



AFRICAN POWERHOUSE

ERIC NYADIMO REPORTS ON THE FIRST POWER UTILITY IN AFRICA TO IMPLEMENT AN ASSET MANAGEMENT AND WORKFLOW GIS BASED ON THE ARCFM UT SYSTEM

Prior to the advent of reforms, the Uganda Power Sector was dominated by a public, vertically-integrated utility, the Uganda Electricity Board (UEB). This had both a regulatory role and monopoly status in generating, transmitting and distributing electric power in Uganda.

The liberalisation of the African Utility market resulted into changes in the structure of these utilities with the unbundling of state-owned companies into new entities. The Uganda Electricity Transmission Company Ltd. (UETCL) was one of the successors of UEB, the others being the Uganda Electricity Generation Company Ltd. (UEGCL), the Uganda Electricity Distribution Company Ltd. (UEDCL), the Electricity

Regulatory Authority and the Rural Electrification Authority (REA).

UETCL (www.uetcl.com) is responsible for the bulk purchase of electricity from generating companies and its sale to the distribution companies throughout Uganda. UETCL is also responsible for all exports and imports of electricity from and to Uganda and currently operates a 1,400-km network at two voltage levels: 132 kV and 66kV.

From analogue to digital

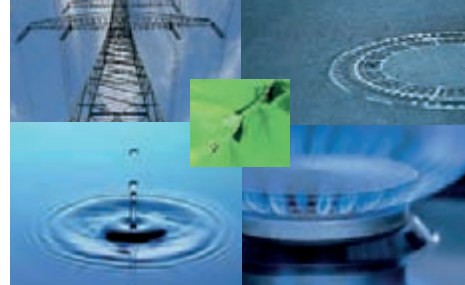
For a long time, UEB maintained its data in the form of paper maps and files stored in closets, cupboards and corridors. Some dates back to 1948 and is in poor physical condition due to wear-and-tear.

In order to improve its network documentation and asset management, UETCL reviewed the manner in which its utility data was being handled. As a result, it signed a contract in late 2008 with Esri East African business partner Geo-Information Communication Ltd., (GIC) of Ntinda, Uganda, to design, develop and implement a GIS based on Esri solutions. GIC contracted Oakar Services Ltd., (www.osl.co.ke), a geospatial solutions company based in Nairobi, Kenya, and the East Africa representative for AED-SICAD (www.aed-sicad.com) to develop the GIS element.

Through study visits to German and South African utilities, UETCL staff saw at first-hand how GIS was being used to improve service delivery. At the German Utility, Pfalzwerke (www.pfalzwerke.de) the UETCL staff were shown in detail how the locations of transmission poles were captured from orthophotos. Of special interest was how Pfalzwerke interfaced its GIS with SCADA, enabling it to gain a real-time overview of grid failures and affected customers. This enabled them to handle emergencies in a timely manner, thereby reducing the overall network downtime and improving efficiency.



GIS handover ceremony at UETCL From left: Stephan Löffler (AED-SICAD), Eric Nyadimo (Oakar Services), Amadra Ori-Okido (GIC), Alsen Habumugisha (Project Coordinator, UETCL) and W.K Kiryahika (UETCL Deputy CEO)



A 'first' for UETCL

In 2009, UETCL became the first African power utility company to introduce a GIS based on Esri's ArcGIS and AED SICAD's ArcFM UT. The GIS development focused on: System design and implementation; training and capacity building; data inventory and conversion; field data collection; and quality control.

The solution consisted of a computerised asset management and workflow, with critical data sources being the analogue maps that depict the transmission network as well as principal assets such as transformers and substations. Schematic diagrams for the power stations and transformers that existed in CAD format were converted into GIS, while GPS was used to collect coordinates for a pilot line considered for this project i.e. the Lugogo-Mutundwe-Kabulasoke-Nkongwe-Nkenda 132kV line. The GIS data collection also covered photographs of the network infrastructure which was considered crucial for asset management.

The developed system was deployed on a server to facilitate wider sharing of the data within the UETCL offices. The server runs Oracle Server as the RDBMS and ArcSDE as the gateway server for delivering spatial services and geodatabase capabilities for all components of the system including the ArcFM UT clients. The server also

runs a high processing power server with considerable memory and storage space to cater for UETCL's business requirements. The centralised GIS embodying standard technologies has many advantages and benefits.

Meeting targets

The decision to invest in a multi-purpose GIS will help UETCL meet its targets for system expansion; to store new and old network data, and to enhance data security. The GIS will also help to make best use of available office space and enhance efficiency thanks to improved data accessibility, analysis and integration.

UETCL plans to use the GIS to support decision-making on urgent tasks such as replacing old, wooden transmission poles in the northern and western parts of the country. These aged wooden structures are vulnerable to rotting during the rainy season and bush fires in the dry season. The GIS will also be used to support feasibility studies for the 400kV Karuma Interconnection; the 132kV Isimba Interconnection; the 400kV Ayago Interconnection; the 132kV Opuyo-Moroto, Mutundwe-Entebbe and Miram-Kabale lines, and the 220kV Masaka-Mutukula-Mwanza and Nkenda-Mpondwe-Beni priority projects.

While officiating at a workshop in Kampala in August, 2009, the UETCL Deputy CEO, Mr. W.K. Kiryahika said that the company had opted to adjust with changes in technology and noted that the GIS would provide value-for-money in support of the proposed grid expansion plans.

Because of this project, UETCL became the first African AED-SICAD customer to receive the Special Achievement in GIS (SAG) award presented during the Esri International User Conference held in San Diego last year... one that acknowledges the vision, leadership, hard work, and innovation of recipients in using Esri's GIS platform.

A growing market

The utility market in Africa, though still in its infancy, continues to grow, and many of its utilities have started adopting GIS technology with a focus on network documentation. The continued liberalisation of this sector will lead to an increased need to integrate information from many sources, both internal and external, into a common framework.

By using this common geographic language, utility managers will discover new insights that can be transformed into tangible business results such as lower costs, improved asset utilisation, and quicker customer hookup. In this context, emerging technologies such as cloud computing, location-based services, smart clients and intelligent GIS will unify information for utility executives, managers, and operators.

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www.osl.co.ke



From planning to field data capture and beyond, the GIS supports UETCL's drive for efficient network modernisation and expansion

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