. These geothermal projects will be implemented in a setting of heightened environmental awareness and legislation. Moreover, environmental issues of geothermal development are not obvious to the environmental regulators and elites outside geothermal field.

The paper discusses the need for enhanced environmental responsibility and audits in the implementation of KenGen geothermal projects. The paper also highlights the company experience in auditing and its role in supporting/influencing the regulatory environment in which the planned geothermal projects will be implemented.

Key words: Environmental Auditing, Geothermal Projects, KenGen

INTRODUCTION

Over the years, considerable efforts have been made in development, generation and utilization of hydropower, thermal, wind and other forms of renewable energy in Africa. However, little effort has been made in development of geothermal energy and hence information on geothermal energy is not easily known to most elites and regulators outside the geothermal field. In contrast, basic environmental and technological information about other forms of renewable and thermal energy are often well known and understood.

To enhance capacity expansion in Kenya, KenGen in its new strategic vision has made deliberate effort to focus on geothermal capacity expansion. The government of Kenya also allocated Kshs 54 billion (USD) in the current budget (2008/2009) for geothermal development to support the strategy. The strategic direction for the company and the country as a whole in energy development is clearly geothermal. The geothermal strategy will be implemented in an environment of heightened environmental awareness in Kenya. The increased knowledge and awareness of environmental issues have led to a rethinking of the role and responsibilities of both government (and their associated agencies) and the private sector.

To demonstrate environmental responsibility, the Kenyan government enacted a National Environment Management and Coordination Act (EMCA 1999) and associated regulations. The new legislation created the National Environment Management Authority (NEMA). Among the new regulations created was the Environmental Impact Assessment (EIA) and Environmental Audit (EA) regulations 2003. Whereas EIA is meant to identify significant impacts at the planning stage, the audit regulation was drawn with the aim of ensuring that projects comply with the recommendations of the EIA and good environmental management practice and that projects implemented after the formulation of EIA regulation put in place measures to comply with environmental requirement.

In the wake of the new regulations and heightened environmental awareness in the country, both private and public sectors are introducing environmental management systems to ensure that they are systematically setting policies for continual improvement in environmental performance and are achieving the policy objectives. Furthermore, voluntary accreditation schemes like ISO 14001:2004 have been introduced in the government performance contracts to enable organizations obtain external confirmation of the adequacy of their environmental management systems and recognition that they are operating such systems. Consequently, the resources spent by both sectors on environmental management and Corporate Social Responsibility (CSR) has

increased, and both businesses and government bodies are forced to look for more cost-effective ways of dealing with compliance issues through environmental auditing.

Environmental awareness among financial institutions both nationally and internationally has also increased and more stringent. The pressure and scrutiny by these institutions has given the government and businesses the impetus to give environmental issues closer consideration. The World Bank has also developed guidelines for environmental audits in industrial projects, which is documented in the pollution prevention and abatement handbook 1998. The guidelines can be used in auditing geothermal project expansion activities.

According to United Nations Environment Program (UNEP) report on environmental due diligence of renewable energy (including geothermal), procedures for environmental due diligence of Renewable Energy Technologies (RETs) are poorly defined and financiers must often adopt *ad hoc* procedures for environmental review. Although most renewable energy technologies are environmentally sound in theory, all of them can have negative impacts on the environment if poorly planned hence the need for auditing and mitigation. The UNEP report has well define criteria for environmental due diligence for geothermal power projects.

Consequently, environmental audit though still at infancy stage, is becoming the next important environmental management tool after EIA in Kenya and the world at large.

DEFINING "ENVIRONMENTAL AUDITS''

There are several definitions of environmental audits one of them is as described by the International Chamber of Commerce (ICC)**:**

The systematic examination of the interactions between any business operation and its surroundings. This includes all emissions to air, land, and water; legal constraints; the effects on the neighboring community, landscape and ecology; and the public's perception of the operating company in the local area. Environmental audit does not stop at compliance with legislation. Nor is it a 'green-washing' public relations exercise. Rather it is a total strategic approach to the organization's activities.[4]

In a nutshell, the short term objectives of the audits are to determine compliance with environmental laws and regulations, to determine conformance with internal environmental policy, to assess strengths and weaknesses of a facilities environmental management systems, and to assess level of environmental awareness and communication while the long term objectives are to improve environmental compliance and management, and to build supporting financial programs and budgets appropriate for environmental compliance requirements.

