

*Scoping Report and TOR for the Proposed Kisumu-Lessos-Olkaria  
Transmission Line Upgrading Project, July 2009*

**Table Potential Impacts and Proposed Mitigation Measures**

<b>Potential Positive/Negative Impacts</b>	<b>Proposed Outline of Mitigation Measures/EMP</b>
Impacts of Land Acquisition & Resettlement during Planning	<ul style="list-style-type: none"> <li>- Alternative consideration of the RoW (Alternative 1 &amp; 2)</li> <li>- Minor diversion of the RoW to minimise the impacts of resettlement</li> <li>- Appropriate compensation for land and resettlement at the replacement cost if any</li> </ul>
Impacts on the Hell's Gate National Park during Construction and Operation	<ul style="list-style-type: none"> <li>- Minor diversion of the RoW to minimise the disturbances in fauna &amp; flora in the National Park.</li> <li>- Appropriate planning to minimise unnecessary vegetation clearance including herbicide management</li> <li>- Provide environmental education to workers to prevent from poaching wildlife or cutting trees</li> </ul>
Impacts on Forests during Construction and Operation	<ul style="list-style-type: none"> <li>- Consideration of alternative alignment (Alternative 1 &amp; 2)</li> <li>- Minor diversion of the RoW to minimise the disturbances in fauna &amp; flora in forests.</li> <li>- Appropriate compensation (e.g. Conservation Fee) for compensation planting in consultation with relevant authorities such as KFS &amp; KWS.</li> <li>- Appropriate planning to minimise unnecessary vegetation clearance including herbicide management</li> <li>- Provide environmental education to workers to prevent from poaching wildlife or cutting trees</li> </ul>
Impact on Soil Erosion during Construction and Operation	<ul style="list-style-type: none"> <li>- Appropriate planning to minimise unnecessary excavations and vegetation clearance</li> <li>- Provision of vegetation (e.g. suitable sediment binding grasses)</li> <li>- Excavation and other earth works to be carried out during the dry season</li> <li>- Excess loose earth to be disposed/stabilised on site before the onset of the rains</li> <li>- Use of appropriately managed quarries, borrow pits</li> </ul>
Impacts on Landscape during Construction and Operation	Minor diversion of the RoW to minimise the impacts of landscape in the tourist/scenic sites by the field investigation.
Archaeological, Cultural and Historical Sites during Construction	<ul style="list-style-type: none"> <li>- Minor diversion of the RoW to minimise the impacts of archaeological, cultural and historical sites by the field investigation.</li> </ul>
Noise/Vibration during Construction	<ul style="list-style-type: none"> <li>- Avoid night time construction</li> <li>- Machinery and vehicles will be well maintained to keep noise at minimum.</li> <li>- Appropriate maintenance of the transmission lines</li> </ul>
Health and Safety Impact during Construction and Operation	<ul style="list-style-type: none"> <li>- Provision of health and safety education to workers and local residents</li> <li>- Provision of health and safety clothes and equipment to workers</li> <li>- Prohibit local residents from living under the transmission line corridor</li> <li>- All towers will be fitted with warning signs and anti-climbing devices.</li> </ul>
Impact on Birds during Operation	<ul style="list-style-type: none"> <li>- Provide a precautionary measure be taken near wetland and lake areas to reduce the risk for bird collision/ electrocution, such as a use of reflectors placed at intervals</li> </ul>
Air Pollution during Construction	<ul style="list-style-type: none"> <li>- Sprinkling water during the construction work to minimise dust at construction sites near villages.</li> <li>- Vehicles delivering materials shall be covered to reduce spills and dust</li> </ul>

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Potential Positive/Negative Impacts	Proposed Outline of Mitigation Measures/EMP
Waste Generation during Construction	- Proper waste management plan

### Conclusion and Recommendation

This project has many social & economic benefits nationally since it will boost the country's economic growth and more stable access to electricity for Kenya. However, potential for the project to cause adverse impacts on the local environment and society does exist. In order to realise maximum benefits from the project and safeguard the environment and local communities, careful consideration of the proposed project impacts on the environment and society should be undertaken and mitigation measures put in place in accordance with the proposed TOR of the ESIA. As such, the following recommendations are made:

