

# Utility Management Consulting

## Geographic Network Information Systems



Geographical Information Systems is a key component of a utility's asset management systems. NETGroup has been involved in various GIS implementations with a specific focus on electrical utilities. We understand the importance of the underlying data model, connectivity and the ability to extract value for engineers. The **initial step** before implementing or expanding a Geographic information system (GIS) is to assess the current GIS capabilities in terms of data, skills and potential and to provide a blueprint or roadmap for the utility to enhance and improve the GIS system and associated processes. This roadmap must include specific projects and cost estimates for inclusion in a capital budget.

Although the focus is on the AM/FM/GIS system that is required by the utility, it cannot be approached without consideration of the bigger picture regarding the enterprise-wide view of all related business functions.

### Best Practice & Critical Success Factors:

Business functions and processes transcend any one division, department, system or application. Utilities need to embrace the GIS function in totality and be aware of all the other areas, divisions, systems and applications that may be involved in order to support the overall vision for the business. Work should flow across the business units and an enterprise-wide integrated information system is the major tool to realise and support this goal. It is of critical importance that the need for systems integration be addressed in conjunction with a systems roadmap.

The key value chains as defined by a utility relating to power system resources (Network Asset Creation, Maintain Network, Manage Availability of Supply and Acquire Customer) need to define the associated processes as well as the relevant business events and information exchange requirements pertaining to these processes. Only once this is achieved, can utilities realistically expect to get integration and information management and business process automation under control and can real business benefits be derived from the use of information systems.

A GIS is the most effective solution for managing the geographical component of enterprise data. A best practice strategy is to capture and maintain the complete as-built network on the GIS system, and use it as a data source for all other systems that may require power system related data. Enhancing the GIS to cater for the capturing and modelling of complex electrical network equipment is not difficult to do, but takes time and experience to do it right. NETGroup has coined the term Geographic Network Information System GNIS which extends the traditional GIS to focus on networks.

**Successful implementation** of enterprise Geographical Network Information Systems has some golden rules in common:

- Top Management's vision and commitment is of the utmost importance. Implementation is made easier if management has the vision of how new technology can improve company operations.
- Use an enterprise-wide and holistic approach to the implementation of GIS. The whole is larger than the sum of the parts.
- Always look at Value Chains & Business Processes. Business processes & organizational design must support the capturing, updating, maintenance and publishing of information.
- Ensure that People Issues are dealt with. This includes requirements, which lists, training, and buy-in.
- Make sure that data is used which will instil confidence and enhance chance for success
- Try to enforce a single point of data entry philosophy where specific data gets input / updated / edited only once. Data ownership issues will thus have to be dealt with.
- Identification and implementation of processes to maintain the data in the system. Changes to power system equipment through maintenance, refurbishment and new works are reflected
- Go for incremental approach, but... build on a solid foundation, ensuring that each step taken is a step in the right direction.
- Focus on data first, before attempting extravagant functionality. Create a robust data model, enforce data quality, increase data coverage, and provide data presentation and distribution. Normally 80% of requirements are covered by just providing accurate



GIS

Field name	Value
Transformer Name	TRF 2A
Primary Voltage	132KV
Secondary Voltage	11KV
Status	In service
MVA Rating	20.00
Location	✓
Annotation	✓
Symbol Location	
Description	TRF 2A
Manufacturer Name	English Electric
Serial Number	AFS1305/700
Cooling Method	ONAN/OFB
Vector Group	Yyn0d11
Hv Hv Phase Shift	0
Hv LV Phase Shift	30
Hv Grounding Code	
MV Grounding Code	
Tertiary MVA Rating	7.500

GNIS

# Geographic Network Information Systems



- reliable data.
- Utility assets need to be managed as connected networks rather than individual pieces of equipment
- Make information & data accessible enterprise-wide at earliest convenience
- Managing the processes and information in this environment has some unique challenges

## Data Requirements:

The basic requirement from any utility is to have reliable power system equipment information and associated supply area & network connectivity information, as well as the need to know where the customers are located and which customer is connected to which devices (the Customer-Network Link). One view that transcends most departments is that the GNIS should be the custodian or owner of power systems and CNL information and that it should exchange information with all other systems within the utility.

GNIS data quality is described on three levels:

- data sufficiency (does the data support all aspects of the business?),
- data coverage (do we have all of the data?) and
- data accuracy (is the data believable?)

## Architecture & Technology Platform

The choice of GIS technology platform is a key decision that the utility needs to make. Factors that influence this decision (other than a pure technology choice), are the changing business environment, technology choices made by associated role-players and current AMFM/GIS technology platforms in use.

In addition, the level of experience at the utility pertaining to the current AMFM/GIS technology platform and the associated change-readiness of the personnel will play a major role in the technology platform decision.

## Organisation

The GIS department should not operate as a drawing office, but rather a fully-fledged GIS office, performing the "RECORDS & ASSET MANAGEMENT" business function. Within the department the role of USER and SUPPORT should be split in order to use resources optimally and define clear lines of accountability. GIS maintenance, support and development (including hardware and networks / bandwidth) should typically report through the CIO, as GIS should be viewed as an enterprise system, rather than a unique stand-alone mapping application. Further to this, the power system design function should report through a separate management structure using appropriate GIS and other tools (load information and load forecast, power system model, power system analysis, etc).

## Conclusion

An Enterprise GNIS initiative is aimed at creating a logical, phased framework for a system that would support all the relevant Value Chains within the utility in a sustainable manner. This has a longer-term focus. Critical items are the development of a data model, and associated "basic applications" for data capturing, data maintenance and data conversion, as well as the development of the business processes and information exchange requirements to ensure that sustainable solution is implemented

## Our Services:

**NETGroup** provides the following services in this domain, more detailed information can be provided on request.

- GNIS consultant (not a vendor)
- Cross-platform
- Selection, design, development & implementation of GNIS
  - Data model
    - Objects, attributes, connectivity
  - Functionality
    - User Requirements, Design, Develop, Implement, Train
  - Data capture
    - Training
- System Integration
- Spatial Analysis

