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2. Introduction

2.1 Background

Gulf Power Ltd. wishes to develop an 80MW medium speed diesel (MSD) power plant adjacent to the Nairobi – Mombasa highway in Athi River town in Machakos district. The power plant forms one component of the latest version of the 2010 – 2030 Least Cost Power Development Plan (LCPDP). The land on which the power plant is to be built is owned by the Kenya Power and Lighting Company Ltd. (KP&LC) and will be leased to Gulf Power Ltd. for a period of 20 years. The environmental and social aspects and impacts associated with the proposed power plant are being coordinated by Nutek Solutions Ltd. which is a National Environment Management Authority (NEMA) registered Firm of Experts. Nutek Solutions Ltd. was appointed by Gulf Power Ltd. to complete the Environmental and Social Impact Assessment (ESIA) Study and Environment and Social Impact Management Plan (ESIMP) for the necessary environmental authorizations in terms of the Environment Management and Coordination Act, 1999 (EMCA).

This report describes the ESIA phase for the Gulf Power 80MW MSD power plant and presents the ESIMP. Subsequently a full ESIA Study has been performed for this project in order to provide the necessary inputs for environmental authorization (EIA License). The proposed power plant has been the focus of specialist impact assessment studies undertaken for this report.

The NEMA has been identified as the lead agency for environmental authorization of the project. The NEMA reference number for the project is **NEMA/PR/5/2/6972**.

2.2 Contact details of the Proponent

Project Proponent:

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2.3 Motivation for the project

The Energy Sector policy is defined by the Sessional Paper No. 4 on Energy approved by Parliament in 2004. The objectives of the policy are the enhancement of the legal, regulatory and institutional framework of the sector in order to create both consumer and investor confidence and provision of adequate cost effective supply of energy to meet development needs while protecting the environment. The culmination of Sessional Paper No. 4 resulted in the enactment of the Energy Act, 2006 which is the principal act that is used to regulate the energy sector in Kenya.

In order to provide cost effective energy sources to consumers in Kenya, the Ministry of Energy together with parastatals in the energy sector developed an energy blueprint known as the Least Cost Power Development Plan (LCPDP). Every year, an update of the Least Cost Power Development Plan ("LCPDP") for a twenty year planning is carried out. The last update was completed in March 2008 and covers the period 2009 to 2029. During this period Kenya's maximum demand for interconnected electricity is projected to increase from 1,172 MW to 8183 MW and the corresponding energy demand will rise from 6,928 GWh to 52,623 GWh. To satisfy this increase, generating capacity will have to increase from 1,317 MW to 8,817 MW. This will be achieved through a combination of geothermal, diesel, coal and hydroelectric generating stations and imports from neighboring countries, Ethiopia, Uganda and Tanzania.

Subsequently the proposed 80MW MSD power plant which is included in the LCPDP aims to increase the availability of electricity to Kenya's national grid. The high level of economic growth predicted in Kenya's Vision 2030 point towards capacity of the electric power generation system being outstripped by demand if urgent measures are not undertaken to develop cost effective energy generation. Kenya relies heavily on hydroelectric power generation which is dependent on favorable climatic conditions to fill up the dams. The electricity shortages experienced due to adverse climatic conditions recently placed pressure on petroleum supplies due to the addition of emergency power generation using expensive diesel generators.

This had an adverse impact on the overall cost of electricity to consumers resulting in higher uncompetitive prices of goods and services emanating from Kenya for the local and international market.

It is in terms of this background that the proposal to construct an 80MW MSD power plant in Athi River is presented.

2.4 Legislative requirements

A list of legislation that is being considered for this project is shown in section 7 of the ESIA Study. Key legislation applicable to this project is discussed below.

2.4.1 ESIA requirements

The Proponent (Gulf Power Ltd.) has appointed Nutek Solutions Ltd. as the Firm of Experts for the project in terms of the EIA Regulations of 2003. Nutek Solutions Ltd. is producing the ESIA/ESIMP report in accordance with Rule 11 – 23 of the Environment (Impact Assessment and Audit) Regulations 2003.