Types of environmental audits vary in scope and objective. Types of environmental audits as used in the context of this report include the following:

- Environmental due diligence or liability audits
- Environment Management Systems (EMS) Audits (ISO 14001:2004)
- Regulatory compliance audits
- Environmental Management Plan Audit (as recommended in the EIA)
- Financial audits of environmental performance

The above audits can be combined. Environmental audits are undertaken by independent environmental or specialist consultants or suitably trained internal company staff, depending on the purpose of the audit.

The nature and scope of details can be defined in various ways; different kind of individuals skills are involved; terms of reference for examination may differ; approaches and techniques are still continuing to emerge; and there are different ways of reporting the results and suggest ways for improvement.

ENVIRONMENTAL AUDITS EXPERIENCE IN KENGEN

Despite the fact that EIAs were done prior to implementation of power projects in KenGen, environmental audits were not done until the year 2003 after the establishment of the environmental audit and compliance enforcement section. Just like other departments in the company, the environmental audit section must understand its new role in achieving geothermal growth within the environmental legal framework and ensuring that the projects are regularly audited to enforce compliance and avert liability.

The company has therefore undergone regulatory compliance audits since 2003, thus complies with environmental audit regulatory requirement of self-audits. The reports are submitted to NEMA for scrutiny on an annual basis. It is worth noting that the initial regulatory audits were done under some legislation gaps which were bridged after 2006 i.e. Water Quality Regulation 2006, Waste Management Regulation 2006 (both came

4 www.iccwbo.org/policy/environment/

into force in April 2007) and more recently Air Emission Regulation in 2008. Copies of the audit reports are also submitted to the Energy Regulatory Commission (ERC) whose mandate includes ensuring environmental health and safety compliance in the electric power industry. The Energy Regulatory Commission despite developing audit protocols for geothermal projects are yet come up with specific environmental standards for geothermal projects and the sector as a whole as these were omitted in the above regulations. The role of environmental audit section under the regulatory management division is to influence formulation and publishing of these standards.

Most recently, the company underwent an EMS ISO 14001:2004 certification audits. The audits which were conducted by Kenya Bureau of Standards are expected to continue biannually while internal audits are expected on a quarterly basis. The implementation of ISO 14001:2004 began in 2007 and is in its final stages. Under ISO 14001:2004 management systems requirements, all divisions identified and documented their significant aspects, objectives and targets, developed environmental management programs with timelines and documented operational procedures for controlling the significant aspects. Duties are responsibilities of environmental management within each division/section have been allocated. The ISO 14001 approached has improved not only documentation of environmental processes and procedures but heightened the need for compliance.

External environmental audits on the company in the recent past include; Energy Regulatory Commission (ERC) audits for regulatory compliance, Kenya Bureau of Standards (KEBs) audits for EMS ISO 14001:2004, one environment and risk assessment audit in 2007 (for insurance), at least two environmental due diligence (for the Initial Public Offer (IPO) and the shelved Secondary Public Offer (SPO) done in 2006 and 2007 respectively. This was in bid to offload Government shares in KenGen to the public through the Nairobi Stock Exchange (NSE) (30% in the IPO and 19% in the SPO). In the due diligence process, environmental audit reports formed the main reference documents besides the EIAs. The company has also continued submitting annual environmental audit reports to the World Bank Clean Development Mechanism (CDM) group for the Olkaria II unit III Geothermal project. The World Bank also subjected the same project to an environmental audit in 2004 as pre-funding condition since it is an extension of an existing project (Olkaria II). Lending institutions will often require an environmental audit in order to avert the risk of environmental liabilities and to assess appropriate cost of mitigation on unavoidable impacts. In the past two-years external financial auditors of KenGen have also captured environmental performance review and compliance audits as part of their audit program.

KenGen is currently sourcing for funds through a financial arranger to finance the upcoming projects including geothermal. Part of the financial arrangement process includes environmental due diligence on past and future projects. Since the new corporate strategy is dominated by geothermal expansion, the financiers are keen on environmental performance of geothermal projects. To objectively assess this, all environmental audit reports and EIAs are currently being reviewed by the assessor for financial arranger.

