LESOTHO ELECTRICITY CORPORATION IMPLEMENTS SDI

Moving Mountains in Africa

There is general agreement that spatial data is key to sustainable resource management and overall economic development. A Spatial Data Infrastructure (SDI) in turn provides the underlying foundation for accessing and using spatial data in decision-making processes. The author shows how SDI is being utilised by the Lesotho Electricity Corporation so to assist in national sustainable development programmes.

The government of Lesotho, through its Ministry of Tourism, Environment and Culture has recognised that the interaction of environmental components and human behaviour in the biosphere are multifaceted. The resulting complex interfaces called for an interdisciplinary approach to managing both the impact made by humans on the environment and vice versa. The government has thus made efforts to explore SDI issues, not only within its own institutions but also in organisations such as the Lesotho Electricity Corporation (LEC). The issues involved concern developing technological scenarios for SDI developments and exploring SDI application models to support decision makers and stakeholders in getting appropriate and timely information about areas earmarked for sustainable development.

Lesotho Electricity Corporation

In the terms of the LEC Act of 1969, the Corporation is a vertically integrated public monopoly responsible for generation, transmission and distribution of electricity throughout the country. LEC is linked to major hydro-electric dam constructions. One is Africa's biggest water project: to reduce the ever-increasing water demands for the adjacent Rand area in South Africa, and for hydroelectric power generation in Lesotho proper, in co-operation with South African parties like ESKOM, the South African Electricity Company. The main objectives of LEC here are:

- to generate, transmit and distribute electricity; to establish, acquire, maintain and operate transmission lines and works for that purpose, and to acquire existing generating plants
- to extend electricity at minimum cost
- to conduct research, experiments or trials for the improvement of methods of generation, transmission, distribution or use of electricity.

The Board of Directors is the highest executive body of the LEC. The government of Lesotho, advised by the board, appoints the managing director who is responsible for the day-to-day running of the Corporation, assisted by the management team.

CART Technology

LEC has been undertaking many electrification projects to increase the customer base and extend electricity supply throughout the country. The technology currently employed by the LEC is the Computer Aided Reticulation of Townships system (CART), which is not very different from the SwedNet phased out as CART was introduced into the system not long ago. Areas are normally earmarked for community development projects, after which a GPS is used to find their coordinates. The intention is then to map the project areas using CART in conjunction with Bentley's MicroStation so as to put them on the map and identify specific households and buildings to be electrified. LEC also buys digital maps from the Department of Lands and Surveys. These maps are destined to plot the existing network at different voltage levels using MicroStation.

SDI Initiatives

The Lesotho Electricity Corporation intends to embark on a Statistical Metering Project to find a means of balancing energy supplied at bulk-supply level to that received and recorded at the distribution end of the business. The aim is to determine the current level of technical and non-technical losses in the network system. To allow continuous monitoring of system losses, a method will be found of geographically identifying areas of high non-technical loss and forming strategies to reduce this. The long-term objective is to reduce non-technical losses to 5%. This will be achieved through installation and subsequent monitoring of statistical meters at critical points of the electrical network as part of a broad revenue-protection strategy also encompassing other activities such as meter inspection surveys.

Statistical Meters

The installation of statistical meters is to be implemented in three phases. Phase 1 consists of the confirmation of identified critical network points, detailed planning of data required and systems to be used for analysis, and finalisation of the approach and methodology to be employed. Phase 2 will result in equipment acquisition and implementation of the project; Phase 3 will lead to analysis of the data and establishment of the means for continuous monitoring. Prepayment customers are being grouped according to their respective feeders for input into the system. Once the project is completed there should be no manual punching in of electricity meter readings onto spreadsheets and databases. This is meant to avoid errors by officers and any temptation to provide fiddled data. In this connection, there

will be optical-eye equipment for electronic data download.

Processing Software
Software will be Windows server-based. The use of voluminous spreadsheets will be avoided and all reports will be automated. The system will have user-defined passwords for different access levels and multiple users. This system will integrate both the prepayment and credit billing systems to calculate system losses. Lastly, data validation and verification will be built-in. There will be some stipulated required outputs at the end of the project, including establishment of a system to monitor system losses, provision of management tools for verifying statistical metering results, detailed management reporting mechanism and recommendations on strategies to deal with high-risk areas. The Statistical Metering System project is meant to take off by mid-2005.

Geographical Notes
The Kingdom of Lesotho is a mountainous country entirely surrounded by the Republic of South Africa. It covers an area of 30,350 square kilometres, making it one of the smallest countries in Africa. The country is divided into four major regions, the lowlands along the western plateau, the Senqu river valley, the foothills and the mountains. For the purpose of administration, the country is divided into ten districts. Climatic conditions are highly variable because of the topography. Average rainfall over the entire country is 750mm a year, the highlands receiving the highest 760mm, followed by the northern region, with 750mm; the southern region receives the lowest rainfall of 690mm. Temperatures in the lowlands vary from a maximum of 32 degrees Celsius in summer to a minimum of below –2 degrees Celsius in winter. The de jure population of Lesotho is estimated at two million, of which an estimated 30% live in the highlands, 20% in the foothills and the rest in lowlands, where the capital, Maseru, is situated.