In January 2010, the KP&LC made an application to undertake an environment project report (EPR) study to NEMA, the lead agency responsible for environmental authorization of this project. The NEMA file reference number for the power plant was given as NEMA/PR/5/2/6972. The Energy Regulatory Commission (ERC) will provide input to the NEMA on the authorization of this project.

2.5 Overview of the study area

The study area falls within the Mavoko Municipal Council in Machakos district which lies within Eastern Province. The proposed project site is about 700m before the Stony Athi River crossing with the main Nairobi – Mombasa highway on the right hand side of the highway.

2.6 Overview of the ESIA process

The ESIA report is being undertaken in two phases:

- Scoping (an environmental project report (EPR) submitted to NEMA by the KP&LC in January 2010); and
- A detailed assessment (the subject of this ESIA report).

The EPR was made available for comment to authorities and other interested and affected parties (IAPs), and the final EPR was submitted to the NEMA for approval. In accordance with Rule 10 of Legal Notice 101: Environmental (Impact Assessment and Audit) Regulations 2003, the NEMA instructed KP&LC to conduct a full ESIA Study which is presented in this report.

Consequently an application for approval was made to the NEMA on February 17th, 2010 for terms of reference to undertake a full ESIA Study. NEMA acknowledged and approved the terms of reference for the full ESIA Study on February 26th, 2010 and formed the basis of environmental investigations and subsequently this report.

This ESIA report will be made available to the authorities and to the public for their comment. Comments received after completion of the public/stakeholder consultation period will be incorporated into the ESIA Study. Once the final ESIA report has been drafted, it will be submitted to the NEMA for their authorization before the development can proceed.

2.7 Terms of reference (TOR) for the ESIA Study

The TOR for the full ESIA Study was aligned with those indicated in the Second Schedule of the Environmental (Impact Assessment and Audit) Regulations, 2003. Subsequently the TOR for the full ESIA Study included:

- Conduct an ESIA to comply with the requirements of EMCA and its subsidiary legislation on the proposed 80MW power plant;
- Compile a background information document (BID) on the entire project for the public/stakeholders;
- Undertake public involvement activities for the ESIA phase of the project including interactions with key authorities;
- Arrange and facilitate a public open day/public meeting to provide the stakeholders sufficient opportunity to raise their issues or concerns;
- Compile the draft and final ESIA reports;
- Commission specialist investigations into key issues;
- Compile the final ESIA/ESIMP report.

2.8 Purpose of the ESIA phase

The purpose of the ESIA phase is to:

- Provide the rationale for selection of the power plant location.
- Produce the ESIA report based on the proposed power plant location.

2.9 Detailed specialist studies

The TOR for the specialist studies is shown in the table below.

Specialist study	Summarized specialist investigation
Hydrogeology, geology and soils	<ul style="list-style-type: none"> • Identify geological formations underlying the site using geological maps. • Identify regional groundwater data using hydrogeological maps and other existing data. • Identify soil types within the project area. • Assess the potential impact of surface and sub-surface soil contamination during the construction and