- i. The significant identified issues/impacts should be studied and analysed further to determine their magnitude;
- ii. Appropriate mitigation measures to reduce/prevent impacts identified both for those considered significant and not significant should be identified in the proposed ESIA Study; and
- iii. An appropriate monitoring plan for all the adverse impacts identified should be developed. Particularly, special attention shall be paid to the monitoring plan for soil erosion, vegetation clearing, accident & health and social issues such as resettlement if any. For this to be possible, the proposed ESIA Study should establish the existing baseline conditions for the parameters under investigation, frequency, budget and responsible organisations should be clearly indicated;
- iv. Develop EMP which will enhance the general management of the environmental issues that are related to the proposed project which could be identified during construction, operation and decommissioning phases

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## **1.0 PROJECT DESCRIPTION**

### **1.1 Background**

The Kenya Power and Lighting Company Limited (KPLC) customer base is expected to grow by 200,000 connections every year creating an annual demand growth of about 150 MW. Power generation has risen from 4,852GWh in 2003 to 5,195GWh in 2004, while maximum energy demand was projected at 5,641GWh in 2006 and 24,957GWh by the year 2026. The Kenya Electricity Generating Company Limited (Kengen) is currently able to generate about 80% of the total national capacity while independent power producers (IPPs) contribute the balance of 20%. Kengen is working towards enhancing its capacity through hydro-plants and geothermal sources among other initiatives, but additional sources would still be required to meet the anticipated growth in demand.

The Project Proponent hereinafter referred to as the 'Proponent', is proposing to establish to upgrade the Kisumu- Lessos- Olkaria transmission line within the existing KPLC line. Rapid economic growth and projections on increased demand for energy are among the justifications for upgrading and reinforcement of the electricity generation and distribution capacity. The Proponent takes the opportunity to invest in power distribution and contribute towards meeting the additional energy demand.

The proposed upgrading project of Kisumu –Lessos –Olkaria transmission lines traverse eight (8) districts of Naivasha, Nakuru, Kericho, Uasin Gishu, Baringo, Nandi, Nyando and Kisumu. Kisumu – Lessos is 132 kV lines is a single circuit which provides an alternate path from Lessos- Muhoroni- Kisumu to supply Kisumu area and improve reliability. Kisumu is located about 85 Km southwest of Lessos sub station. While Olkaria –Lessos 220kV line is a double- circuit which provides an alternative path from the Lessos – Juja Road 132 kV. This double – circuit lines do supply the Lessos area and improve reliability. Lessos is located approximately 170 km northwest of the Olkaria power plant and substation.

The Kenya Government policy on all new projects requires that an Environmental and Social Impact Assessment (ESIA) study be carried during the project planning phase in order to ensure that significant impacts on the environment are taken into consideration at the construction and operations stages. A power transmission line is one of the developments listed under the second schedule of the Environmental Management and Coordination Act (EMCA), 1999. As a preliminary stage of the full ESIA, this Scoping Report presents in broad terms the key environmental and social issues that are anticipated to arise from the proposed project. The Scoping Report which was presented

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in accordance with the Environmental (Impact Assessment and Audit) Regulations, June 2003 provides an outline action plan that would lay a basis for the development of a comprehensive Environmental Management Plan (EMP).

### **1.2 The Proponent**

The Proponent goes by the name of Kenya Power and Lighting Company (KPLC). The KPLC is expecting to receive financial assistance for the proposed Kisumu-Lessos-Olkaria transmission line upgrading project from Japan International Cooperation Agency (JICA). JICA has selected a consultant (Nippon Koei/ICNet/Tokyo Electric Power Services) who will be undertaking the Preparatory Survey on Kisumu-Lessos-Olkaria Transmission Line Upgrading Project in order to review the existing Feasibility Study and the preliminary EIA Study which were prepared by the US Trade and Development Agency in 2003 and to assist KPLC's ESIA implementation between June and Nov. 2009.

### **1.3 Project Objectives**

The principal objective of the project is to upgrade the 220kV and 132kV transmission system necessary to improve reliability and serve increasing load through the year 2022. Other objectives of the proposed project include the following:

- Design and construction of a power transmission line as per specifications provided by the electricity generation regulatory authorities (ERB, KPLC, Ministry of Energy, etc.),
- Observe sustainability through complying with all local laws among them those dealing with environmental protection, and
- Upon completion construction of the line it will be handed to KPLC.

