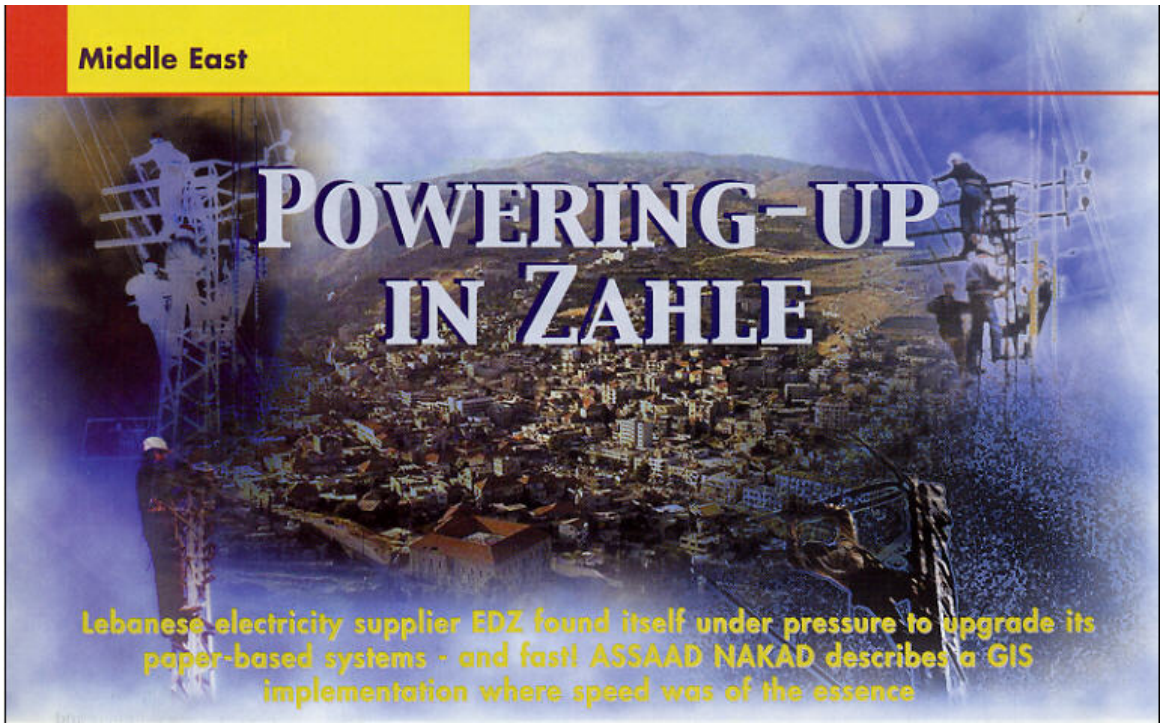


Electricité de Zahlé
GEOEurope Press Release - October 2000

Situated in the heart of Lebanon's fertile Beqaa valley, some 52 kms to the east of Beirut, Zahle is the administrative seat of the ***Mohafaza*** or governorate of Beqaa. Also known as ***Arouss El-Beqaa*** (the bride of the Beqaa), Zahle is an active tourist, cultural and commercial centre ... one noted for its healthy climate and good food.

EDZ (Electricité De Zahlé) has supplied power to the region under a government concession since 1927 and, today, serves some 34,000 customers in 17 municipalities and 21 cadastral zones - an area of approximately 230 km^2. Network capacity is rated at 138 MVA and, as with most rural areas, the 1,200 km distribution system is mostly overhead.

A recent modification to the concession - and one prompted by a worrying increase in the fraudulent extraction of power - was a requirement that EDZ upgrade its core paper-based systems to an advanced GIS-IT environment within a time-binding constraint of four months. Accordingly, and in June of last year, EDZ commissioned the Khatib & Alami Consolidated Engineering Company - a 1,000-strong enterprise based in Beirut - to manage an AM/ FM/GIS turnkey project based on ESRI's ArcInfo and ArcView GIS packages.

Despite the heavy workload and challenging timescale, a successful fast track project ensued under the direction of Michel Bridi. As well as his 25-strong K&A team, the development involved 40 EDZ staff and followed the classic route of a user-needs survey, requirement analysis, database design, data conversion, field survey, system acquisition, the development of five priority applications, training, and system installation, integration and deployment.

Overhead Lines in the Beqaa Valley

Each of these areas posed its own challenges in evolving what quickly became known as GISEZ. However, the system's ability to reflect business processes and gain rapid acceptance throughout the organization hinged on its five applications, each of which is discussed in more detail below.

Getting a grip on the business

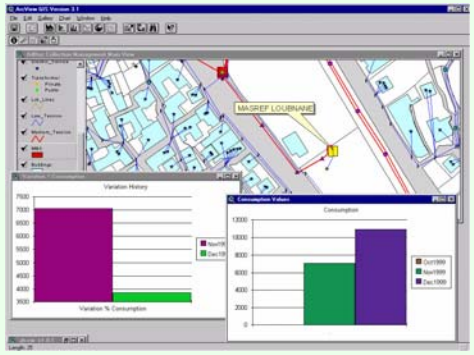
The ***Ad Hoc application*** comprises of a number of modules that generate statistics for managerial and technical purposes. It is most commonly employed to map power capacity and consumption relative to a number of variables. These statistics can be queried on a variety of levels, with percentage values shown for individual transformers, sets of transformers, feeders and groups of feeders, right up to the entire concession. Other uses for this application are to:

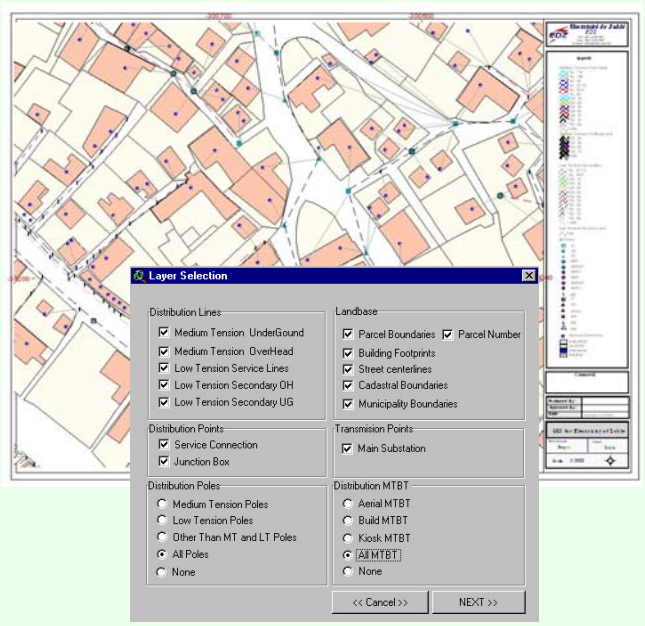
- Highlight mismatches between spatial and tabular entities. These are most commonly encountered where customers are mistakenly registered in municipalities other than those in which they actually reside. Similarly, the energy consumed in individual municipalities can be statistically determined
- Generate charts that reveal the usage of energy according to sector (comercial, industrial, residential, etc.)
- Identify customers by name, location, subscription number or customer-id, and also highlight the energy paths that link transformers to those customers
- Extract useful information about service connections (existing and spare capacity, conductor size, etc.) on request.

Monitoring the flow

The 'killer' application in the suite is undoubtedly ***Collection Management.*** This is primarily used to monitor energy flow across the network by comparing consumption rates at different check points. In other words it allows EDZ to calculate technical and non-technical losses based on installed meter readings and, in so doing, pinpoints the fraudulent tapping of power. Energy consumption can be reported

At three main user-requested levels: customer, transformer or feeder. Groups of customers can be sorted according to their KWH consumption ranges and additional flexibility allows the user to identify any of the above by spatial search or name/number selection.
This application also enables the user to study variations in consumption and produce sets of indices and charts.





The Collection Management 'killer' app (above) monitors energy flow across the network. Map production tools (right) offer wide choice

The application interfaces with EDZ's existing COBOL-based Customer Information and Billing Information systems and has an Arabic language interface to display customers' names. Other functions embodied in this application include:

- Historical charts for customers, municipalities and cadastral areas between billing periods. Variation charts can also be derived that point to abnormalities and irregularities in consumption.
- Listings of transformers with their respective revenues, technical and undefined energy losses. Tables depicting customers connected to each transformer can be prepared on request, as can visualizations of customer-transformer linkages.

From analogue to digital

The ***Map Product*** application replaces manual methods of standard map production. It allows the user to reproduce high quality color plots at up to A0 size for standard 1:500, 1:1000, 1:2000 and 1:5000 scale maps or for scale-independent data.

As well as normal reprographic functions, a layer selection dialog box gives more flexibility to the user to distinguish between themes of interest according to their plotting need. These layered themes include distribution lines, distribution points (devices), distribution poles, distribution MTBT (transformers), transmission points, and map base. Thereafter, geographic selection is performed by choosing from the index table, specifying a Cadastral Area, or zooming to the desired location.

This aspect of the system was kick-started by converting around 200 analogue maps at various sizes and scales. The task was undertaken by 15 people over a three-month period and resulted in a seamless base map complete with electrical coverages.

Advanced mapping

The ***Map Editor*** application goes beyond simple editing and drawing with modules that help preserve electrical consistency, enhance batch processing and automate some repetitive tasks.
Functions accommodated range from the individual and group creation /editing of layers, tolerances and symbols to query building and error checking; and from Quality Assurance routines to connectivity checking and batch conversion.

Go with the flow

A ***Distribution Operations and Distribution Load Flow*** (DistOps/DLF) application, developed by Miner & Miner has been integrated with GISEZ for planning and operational analysis purposes. Its specially-written DLF module extends analysis capabilities to the low voltage side of the network and can generate input files (MV and LV technical losses) for the Collection Management application.

Typical of analyses undertaken with DistOps/DLF are those that explore balanced and unbalanced system load-flows, including voltage drop; calculation of fault currents; generator starting voltage flicker, and the checking of protective devices.

Seven steps to heaven

GISEZ has, without doubt, prompted a paradigm shift in EDZ's daily operation and management style. The cost of the exercise (some US$300,000 before discounts) may not be inconsiderable, but it has positioned EDZ to meet the challenges of the 21st Century. In particular, it has furnished it with the ability to:
1. Deliver higher quality products and more accurately determine losses.
2. Apply fact-based management, thanks to more timely and accurate network data.
3. Boost productivity.
4. Improve coordination.
5. Make better decisions
6. Enhance service.
7. Make better use of assets.

Further development is in progress, the priority being to go on-line. A further phase envisages the integration of GISEZ with EDZ's SCADA (Supervisory Control and Data Acquisition) systems for even more timely fault detection and fraud prevention.

A GPS/GIS field maintenance system is also in the pipeline - all of which is set to position EDZ as one of the most efficient distributors of electricity in the Middle East.

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