Specialist study	Summarized specialist investigation
	<p>operational phases of the project.</p> <ul style="list-style-type: none"> • Assess groundwater potential and aquifers, their vulnerability, potential impacts and aquifer protection requirements. • Recommend measures to mitigate negative impacts on groundwater resources.
Ecology	<ul style="list-style-type: none"> • Describe the structural characteristics of the plant communities. • Provide species composition of each distinct vegetation community. • Identify Red Data flora and fauna species, and plants of medicinal value. • Identify exotic invader species. • Identify ecologically sensitive zones. • Describe levels of disturbance on the habitats in relation to human impacts on them. • Comment on the conservation status and value of the proposed development sites in the context of the area. • Identify and assess the impacts of the proposed development and provide management recommendations including future monitoring requirements if required. • Where necessary, recommend strategies for the relocation and protection of fauna and flora. • Provide recommendations for the rehabilitation of the area following construction, and the implementation of an alien invasive control program.
Socio-economics	<ul style="list-style-type: none"> • Compile baseline information on the economic activities in the surrounds of the proposed development. • Assess the opportunities and constraints presented by the proposed development for the local community. • Identify measures to avoid and minimize negative impacts and enhance benefits of the proposed development. • Assess expected future social developments and/or changes in the receiving human environment. • Identify and characterize potential social impacts for construction, operation and closure. • Identify and assess potential cumulative impacts on the human environment • Recommend measures to mitigate negative impacts and enhance positive impacts.

Specialist study	Summarized specialist investigation
Archeology and cultural heritage	<ul style="list-style-type: none"> • Undertake an archeological and cultural heritage assessment within the study area. • Develop an understanding of the likely archeological and cultural heritage resources that may be found on the basis of a literature review of historical activities in the area. • Detail the likelihood of archeological and cultural heritage resources being present in the area on the basis of the natural setting and suitability for past habitation and/or use. • Following a visit to site and discussions with affected communities, identify and map all cultural heritage resources in the area, including graves. • Assess the impact of development on such heritage resources. • Provide management measures for mitigation of any adverse effects on archeological and cultural resources during and after the completion of the proposed development.
Air quality	<ul style="list-style-type: none"> • Undertake baseline ambient air quality sampling and analysis; • Using internationally recognized software, carry out air dispersion modeling to predict the ground level concentration of SO_x, NO_x, PM₁₀ and PM_{2.5}. • Propose mitigation measures where predicted impacts exceed the EC Directive 2008/50/EC on ambient air quality.
Noise quality	<ul style="list-style-type: none"> • Undertake nocturnal and diurnal noise and vibration baseline survey. • Construct baseline noise contour maps showing the equivalent sound levels following the noise level survey. • Propose noise reduction measures to be in compliance with Kenyan legislation on noise as well as international guidelines.
Traffic assessment	<ul style="list-style-type: none"> • Undertake a baseline traffic count for the Nairobi – Mombasa highway near the power plant project site. • Discuss the pre-construction, construction and operational phase traffic impacts associated with the proposed project. • Propose requirements for movement of seven generators-engines from the port of Mombasa to the power plant site. • Propose mitigation measures for any adverse traffic impacts that could potentially arise from the pre-construction, construction and operational phases of

Specialist study	Summarized specialist investigation
	the project respectively.
Land use and future planning	<ul style="list-style-type: none"> • Acquire the latest versions of part development plans, structure plans, land use plans for the Mavoko area and plots surrounding the power plant. • Discuss the current and future land uses in the Mavoko area. • Undertake consultation meetings with the planning department of the Mavoko Municipal Council on development permissions process for the power plant • Propose any mitigation measures on land use and future planning.

2.10 Report structure

This ESIA Study for the proposed 80MW MSD power plant has been laid out as follows:

- Section 1: Executive Summary
- Section 2: Introduction
- Section 3: Methodology for the ESIA Study
- Section 4: Project Objectives
- Section 5: Project Alternatives
- Section 6: Project Description
- Section 7: Environmental Legislative and Regulatory Framework
- Section 8: Construction HSE Plan
- Section 9: Environmental and Socio-economic baseline
- Section 10: Technology, Procedures and Processes
- Section 11: Construction Processes and Materials
- Section 12: Products, By-products and Wastes
- Section 13: Environment and Social Impact Assessment
- Section 14: Environment and Social Management Plan
- Section 15: Incident Prevention and Hazard Communication Plan
- Section 16: Health Hazard Prevention and Security
- Section 17: Gaps in Knowledge and Uncertainties Encountered
- Section 18: Conclusions