In this environment of intensified environmental audits and a corporate strategy which focuses on geothermal expansion, KenGen needs to take a proactive role in ensuring enhanced environmental compliance of its geothermal projects through regular monitoring and audits. The need for this compliance as based on the company's experience is further discussed below.

THE NEED FOR ENHANCED AUDITING OF GEOTHERMAL PROJECTS IN KENGEN

Locations of geothermal plants

Most geothermal manifestations occur within protected areas and Kenya is not an exception. Just like the Olkaria Geothermal Plants which are located in Hellsgate National Park, the new geothermal potential areas are also located in wildlife and/or forest protected areas e.g. Eburru, Menengai, Longonot, Suswa among others. Opening up of new areas for geothermal expansion within protected areas will require enhance auditing to ensure that all the geothermal activities are controlled and monitored as required. Since most of these spots act as retreat areas and scenic tourist sites, the environmentalists and the financiers alike will be interested in the environmental management plan set-up throughout the project life. The environmental impact assessment and environmental audit recommendations will be expected to create harmony with the wildlife conservation, forest management, tourism and geothermal exploitation. To ensure compliance, both internal and external environmental auditing must be conducted and most significant aspects unique to each area identified and controlled throughout the project cycle.

Need for holistic environmental management through audits

There is a tendency for the EIA to focus on scientific, ecological and social impacts of geothermal projects. While these are important, audit results have shown that other significant environmental aspects are usually

overshadowed. Thus environmental management as stipulated in the EMPs is not holistic. For instance, most common omissions in the EIAs captured as significant aspects during audits, include energy consumption (office and power station), paper consumption, domestic water and waste management, sewage water management, ergonomics, house-keeping, water conservation, emergency preparedness procedures during operation, motor vehicle fuel use and consumption and consumption of other materials etc. Since geothermal energy is considered green, its total impact on environment beyond the EIA must be understood and mitigated. Regular environmental audits must therefore be conducted to ensure that the operators are collecting the relevant environmental data as prescribed, and that the data is properly documented and available and total impact on environment accounted for.

Bridging of weaknesses and gaps in environmental legislation and policy

The Kenyan regulation is relatively new and so is the National Environmental Management Authority (NEMA) that was established in 2003. Though NEMA plays a critical role in approval of projects and in this regard geothermal projects, a lot is still not known about geothermal by the regulators. The NEMA officers who are charged with the issuance of licenses and review of environmental audit reports are usually bogged down with documentation of several other permits without necessarily looking into the details of the EIA or audit reports. The new regulatory management section of KenGen strives to ensure EIA and Environmental Audit reports are not just submitted and shelved but helps the permit writer to understand the operations of geothermal energy in totality before any approval is given. KenGen therefore have opened channels of communication with the regulator and makes effort to present projects to the regulator during or before submission. Some geothermal terminologies which are not understood by the regulators are also explained.

Some of the national regulations as discussed above have not captured applicable requirements for geothermal projects and power sector in general. The task of creating power industry specific environmental regulation therefore lies with the Energy Regulatory Commission (ERC). These gaps should be bridged to ensure value adding auditing. The results of the past audits and monitoring records can be used to create suitable standards based for Kenyan geothermal fields and acceptable international best practice.

The regulator cannot develop these standards without a clear understanding of geothermal operations. The regulatory management division in KenGen and environmental audit section in particular now intends to see the audit results being used in identification of gaps and weaknesses in the implementation of the environmental laws in as far as power projects and especially geothermal projects are concerned in order to provide in-put or further clarifications in future reviews.

Establishment of strategic partnerships with key institutions and groups

The road to achieving the corporate strategy will not be smooth without strategic partners. Present geothermal audits and impact assessment studies must also identify complexities of, and cooperation required in, environmental governance of geothermal projects. This shall include identification of environmental issues which cover more than one institution, and the need to harmonize issues among these institutions, increase coordination and cooperation among them, and to ensure adequate communication and legal enforcement in as far as geothermal projects are concerned. Previously, under the Olkaria Geothermal project, KenGen mainly dealt with the Kenya Wildlife Service (KWS), however, with the expansion of geothermal projects outside Olkaria, new government institutions like Kenya Forest Service (KFS) are now playing a major role in access to geothermal sites as in the case of Menengai and Eburru geothermal project among others. As a result, KenGen has to develop a new Memorandums of Understanding (MoU) and license arrangements with stringent environmental management conditions. The consequences of going against the conditions stipulated in the license include withdrawal of the license. Though geothermal operations might not be evicted from the forest or wildlife conservation area, prudent environmental management as part of good governance will be required on the part of KenGen.

