REGULATORY FRAMEWORKS AND THEIR IMPLICATIONS IN GEOTHERMAL DEVELOPMENT PROJECTS - THE CASE OF KENYA.

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ABSTRACT

In Kenya, several Acts of Parliament regulate and guide use of geothermal and other natural resources in a sustainable way. The laws that deal specifically with geothermal development are Environmental Management and Co-ordination Act of 1999 (EMCA 1999) and the Geothermal Resource Act of 1982 and its supplementary legislation of 1990. Other regulations do not refer specifically to geothermal development but, due to their implications, affect geothermal development at various stages in various ways. These include Energy Act of 2006, Wildlife Conservation and Management Act, Kenya Forest Act of 2005, Occupational Health and Safety Act of 2007, Public Health Act, Local Government Act, Water Act of 2002 and Physical Planning Act of 1999. Geothermal development is also guided by World Bank environmental and social safeguard policies such as the Operation Procedures on environmental assessment, natural habitats, indigenous people and involuntary resettlement. In addition, Kenya is a signatory to various international treaties and protocols which dictate environmental management approaches. Some of these treaties/conventions include the Ramsar Convention, 1994 Convention on biological diversity, Kyoto protocol to the United Nations Framework Convention on Climate Change and Vienna Convention on the protection of ozone layer among others. Presented in this paper are the significant pieces of environmental legislation necessary to fast-track geothermal development in Kenya.

Key words: Environmental legislations, safeguard policies, conventions.

INTRODUCTION

Geothermal energy is considered as a clean, safe, renewable, sustainable and environmentally friendly benign source with opportunities for carbon trading. Further to being indigenous source of energy, it generates continuous and reliable baseload power and offers modular incremental development to remote sites. Though the initial capital needed for development of a geothermal power plant is high, the operation and maintenance costs are low compared to other energy sources.

In Kenya, power demand exceeds the supply, and the current demand growth is 8%. The Kenyan rift is endowed with vast resource of geothermal exceeding 7,000 MWe (Simiyu, 2010), and capable of meeting the electricity demand in Kenya for the next 20 years. Currently, only 202 MWe has been harnessed at Olkaria field with Kenya Electricity Generating Company generating 150 MWe, Orpower 48 MWe and Oserian 4 MWe. The Least Cost Power Development Plan (2008-2028) prepared by the Government of Kenya indicates that geothermal plants have the lowest unit cost and therefore suitable for base load and thus, recommended for additional expansion. In view of meeting 2030 vision, the Kenyan government has recognized the importance and reliability of geothermal energy, and plans to increase the power to 1500 MWe by 2020 and to 4000 MWe by 2030 (Simiyu, 2010).

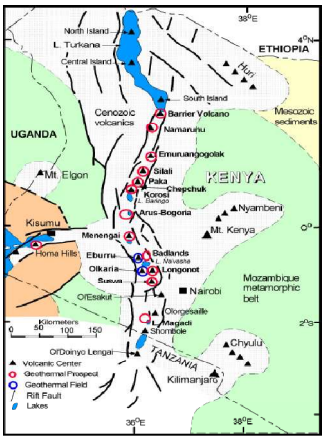

Figure 1: Geothermal fields in Kenya

There are about 14 geothermal fields/prospects located in the Kenyan rift (Mwangi, 2006). The prospects from south to north are Lake Magadi, Suswa, Longonot, Olkaria, Eburru, Badlands, Menengai, Arus Bogoria, Lake Baringo, Korosi, Paka, Silali, Emuruangogolak, Namarunu and Barrier (Simiyu, 2010) as indicated in figure 1. Out of these fields, it's only Olkaria that has been developed. The other fields are at various exploration stages ranging from reconnaissance studies to advanced surface exploration and Eburru field has had exploration wells drilled

Majority of these geothermal fields are located in remote scenic, wild and protected areas such as in national parks, game sanctuary, forest reserves and ramsar sites. Part of the greater Olkaria geothermal field is located inside Hell's Gate National Park. The park was gazetted in 1984, after development of the 45 MWe Olkaria I power station in 1981. Olkaria field has been developed by the Kenya Electricity Generating Company (having developed Olkaria I, II and now in the progress of developing Olkaria IV) and Orpower (developed Olkaria III). Apart from Olkaria IV which is located in a private land, Olkaria I, II and III sub-fields are all located within a national park. The field is also situated near

Lake Naivasha which is a ramsar site and near flower farms. Hence there is need for sound legal and regulatory framework.