### **1.4 Project Justification**

According to the Least Cost Power Development Plan, KPLC customer base is expected to grow by 200,000 connections every year creating an annual demand growth of about 150 MW. The national economic growth has also been on the upward trend - rising from 1.8% in 2003 to 5.8% in 2005. Significant effects of this growth are notable in agriculture, tourism and construction among others with a corresponding increase in power generation that rose from 4,852GWh in 2003 (with sales of 3,801GWh) to 5,195GWh in 2004 (sales of 4,090GWh). Maximum energy demand was projected at 5,641GWh in 2006 and 24,957GWh by the year 2026.

The current national distribution reaches only about 18% of the population with as low as 4% in the rural areas. Rural electrification programmes are among the targets of the Kenya Government's call for enhanced power generation and review of the distribution

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network. This would be approached from improvement and expansion of the transmission line network

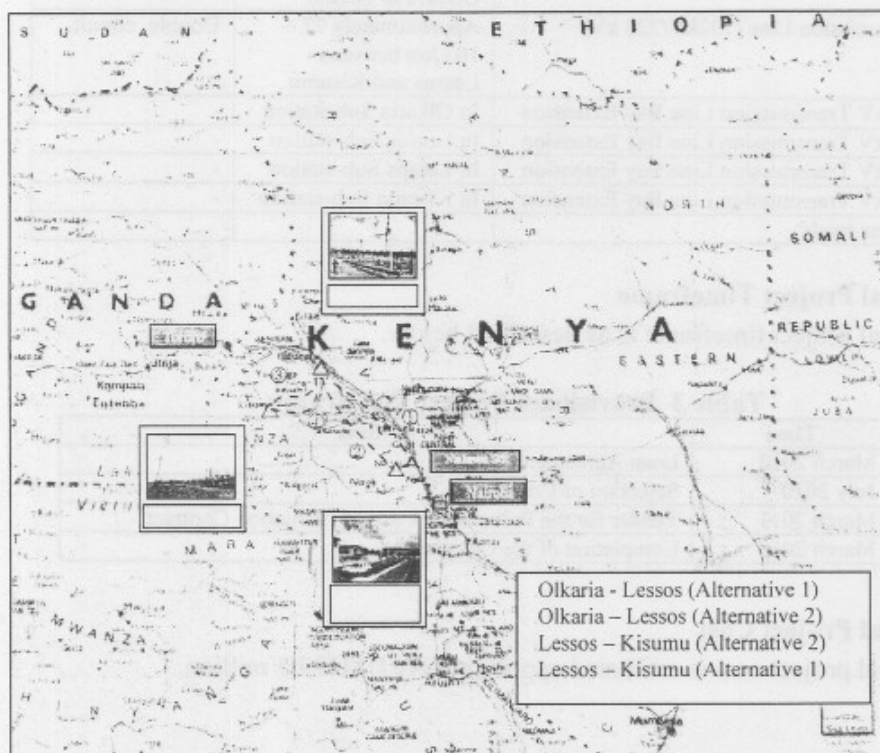
Power generated by KENGEN, IPPs and other smaller plants is sold to KPLC in bulk under a Power Purchase Agreement for distribution. The current transmission capacity comprises of 1,323 Km of 220 kV and 2,085 Km of 132 kV main transmission lines and also about 632 Km of 66 kV sub-transmission lines. Most of the transmission lines are old and need to be upgraded so as to meet the required standards.

The above overview is a strong justification for the proposal by Kisumu-Lessos-Olkaria transmission line upgrading project. However, environmental and social implications as outlined under this Scoping report would be studied in greater detail under a full environmental and social impact assessment, and integrated in the project design.

### 1.5 Project Scope

#### (1) Project Location

The Project Area is shown in Figure 1, and the length of the targeted transmission lines is approximately 255 km, namely approx. 170 km between Olkaria and Lessos and 85 km between Lessos and Kisumu as described in Table 1.



**Figure 1 Target Transmission Lines**

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**Table 1 Project Area**

No.	Route		Type	Length	Districts
1	Olkaria – Lessos	Alternative 1	Double circuit	Approximately 213 km	Naivasha District, Nakuru District, Baringo District, Uasin Gishu District and Nandi District
2		Alternative 2	Double circuit	Approximately 178 km	Naivasha District, Nakuru District, Kericho District and Nandi District
3	Lessos – Kisumu	Alternative 1	Single/Double circuit	Approximately 103 km	Kisumu District, Nyando District and Nandi District
4		Alternative 2	Single/Double circuit	Approximately 77 km	Kisumu District, Nyando District, and Nandi District

**(2) Project Components**

The project components are listed below. The components are preliminarily designed and have been reviewed by the JICA Study which is planned to be finalised by November 2009.

