Overview

Success Factors

Analysis Tools

Drivers

Benefits

The Challenge & the Future
Critical Success Factors

1. Reliability
   - Proper Asset Management
   - Proper Network Analysis & Planning
   - Proper Energy Billing and Accounting

2. Quality

3. Cost of supply

GIS
Drivers

- There is a need to enhance the capability of operational Information Systems, to facilitate the anticipated development of the power system networks
- Consolidate fundamental network objects into a simple network data model
- Establish a foundation on which a more complex network data model and more sophisticated tools can be built
The Problem

- Network data stored in multiple legacy systems
  - Scanned paper maps
  - CAD data
  - Mainframe tables
  - Outage management system
- Modelling tools require accurate up-to-date network asset data, electrical models will depend on this
- Re-drawing complex networks is time-consuming and costly
- Scope for introducing error increased
- Analysing complex networks becomes almost impossible
- Lumped loads

- Manually drawn schematic
- Increased scope for error
- Time consuming especially with complex networks
- Model in PowerFactory DigSilent
- Accuracy depends on the accuracy of the GIS data
Requirements for integration

Analysis of existing network

- Network capacity
- Weak point analysis

Network Planning

- Long term network planning and restructuring
- Loss reduction and optimization
- Reliability studies with link to maintenance strategies and asset management
- Protection coordination
- Stability and feasibility studies

- Network calculation as a background process
- Load results into GIS for analysis

- Export network data into a planning system
- Professional network planning within various calculation modules
Network Analysis Tools

- The Network topology and data from GIS
- Computerized Analysis Tool - Integration of Network Modelling Environment with Power Analysis Tool

Some Power Analysis Tools include:

- PowerFactory from DigSilent
- NEPLAN
- CYMDIST from CYME
- ETAP
- PSS Sincal
- Retic
- PowaMaster
Power Utility Applications in GIS

Network Analysis
- Single Line Diagram (SLD)
- Load Flow Analysis (Voltage drop/Loading)
- Contingency Analysis
- Switching Optimization
- Capacitor Placement
- Reliability Analysis

Electrical Design Manager
- Work Order Processing
- BoQ preparation

Other
- Energy Auditing
- Asset Management
PSS Sincal ISO-Diagram
Data Flow Diagram

- Voltage Drop Analysis
- Capacitor Placement
- Short Circuit Analysis
- Load Allocation
- Service Restoration
- Reliability Analysis
- Contingency Analysis

Compatible Format: ASCII, mxd, xml etc

Access Network data from GIS

Network Analysis in GIS

GIS Core
- Network Connectivity
- Network Asset details

DB

CyMe
ETAP
PSS SinCal
DigSilent

www.umeme.co.ug
Benefits

From GIS point of view
- More accurate data
- Provision of network data including basemap
- Data update/maintenance at one place only
- Flexible evaluation and display of calculation results (thematic maps)

From Network Calculation point of view
- Increased productivity - Substantial improvements in the planning process
- Cost cutting by data capturing and maintenance
- Access to maintained data with good quality
- Integration with the company wide data management (SCADA, Outage Management System, Metering Systems)

There is a great value added for all departments!
The Challenge

- Centralize the network asset information in one place (database - GIS)
- More research needed to integrate GIS into the existing systems
The Future

- In near future, GIS will be a powerful tool to restructure the power sector for making effective investment decisions.
- The most important usages of GIS in distribution system are:
  - Optimizing electric line routing
  - Suitable sites for locating new feeders
  - Optimal design and choice of substation location and capacity
  - Load distribution and load forecasting
  - Project costing and appraisal
Thank You