It is imperative to comply with environmental legislations at the various phases of geothermal development including exploration, drilling, power plant construction, operations and decommissioning. Failure to adhere to these legislations at any stage of development may lead to delays in the project implementation, adverse financial implications or even abandonment of the project. Hence it is of essence to understand the necessary environmental legislations in relation to geothermal development particularly in Kenya.

LEGISLATIVE FRAMEWORK FOR GEOTHERMAL DEVELOPMENT

There are more than 77 statutes in Kenya which relate to environment. The paper summarizes key environmental legislative requirements for a geothermal project in the country. For ease of discussion, these legislative requirements have been divided into three major parts namely Kenya environmental legislation, World Bank safeguard policies and relevant international conventions and treaties.

KENYA ENVIRONMENTAL LEGISLATION

In Kenya, several Acts of Parliament regulate and guide use of geothermal and other natural resources in a sustainable manner. The laws that deal specifically with geothermal development are Environmental Management and Co-ordination Act of 1999 (EMCA 1999) and the Geothermal Resource Act of 1982 and its supplementary legislation of 1990. Other regulations do not refer specifically to geothermal development but, due to their implications, affect geothermal development at various stages in various ways.

Environmental Management and Co-ordination Act of 1999 (EMCA 1999)

With the enactment of the environmental management and Co-ordination Bill in December 1999, the institutional framework for environmental management was strengthened. The Environmental Management and Co-ordination Act (EMCA) of 1999 provided for the establishment of an environment agency known as National Environment and Management Authority (NEMA) which has been operational since 2002. The authority has been mandated to supervise and coordinate all environmental activities within the country and is the principal instrument of the government in implementation of all policies relating to the environment.

EMCA 1999 supersedes all other environmental legislations and provides "for the establishment of an appropriate legal and institutional framework for the management of the environment". The Act governs Environmental Impact Assessment (EIA) studies and the second schedule of the Act lists project that require EIA studies. More information concerning NEMA environmental regulations are contained in publications by republic of Kenya (1999 and 2003).

The Environmental (Impact Assessment and Audit) Regulations 2003: The environmental Impact Assessment (EIA) is a critical examination of the effects of a project on the environment. The goal of an EIA is to ensure that decisions on proposed projects and activities are environmentally sustainable. Environmental Audit (EA) is the systematic documentation, periodic and objective evaluation of activities and processes of an ongoing project. The goal of EA is to establish if proponents are complying with environmental requirements and enforcing legislation. The purpose of EA is to determine the extent to which the activities and programs conform to the approved environmental management plan. An initial environmental audit and a control audit are conducted by a qualified and authorized environmental auditor or environmental inspector who is an expert or a firm of experts registered by the Authority.

Environmental Management and Co-ordination (Waste Management) Regulations 2006: These regulations outline requirements for handling, storing, transporting and treatment/disposal of all waste categories including industrial waste, hazardous and toxic waste, pesticides and toxic substances, biomedical wastes and radioactive substances.

Environmental Management and Co-ordination (Water Quality) Regulations 2006: The regulations provide for the protection of lakes, rivers, streams, springs, wells and other water sources. The objective of the regulations is to protect human health and the environment. The regulations also provide guidelines and standards for discharge of poisons, toxins, noxious, radioactive waste or other pollutants into the aquatic environment.

Environmental Management and Co-ordination (Controlled Substances) Regulations 2007 (Legal Notice No. 73 of 2007): The Controlled Substances Regulations defines controlled substances and provides guidance on how to handle them. These regulations make it mandatory for industries and other stakeholders in ozone depleting substances trade to obtain a licence to import these substances. Under these regulations, NEMA will be publishing a list of controlled substances and the quantities of all controlled substances imported or exported

within a particular. The list will also indicate all persons holding licenses to import or export controlled substances, with their annual permitted allocations.

Environmental Management and Co-ordination, Conservation of Biological Diversity (BD) Regulations 2006: These regulations apply to conservation of biodiversity which includes conservation of threatened species, inventory and monitoring of BD and protection of environmentally significant areas, access to genetic resources, benefit sharing and offences and penalties.

