University of Nairobi

School of Engineering

Developing a GIS-Based Utility Management System for Kenya Power and Lighting Company Ltd.

CASE STUDY: GITUAMBA AREA, RUAI WARD.

BY

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Abstract

The Kenya Power and Lighting Company Ltd (KPLC) is a limited liability company responsible for the transmission, distribution and retail of electricity throughout Kenya. In its endeavor to provide every citizen with power it has put up programs to take power right at the door steps of the customers. These include the rural electrification program and the new 'Umeme Pamoja' campaign. For a country to successively make major positive transition in development, it must be having efficient, reliable, vast and environment friendly sources of energy.

In Kenya Power and Lighting Company utility management is a highly variable entity. In the power industry assets range from turbines in the generation stations, electric power lines, transformers, feeders to electric meters at the consumer's house. Management of such calls for a system that is able to handle spatially related information with high precision thus the need for GIS technology in utility management.

The Frequent vandalism of the company's expensive appliances is posing a major challenge to the company, amidst rising expectation from its customers, shareholders and other stakeholders. The company's electrical data is stored in the form of analogue maps and commissioning reports found mainly in drawing offices with the two not being integrated into one system. With a fast growing industry, changes are experienced everyday through new customer connections, network maintenance and expansion. This presents a challenge as far as quick connection of new customers is concerned, quick response to electrical breakdowns, vandalized transformers and easy selection of short and economical routes for supply of electricity.

The methodology for the study involved scanning of the analogue maps, carrying out on-screen digitization and populating the geo-database. Key results included the ability to analyze the geo-database, to determine the most optimal manner to connect power to a new customer, planning for a power distribution network in a controlled development area, using the ArcGIS Network Analyst extension, to perform route analysis to find the best route so that the patrol vehicles can utilize the information to find the best way to respond in case of any interruptions of power at transformers (attempts of vandalisms).Using the information generated from the geodatabase, the operator can locate the nearest police station and contact it via phone requesting them to respond urgently.

This means that not only will the community benefit from quick connection of new meters, quick response to electrical breakdowns, reduced cases of vandalisms but also will have the mains repaired as fast possible to return the state of normalcy.