Applied GIS in Power Utilities

People's Tool for Developing Nations



Presented by

Kaushik Banerjee

PrecisionGIS and People'sGIS



Stesalit

GIS for Developing Nations

Extremely Expensive Technology

Non-relevant in everyday governance

Benefits does not reach the people

Building a People's GIS



People'sGIS – How – Indian Exp



\bigcap	







This is a time of major change in the utility industry. Privatization, deregulation, and the introduction of advanced technology are all having profound impacts on utilities.

Critical utility applications include

- Map Editing
- Creation of Map Products
- Query and Display
- Design/Work order processing
- Network Modelling
- Executive Information Systems
- Decision Support System



Prime Objective

The Power Utility solutions should include a series of focused maps and applications designed to help utilities leverage their geographic information and the Platform to improve utility operations and enhance customer services.

The three steps to achieve this goal are:

- Configure
- Organize
- Deploy



Configure

- A robust online model implementation to configure a mapping platform for the utility. It provides a pattern which can be followed to manage and to
 - geographic content
 - deliver focused maps and apps
 - Distribute the knowledge to the customers



Organize

Define an authoritative service catalog by

- Registering the files, existing data and services
- Share them with groups
- This central catalog is the foundation for the maps and apps that support the business.



Deploy

 Utilities should include a collection of maps and apps that align with the business needs.





Public Outage Map

- Public Outage map allows a utility to inform customers about the electric system status by region. This app utilizes different geographic regions to display summaries of customer in and out of service as well as a percentage of customers out of service. Optionally, the locations of outage events can be displayed.
- The map and outage information is created through a series of geoprocessing models. The results are shared to provide the public with a scalable map that can handle heavy demand when there is a large outage. Additionally, using the cloud environment, the application will be available at all times regardless of the utility's status.



Public Outage Map



Stesalit

Damage Assessment Collector

Damage Assessment Collector solution allows field crews to record the location and severity of damages after a major storm with their smartphone or tablet in the field. This solution also allows for field crews to add a photo attachment to provide additional details for the incident. By creating a map of damage from the field, the scope of damage and impact on the electric network can be viewed in near real time.



Damage Assessment Collector



Enterprise GIS and Smart Electric Grid



Stesalit

Enterprise GIS and Smart Electric Grid – Indian Perspective

- Govt. of India has short listed Smart Grid pilots to 14 distribution utilities;
- Estimated cost of each pilot would be US\$ 10 million of which 50% is grant from Government of India, targeted to be completed by the end of 2014;
- These pilots will help in determining selection of appropriate technologies and communication systems for different regions in the country and build business cases, policy and regulatory recommendations;
- Pilots are also expected to fine tune the changes in business process of utilities and rules for consumer engagement;



Enterprise GIS and Smart Electric Grid – Indian Perspective

- IT enabling the distribution network by mapping all the electrical assets in the town, consumer indexing and mapping all consumers with the DTs, measuring the flow of energy into the towns, feeders and DTs and HT consumers by deploying AMI;
- Integration of commercial operation like billing etc. with acquired data to help utilities analyze and optimally design and operate their electrical network, measure energy flow and losses in various electrical assets including pilferages;
- R-APDRP systems can also help to monitor the condition of electrical assets and taking corrective steps like replacements/strengthening of assets, balancing the feeders and DTs etc.
- Integration of consumers with distribution utility by way of bilateral communication shall be possible through deployment of suitable smart meters which could help in demand side management and peak load management;



Enterprise GIS and Smart Electric Grid

- GIS is widely recognized for its strong role in managing traditional electric transmission, distribution and communication networks;
- For utilities, GIS can provide comprehensive inventory of the electrical distribution network components and their spatial locations;
- When viewed in the context of geography, data is quickly understood and easily shared;
- Enterprise GIS creates spatial information about utility assets (poles, wires, transformers, duct banks, customers etc.) and servers that information to the enterprise level;
- To develop an efficient Smart Electric Grid system, utility agencies need to have real-time analytic engines which will be able to analyze the network, determine the current state and condition of the system.



Value of GIS Data Quality in Smart Grids



Smart Grid Requires Improved Data

Stesalit

Importance of GIS in Smart Grids

- Visualize the Electric and Communication System:
 - Must know the Health of the System;
 - Real-time view of the Grid;
 - Complete state of the Grid.
- Control the State of the Grid:
 - Get the Grid back to the normal state after an abnormal event;
 - Or, have it do something different.
- Adapt the Grid:
 - Prevent Outages ;
 - Relieve Loads.



Critical Role of GIS in Smart Grids

- GIS certainly would help utilities to understand the relationships in Smart Grid networks – electric and communications;
- GIS also helps utilities to understand the relationship of networks with surroundings because it is an essential tool for restoration, storm tracking and security monitoring;
- On the other hand, utilities must have processes and procedures in place to ensure accurate and timely GIS data so that the Smart Electric Grid will be able to make automated decisions based on correct information;
- As one of the critical parts of the distribution system, GIS can actually control parts of the grid;
- Within GIS, operators would then perform a spatial analysis to determine risk of failure and customer impact.

Critical Role of GIS in Smart Grids

- Inventory of both Networks;
- Condition;
- Relationship of Assets to each other;
- Connectivity;
- Networks in Relationship to surroundings;
- Determine Optimal Location;
- Analytics, Tracking and Spatial Metrics;
- Serving Smart Grid access to the Enterprise;
- Operational Awareness ;
- Work Force Management;
- Routing new networks to Renewable Energy resources.





esali

Configuration



GETCO Power Atlas 1. Creation of 1:50K SOI Topo-sheet Grid



GETCO Power Atlas Processing of Satellite Image



GETCO Power Atlas Data View on Map



GETCO Power Atlas Web Interface: Map View Mode



Search the Substation and view the attributes

GETCO Power Atlas

Attribute Query on Web



GETCO Power Atlas PREPARATION OF POWER ATLAS

Gujrat Energy Transmission Corporation Ltd.



Power Atlas





Toposheet No: 46B14

Total Area of Gujrat : 203,800 Sq. Km.

Total No. of Toposheets : 332 nos (1:50,000)



Copyright : Steau M Ltd



Asset Mapping, Consumer Indexing For RAPDRP

- Madhya Gujarat Vij Company Ltd.

Leading the Transformation

People'sGIS can lead the transformation of GIS from an elitist technology to a people's technology

Convergence of inexpensive open source GIS with electronics and mobile communication ensures easy adoption of GIS as everyday planning and response tool for governance

Faster socio economic development for developing economies through efficient governance