Kenya has a large diversity of ecological zones and habitats including lowland and mountain forests, wooded and open grasslands, semi-arid scrubland, dry woodlands, inland aquatic, and coastal and marine ecosystems. In addition, a total of 467 lake and wetland habitats are estimated to cover 2.5% of the territory (KPLC, 2010). In order to preserve the country's wildlife, about 8% of Kenya's land area is currently under protection.

Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution Control) Regulations 2009: This law has given general prohibitions on excessive vibrations, and permissible noise levels. It gives provision related to noise from certain sources such as from motor vehicle, construction at night and noise, excessive vibrations from construction, demolition, mining or quarrying sites.

Environmental Management and Co-ordination (Wetlands, Rivers Banks, Lake Shores and Sea Shore Management) Regulations 2009: These regulations include management of wetlands, wetland resources, river banks, lake shores and sea shores.

Environmental Management and Co-ordination (Fossil Fuel Emission Control) Regulations 2006: Apply to all internal combustion engine emission standards, emission inspections, the power of emission inspectors, fuel catalysts, licensing to treat fuel, cost of clearing pollution and partnership to control fossil fuel emissions used by the proponent.

Geothermal Resources Act of 1982 and its supplementary Legislation of 1990

The Act focuses on the drilling and licensing of geothermal wells while taking into consideration the need to dispose the waste products from the geothermal processes appropriately. The regulations stipulate the procedures to be followed by those who wish to explore, drill, extract and utilize geothermal resources.

The Act has provisions on authority for geothermal resources and states that all ownership of all geothermal resources under any land is vested with the Government. The minister for energy is responsible for declaring any area a geothermal resources area and grants the authority or licence to search for geothermal resources or to drill and extract geothermal resources and to do all that is necessary for the conduct of those operations.

Energy Act No. 12 of 2006

The Act establishes an energy regulatory commission, which is the main policy maker and enforcer in the energy sector. This commission among other things shall be responsible for issuing all the different licenses in the energy sector, prescribing the licensing processes, setting and enforcing energy policies, collecting and disseminating energy data and public education and enforcing energy conservation. With this act, all the different aspects of energy e.g. electricity, petroleum and renewable energy are brought under one ambit.

The Act prescribes the manner in which licences shall be obtained for generating, transmitting and distributing electricity. The licence is required if generation is more than 1MWe or the power requires a transmission system from the generation site to the consumption site or the power will be distributed to the public.

The Act in Section 67 establishes a rural electrification authority which is mandated to facilitate access to electricity in rural areas, promote development of renewable energy and levy a fee on all electricity sold for the rural electrification fund.

The Wildlife Conservation and Management Act, Cap 376

This Act consolidates and amends laws relating to the protection, conservation and management of wildlife in Kenya. The main objective is to ensure that wildlife are managed and conserved in a manner that yields optimum returns in terms of scientific, cultural, aesthetic and economic gains, while at the same time taking into account the varied forms of land use and the inter-relationship between wildlife and other land uses. The Act establishes the Kenya Wildlife Service (KWS) as the implementing agency. Under this Act, KWS and KenGen has a Memorandum of Understanding concerning use, management and conservation of Hell's Gate National Park.

The Kenya Forest Act 2005

The Kenya Forests Act, 2005, allows for the sustainable development of a forest in collaboration with institution. Part II (Administration) of the Act, Sec. 4(f) states that; 'The Kenya Forest Service shall collaborate with individuals and private and public research institutions in identifying research needs and applying research findings.'

The Occupational Safety and Health Act No. 15 of 2007

This Act applies to all workplaces where any person is at work, whether temporarily or permanently. The purpose of this Act is to secure the safety, health and welfare of persons at work, and protect persons other than persons at work against risks to safety and health out of, or in connection with, the activities of persons at work. The Act also provides for the establishment of the National Council for Occupational Safety and Health. Some of the areas addressed by the Act include machinery safety, chemical safety, health, safety and welfare special provision.

Public Health Act 1986 Cap 242

The Act regulates activities that may be detrimental to human health. Part IX section 115 of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires Local Authorities to take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable for injurious or dangerous to human health. Part XII, section 136, states that all collections of water, sewage, rubbish, refuse and other fluids which permit or facilitates the breeding or multiplication of pests shall be deemed nuisances and are liable to be dealt with in the matter provided by the Act.