Currently, the audits also include checking compliance with conditions stipulated in the MoU between KenGen and Kenya Wildlife Service (KWS), community complaints records etc. similar audits will be done under the new MoU and license agreements with the KFS.

Overspecialization of environmental experts

In most instances, environmental professionals are always blinded by their expertise and often pay less attention to other fields. The environmental audits create opportunity for different experts coming together on a regular basis to inspect diverse environmental aspects of the project thus giving a broader knowledge of information. Environmental audit teams in KenGen are selected from different professional background, which include various environmental disciplines, engineers, human recourse officers, finance officers among others. The

multidisciplinary approach that has now been adopted through the EMS ISO 14001:2004 system is expected to give a holistic approach to environmental management in the company. The role of each division in environmental management has been identified, documented and tasks assigned to all persons whose activities impact on environment. Environmental audits can thus be used as a means to enhance capacity development in environmental management throughout the company.

Impact of environmental management on KenGen share price in the Nairobi Stock Exchange (NSE)

Since the turn of the new millennium, several companies in Kenya started trading freely in the Nairobi Stock Exchange. The highest entry into the Nairobi Stock Exchange was witnessed after the successful KenGen IPO (Initial Public Officer), which was concluded in May 2006. Companies that followed the KenGen IPO include Safaricom Ltd, Scan Group, Stanbic Uganda, Access Kenya, Kenya-Re, and Eveready among others. KenGen's entry into the stock market mandates it to publish and circulate annual reports to shareholders with a disclosure on environmental management. As part of preparations for the IPO and SPO, two environmental due diligence were conducted to assess the company's credibility in environmental management. During data collection for environmental due diligence, it was easy for the lawyers to identify risks associated with hydro and thermal power plants than with the geothermal plants. Previous environmental audit reports played a key role in highlighting some of the environmental concerns associated with geothermal plants.

Potential environmental catastrophes can have a direct impact not only on the company image but on the share price, hence the emphasis on environmental risk assessment and emergency preparedness in the due diligence process. The some of the key areas assessed during the due diligence include type community complaints, environmental litigation in court, notices from the environment regulators, previous emergency situations, possibilities of material liabilities, contractual liabilities, correspondences with regulatory authorities, health and safety, insurance and general expenditure on environmental safety, risk management among others.

Geothermal Clean Development Mechanism (CDM) projects

A meeting of the framework convention on climate change in 1997 established the Kyoto protocol, which sets firm targets for green house gases emissions for developed countries. Also agreed at Kyoto is clean development mechanism (CDM) which allows developed countries to meet targets for reducing emissions by gaining certified credits from projects undertaken in developed countries. The twin objectives of CDM are emission reductions in developed countries and accelerated sustainable development in developing countries.

Geothermal projects are classified as potential CDM projects. Clean development mechanism is thus an impetus to adoption of geothermal energy in Kenya. However, to meet the CDM criteria, a project has to satisfy a number of requirements; such as environmental, technological among others. A successful project is one which links energy and socioeconomic aspects, meets needs, uses appropriate technology, is reliable, sustainable and economically viable. Olkaria II unit III is a classic Kenyan example of such. Currently, Olkaria II has an installed capacity of 70MW consisting of two units of 35MW each. The project has potential of an additional third unit of 35MW which will use the excess steam. The Unit III component of the project is expected to generate 125,000 tCO2-equivalent annually up to 2014and is expected to start generating CERs by October 2010.

Since the acceptance of the project by World Bank and UNFCCC as a potential CDM project in 2006, KenGen has been submitting environmental audit reports to the bank on an annual basis and has continued working on the social component of the project. Currently, an independent validator has been appointed to certify the emission reductions that will be generated from the project. Once again, all environmental audit reports of geothermal operations were collected for scrutiny. In order to submit sound CDM projects that can pass validation and verification processes, the evidence of continual improvement in the current project must be provided. Environmental auditing is expected to bring about continual improvement and KenGen hopes that the systematic improvement of environmental management of KenGen geothermal projects will be seen in the audit reports. Continual improvement can only be achieved through regular auditing and implementation of the mitigation.