**Table 2 Project Components**

No.	Components	Location	Circuit Type
1	Transmission Line (220kV)	Approximately 178-213 km between Olkaria & Lessos	Double circuit
2	Transmission Line (132kV/220 kV)	Approximately 77 – 103 km between Lessos and Kisumu	Double circuit
3	220 kV Transmission Line Bay Extension	In Olkaria Sub-station	-
4	220 kV Transmission Line Bay Extension	In Lessos Sub-station	-
5	132 kV Transmission Line Bay Extension	In Lessos Sub-station	-
6	132 kV Transmission Line Bay Extension	In Kisumu Sub-station	-
7	Access roads		

**(3) Provisional Project Timeframe**

The provisional project timeframe is as described below.

**Table 3 Provisional Project Timeframe**

No.	Time	Actions
1	March 2010	Loan Agreement
2	July 2010	Selection of Consultant
3	March 2011	Tender for the Procurement and Construction Contract
4	March 2013	Completion of the Construction

**(4) Provisional Project Cost**

The provisional project cost is estimated approximately USD99.5 million.

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### (5) Provisional Staffing

The provisional staffing is estimated as described in the following table.

**Table 4 Provisional Staffing**

No.	Staffing	No of Staff
KPLC		
1	Project Manager	1
2	Transmission Engineer	4
3	Surveyor	8
Consultant		
4	Team Leader	1
5	Transmission Engineer	1
6	Sub-station Engineer	1
7	Civil Engineer	1
8	Communication Engineer	1
9	Environmental Engineer	1
Contractor		
10	Project Manager	1
11	Accountant	1
12	Transmission Engineer	4
13	Sub-station Engineer	1
14	Civil Engineer	1
15	Surveyor	10
16	Worker	200

### (6) Commissioning

The commissioning for the proposed transmission line is expected from April 2013, which is considered suitable because the construction of Bujagari dam in Uganda is planned to be completed before the commissioning of the proposed transmission line.

### (7) Area Affected by the Project

The area of immediate impact will be the line corridor Right-of-Way (ROW) for 220 kV lines will be 40 m in width by 178-213 km in length (roughly an area of 712-852 ha) from Olkaria to Lessos and for 312 kV lines will be 30 m in width by 77-85 km (roughly an area of 231-309 ha) from Lessos to Kisumu.

Along the corridor, appropriate clearance between conductors and vegetation/structures needs be maintained for the entire life of the transmission line. However, farming and grazing within the corridor is generally permitted.

As for the tower foundations, they will require a permanent area of approximately 6-8 m x 6-8 m (36-64 m<sup>2</sup>) based on a typical 220 kV line tower, and the land for the tower shall be acquired by the project proponent.

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## **2.0 ESIA SCOPING**

### **2.1 Scoping Framework**

The Kenyan Government policy on all new projects requires that an Environmental and Social Impact Assessment (ESIA) study be carried out at the project planning stages to ensure that significant impacts on the environment are taken into consideration. A power transmission line is one of those listed under the second schedule of EMCA, 1999.

The ESIA would establish the following:

- A description of the proposed project and sources of basic construction materials,
- Environmental baseline status of the project area, including the bio-physical environment, social and economic aspects,
- Environmental impact assessment report with recommended mitigation measures, and
- An environmental management and monitoring plan outline.

The project Proponent and beneficiaries have a responsibility to ensure that appropriate measures are taken during the design, construction, operation and decommissioning, as well as monitoring and continuous evaluation of the transmission line's sustainability. These measures may include development of an environmental management policy and constant improvement and review of transmission line operations with respect to environmental quality.

As a preliminary stage of the Environmental and Social Impact Assessment (ESIA), this Scoping Report presents in broad terms the key environmental and social issues that are anticipated to arise from the proposed project and would need further analysis. It has also identified environmental impacts that will arise from the project which can be easily mitigated.

The scoping process involved discussions with the project Proponent at the proposal stage, review of available documents and implementation plans, and a rapid assessment of the site and the surrounding areas. The public views were also obtained from local residents in the project site by a questionnaire survey during the site visit of KPLC staffs and JICA Study Team to capture their opinions regarding positive/negative impacts of proposed project.

A scoping exercise is the preliminary step in the process of conducting an Environmental and Social Assessment of a project of this nature. Scoping is aimed at assisting in the identification of pertinent issues and significant impacts that need to be addressed in the ESIA study. It helps in focusing the study to ensure that only critical issues that require