3.8 Local Government Act (cap 265)

Section 163 (e) allows the County Council to prohibit all businesses, which may be or become a source of danger, discomfort, or annoyance due to their noxious nature through smoke, fumes, dust, noise, or vibrations. Section 165 allows the local authority to refuse to grant or renew any license which is empowered in this act or any other written law on the grounds that the activity does not conform to the requirements of any bylaws in force in the area of such local authority or the granting of the license would be contrary to the public interest.

3.9 The Water Act 2002

The Water Act 2002 provides the legal framework for the management, conservation, use and control of water resources and for the acquisition and regulation of right to use water in Kenya. It also provides for the regulation and management of water supply and sewerage services. In general, the Act gives provisions regarding ownership of water, institutional framework, national water resources, management strategy, requirement for permits, state schemes and community projects. Part IV of the Act addresses the issues of water supply and sewerage.

Part II section 18 of the Act provides for national monitoring and information systems on water resources. Sub-section 3 allows the Water Resources Management Authority to demand from any person or institution, specified information, documents, samples or materials on water resources. Under these rules, specific records may need to be kept by a factory operator and the information thereof furnished to the authority.

Section 73 of the Act allows a person with license (licensee) to supply water to make regulations for purposes of protecting against degradation of water sources. Section 75 and sub-section 1 allows the licensee to construct and maintain drains, sewers and other works for intercepting, treating or disposing of any foul water arising or flowing upon land for preventing pollution of water sources within his/her jurisdiction.

Physical Planning Act, 1999

This is the main Act that governs land planning and all proposed developments must be approved by the respective Local Authority and certificates of compliance issued accordingly. The Local Authorities are empowered under Section 29 of the Act to reserve and maintain all land planned for open spaces, parks, urban forests and green belts. The same section allows for the prohibition or control of the use and development of land and buildings in the interest of proper and orderly development of an area. Section 30 states that any person who carries out development without development permission will be required to restore the land to its original condition. The section also states that no other licensing authority shall grant license for commercial or

industrial use or occupation of any building without a development permission granted by the respective local authority.

WORLD BANK SAFEGUARD POLICIES

Besides the national legislations, there are guidelines that govern the development of geothermal resources and particularly those tied to conditions on funding geothermal projects. The World Bank has developed guidelines for pollution prevention and abatement measures as well as emission measures that are acceptable to the bank (World Bank Group, 1998)

Environmental Assessment (Operational Policy, OP 4.01)

The objective of this policy is to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and of their likely environmental impacts (World Bank, 1989). This policy is triggered if a project is likely to have potential (adverse) environmental risks and impacts on its area of influence. OP 4.01 covers impacts on the natural environment (air, water and land); human health and safety; physical cultural resources; and trans-boundary and global environment concerns.

Natural Habitats (Operational Policy, OP 4.04)

This policy recognizes that the conservation of natural habitats is essential to safeguard their unique biodiversity and to maintain environmental services and products for human society and for long-term sustainable development. The Bank therefore supports the protection, management, and restoration of natural habitats in its project financing, as well as policy dialogue and economic and sector work (World Bank, 1989). The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development.

This policy is triggered by any project (including any subproject under a sector investment or financial intermediary) with the potential to cause significant conversion (loss) or degradation of natural habitats, whether directly (through construction) or indirectly (through human activities induced by the project).

4.3 Indigenous Peoples (Operational Policy 4.10)

The objective of this policy is to ensure that the development process fosters full respect for the dignity, human rights, and cultural uniqueness of indigenous peoples. The policy ensures that adverse effects during the development process are avoided, or if not feasible, ensure that these are minimized, mitigated or compensated. The policy also ensures that indigenous peoples receive culturally appropriate and gender and inter-generationally inclusive social and economic benefits.

4.4 Involuntary Resettlement (Operational Policy 4.12)

The objective of this policy is to avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs. The policy is applied to assist displaced persons in improving their former living standards, income earning capacity, and production levels, or at least in restoring them and encourage community participation in planning and implementing resettlement. The policy also provides assistance to affected people regardless of the legality of land tenure (World Bank, 1990). The policy covers not only physical relocation, but any loss of land or other assets resulting in relocation or loss of shelter, loss of assets or access to assets, loss of income sources or means of livelihood, whether or not the affected people must move to another location. It also applies to the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.