Lessons learnt from the current geothermal CDM project must be incorporated in the project idea note (PIN) or project design document (PDD) of the future geothermal CDM projects. Lessons from environmental audits will also act as valuable source of information to guard against penalties of non-compliance with the monitoring and project performance requirements.

If a company has no robust environmental auditing systems of CDM projects in place, it will not meet the CDM requirements. Currently there is a need for capacity building in KenGen for monitoring and auditing CDM projects as the company plans to generate CERs from the proposed geothermal projects

Public accountability & enhance stakeholder relationship

The new geothermal expansion strategy will mean opening up of new areas with different environmental set-up from the Olkaria Geothermal project. The Company is more likely to meet more organized communities with different cultures and demands from the Maasais of Olkaria. The expansion of geothermal projects will increase interaction with these communities and the the public at large. Thus the enhanced environmental audits should start as soon as drilling works starts. The audits of the new projects should be flexible and dynamic and try as much as possible to collect new information, which is unique to the area other than assuming that the outcome will simply be the same as Olkaria geothermal project. If properly controlled, accountability will be enhanced and conflict with the local community reduced.

Review of the actual operating environmental performance of the plant in relation to its original design parameters.

As the geothermal power plant ages, the performance decreases and the environmental parameters as designed change. The environmental audits should assess the plants performance in the relation to the age and identify deviations from the original design parameters. Some of the environmental audit considerations at this stage should include inspection of the emergency management equipment, waste water facilities, plant efficiency and its ability to cope with the risks, environmental concerns arising from operation and maintenance of the plant, occupational health & safety of workers among others. The environmental audit should recommend energy efficiency, technology review and optimization of resources where necessary.

CONCLUSION

KenGen capacity expansion strategy will require proactive regulatory management of all aspects of geothermal development and especially environmental management. With the new regulatory management division and a well defined environmental section in place, the company will be able to provide leadership to the regulators and the relevant ministries. The company has already made a stride in improving its environmental management system by adopting the ISO 14001:2004 standards. As part of continual improvement process, all divisions will be expected to identity two best practices in environmental management to improve their procedures in bid to control significant aspects. An annual budget is provided for implementation and maintenance of the system.

Despite the fact that annual environmental audits is a mandatory legal requirement for companies, the pressure to do so is very low because the NEMA does not have manpower and capital to enforce the regulation. KenGen has taken a proactive role in engaging NEMA and other stakeholders in its environmental undertakings. This engagement has opened up channels of communication which will be important in implementation of future projects and developments of new environmental standards. KenGen also implements relevant environmental regulations as good environmental management practice.

Environmental audit is at a crucial stage of development as a disciple in Kenya and its future will be shaped by standards that environmental professionals will evolves. There is still need for capacity building for auditing geothermal projects especially where the audits are external (done by a third party who may not understand all the intricacies of geothermal operations). KenGen is expected to play a major role in opening up geothermal as a known and leading alternative source of energy.

STATUS AND STRATEGIC FRAMEWORK IN GEOTHERMAL DEVELOPMENT IN ETHIOPIA

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ABSTRACT

The significance of Geothermal Power within Ethiopia has long been recognized. Under a programme that began in 1969, geo-scientific studies have been conducted in a number of Ethiopian fields and over sixteen areas have been identified in the Ethiopian Rift Valley to have Geothermal Resources suitable for electricity generation. From these areas it is recognized that a total of about 5000 MWe geothermal energy could be developed. So far deep drilling has been undertaken in Aluto Langano (1982 to 1985) and Tendaho (1993 to 1998) and detailed surface exploration has been nearly completed in four other areas. A 7 .3 MWe net capacity pilot plant has been installed at Aluto, currently generating about 5MWe. Feasibility study for the expansion of the Aluto Langano Geothermal power has been recently completed with the Japanese Overseas Development Assisstance. The study indicated expansion of the Aluto Geothermal power to additional 35MWe is feasible.