



## Calculation of electricity networks the easy way

FICHTNER CONSULTING & IT (FCIT) presents a new product named GeoXtension Analyser (GX Analyser) for electricity network calculation. The options include network load assessment and short circuit calculation. The GX Analyser is unique in that it creates a simple user interface allowing calculations to be performed by personnel not specifically trained in the background of electrical engineering calculations. It also delivers exceptional calculation performance by use of a proven library resulting from years of academic research. This combination allows electricity distributors to comply with new network regulations in a most cost-effective way. The GX Analyser is a plugin to FCIT's GeoXtension product with its three-tier-architecture and web client, which is independent of proprietary GIS databases.

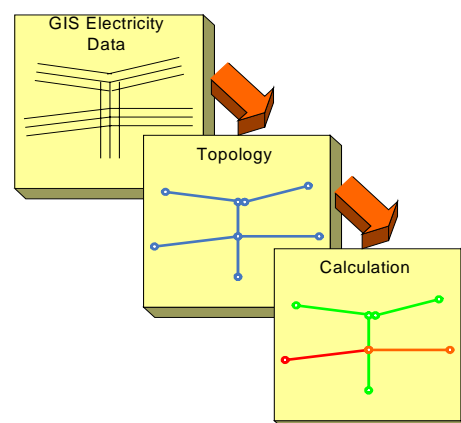
### Situation

With the geographical data of an electricity network comes the wish to use the investment in high quality data as efficiently as possible. Apart from GIS tasks and asset management it would be desirable to perform computations such as prediction of net load, short-circuit computations and others. These calculations are important not only in the design phase, but also in the operational mode of the network. These computational possibilities bring out the value hidden in the rich data your company has collected over the years.

Recently, regulators have also started demanding quick assessments of network load capacities and general states of the network. Typical traditional calculation programs could only perform a few assessments per day. Moreover, only expert network design engineers were able to carry out these calculations. To conform with regulations in a most cost-effective way, a different approach is needed. FCIT presents a solution that addresses these issues.

### Functionality

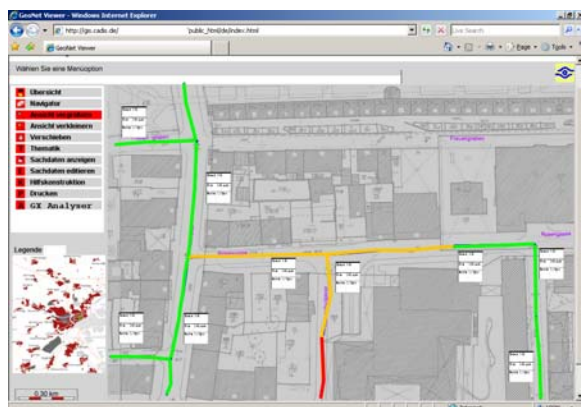
As a new plugin to GeoXtension, FCIT's standardized, open and configurable geodata solution, the GX Analyser is introduced. GeoXtension is the product giving access to geospatial data and topology, providing the spatial options of common database vendors, but without the need of locking up data in proprietary GIS databases. Its architecture is three-tier, the user interface existing of a web client. This brings all the advantages of a three-tier-architecture, among others no client side installation and a centralized application and database.



The GX Analyser is an electricity network calculation program based on an advanced computation library, developed on an algorithm with several years of academic research behind it. This algorithm is many times faster than comparable computation libraries on the market. Now, networks can be calculated and recalculated within seconds so that „what if“ scenario analyses can be performed.

In traditional calculation programs, the choice of algorithm and interpretation of results required specialist engineering knowledge. Multiple selectable algorithms were needed, because each algorithm had anomalous situations in which the computation would give nonsensical or inaccurate results. Since the new library uses a single algorithm that can handle these anomalies, there is no need for this selection process. This greatly simplifies the user interface to the calculation and makes it accessible to personnel with less specific knowledge.

The GeoXtension product in combination with the latest topological network libraries from database vendors make this functionality possible. The calculations are activated from the GeoXtension browser-based interface with an easy-to-understand menu dialog. A part of the electricity network is selected with a user-drawn polygon, or by indicating a starting point with a user-placed flag. The network is then traced to verify the user input and the active sub-network is highlighted.



After starting the calculation, results are immediately displayed in the map window with the familiar green-orange-red traffic light colors. Elements colored green indicate that the calculated current is far below the specified maximum, yellow indicates the current is still at a safe level, but over 80% of the maximum allowed, red means the current is surpassing the maximum. In this way, problem areas are immediately visible when navigating the map.

In addition to the coloring of the network, the calculated values are displayed as multi-line text labels in the map for a detailed look at the actual values. The map, including labels and colors can also be sent to a printer or plotter using the standard GeoXtension functionality.

After the initial calculation and the identification of problem areas, „what-if“ scenarios can be acted out by changing network parameters such as installing a higher capacity line or a greater transformer, and then recalculating to see the effect of the change. Due to the speedy recalculation, the effects are visible almost instantaneously.

## Benefits

- Flexibility and cost savings due to limited expertise requirements
- Ability to effectively comply with regulations
- Speedy calculations within seconds
- Full integration with other GeoXtension features
- Easy-to-understand interface
- Quick evaluation of alternative scenarios
- Calculation anomalies eliminated with single algorithm
- Full advantage of earlier investments in GIS data quality
- Easy generation of output for regulators and decision makers

For FCIT, the customer interest always comes first and we are steadily looking for ways for our customers to make the best use of their investments in data and software. We will be pleased to discuss the possibilities of the GX Analyser with you or give a demonstration.