RELEVANT INTERNATIONAL CONVENTIONS AND TREATIES

Kenya is a signatory to several international treaties and conventions that would need to be adhered to in implementing any geothermal project and are geared towards environmental protection and conservation. The most important treaties and conventions are hereby discussed.

The Ramsar Convention

The Ramsar Convention on Wetlands is primarily concerned with the conservation and Management of Wetlands and Kenya ratified the convention in June 1990. Wetlands are defined by the convention on Wetlands or the Ramsar Convention (1971) as: “Areas of marsh, fen, peat land or water, whether natural or artificial,

permanent or temporary with water that is static or flowing, fresh, brackish or salty, including areas of marine water the depth of which at low tide does not exceed six meters". Parties to the convention are also required to promote wise use of wetlands in their territories and to take measures for the conservation by establishing nature reserves in wetlands, whether they are included in the Ramsar list or not.

The 1994 Convention for Biological Diversity

The convention aims the conservation of biological diversity, the sustainable use of its components and fair and equitable sharing of the benefits arising out of the utilization of genetic resources. Following on from this Convention, and in accordance with the precautionary approach contained in Principle 15 of the Rio Declaration on Environment and Development, the *Biodiversity Protocol* contributes to ensuring an adequate level of protection in the field of the safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effect on the conservation and sustainable use of biological diversity, taking also into account risks to human health, and specifically focusing on transboundary movements.

The 1992 United Nations Framewok Convention on Climate Change (UNFCCC)

The UNFCCC has established an ultimate objective of stabilizing green house gases emissions at a level that would prevent anthropogenic interference with global climate. In order to achieve the convention's objectives, the *Kyoto Protocol* was drawn in 1997, where the developed nations agreed to limit their green house gases emissions to levels to 5% below 1990 levels by year 2012.

Vienna Convention for the Protection of the Ozone Layer.

Intergovernmental negotiations for an international agreement to phase out ozone depleting substances concluded in March 1985 with the adoption of the *Vienna Convention for the Protection of the Ozone Layer.* This Convention encourages intergovernmental cooperation on research, systematic observation of the ozone layer, monitoring of ChloroFluoroCarbons (CFC) production, and the exchange of information. The *Montreal Protocol on Substances that Deplete the Ozone Layer* was adopted in September 1987, and was intended to allow the revision of phase out schedules on the basis of periodic scientific and technological assessments. The Protocol was adjusted to accelerate the phase out schedules. It has since been amended to introduce other kinds of control measures and to add new controlled substances to the list.

Convention on the Conservation of Migratory Species of Wildlife Animals

Also known as *Bonn Convention* and is intended to ensure that migratory species of wild animals spelt out on appendix I and II to that convention are protected from extinction. The convention requires intergovernmental cooperation to ensure that the species are allowed to migrate as their nature and their habitat is preserved. The convention was adopted on 23rd June 1979 and came to force on 1st November 1983.

Convention on International Trade in Endangered Species

Came in force on 1st July 1975 after being adopted on3rd March1973.The Convention regulates international trade in wild plants and animals that are at risk of extinction as a result of trade. The convention seeks to control trade not only in live species but also in dead specimen and their derivatives.

United Nations Convention to Combat Desertification (UNCCD)

Kenya ratified the convention on 24th June 1997. The purpose of the convention is to address problem of land degradation by desertification and the impact of drought particularly in arid and dry semi-humid areas.

CONCLUSION

Kenya has not met its' energy requirements despite the vast geothermal resources in the country. Geothermal energy has numerous benefits as compared to other sources of energy and the Kenyan Government has considered geothermal power as the least-cost. As has been experienced, geothermal resource can coexist with other land uses and a clear illustration is Olkaria power station which has been operational since 1981 and is located within Hell's Gate National Park.

Most of the geothermal resources in Kenya are located in protected and sensitive areas. The country is rich in biodiversity and it's imperative to preserve and conserve the environment for sustainable development. Environmental legislations play a very important role in ensuring that geothermal resources are exploited in a sustainable manner, taking into consideration the environment and the future generations.

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