GIS Based Power Distribution System: A Study For the Bhopal City

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Reform: Status

- Electricity Act, 2003
- Regulatory Commissions: **19 States**
- Unbundling
- **Mandatory unbundling as per Electricity Act 2003, 22 states have already done unbundling**
- Distribution Privatisation
  - Delhi, Orissa (**2 States**)  

**Shift in Reform Thrust**

\[ \text{IPP} \rightarrow \text{Distribution sector} \]

This shift reflects recognition that the foundation for sustainable power sector reforms must be financially and operationally viable or (efficient) distribution entities
Distribution

- Distribution system although the weakest link in the Indian power sector, but very important for an electric utility due to following main reasons:
  - Its close proximity to ultimate consumer
  - Its high investment cost
  - Final money flows come from it.
Present problems in electric distribution system

- High transmission and distribution losses
- Lack of proper management
- Difficulty in attending high loss areas
- Increased equipment loading
- Ageing infrastructure
Distribution reforms given by GOI

- DRUM project
- APDRP
- Centers of excellence
- Privatization
The Tasks Ahead: A Roadmap To Success

*Distribution systems are changing from neatly every stockholder's perspective.*

- Reorganizing the distribution sector
- Measuring efficiencies and appraising performances in the sector
- Strengthening the regulatory commissions
- Implementing the Multi-Year Tariff (MYT) Framework
- Ensuring Universal Metering and Proper Billing
Suggestions that can be given to improve the distribution system

• Distribution automation
• Using of power electronic devices
• Using of geoinformatics
Distribution automation

• Need based automation would be easier.
• In distribution the function that can be automated can be classified into two categories:
  • Monitoring Functions: 1. meter readings at different location, 2. the system status at different locations in the system and 3. events of abnormal conditions (DSCADA)
  • Control Functions: They are related to switching operations. Fault location and service restoration or outage management are some of the important control functions.
Geoinformatics

- Remote sensing
- Global positioning system
- GIS
Remote sensing
TEMPORAL COVERAGE OF BHOPAL LAKE BY REMOTE SENSING

NOV 25, 1998  OCT 16, 1999

MAR 24, 2001  FEB 12, 2002
IKONOS SATELLITE DATA (1M RESOLUTION)
Global positioning system

GPS is based on constellation of 24 high altitude satellites. The satellites are positioned in six earth central orbital planes with four satellites in each plane. These satellites are equipped with atomic clocks and send out radio signals as to the exact time and their location. These radio signals from the satellites are picked up by the GPS receiver.
How GPS works
Geographic Information Systems

• GIS used extensively in distribution sector to enhance the service reliability using genetic algorithm. Through this all practical issues are taken into consideration. such as:

• cost parameters (investments, Line losses, maintenance)
• technical constraints (voltage drop, thermal limit, reliability)
• physical routing constraints (obstacles, high cost passages, existing line sections)
Present case study

Following steps are involved in the above study:

• Field work or GPS survey
• Conversion GPS Easting Northing coordinates to latitude longitude coordinates (using iilwis software)
• Downloading images from google earth pro
• Georeferencing: This is the process of aligning spatial data to an image file
• Creating coordinates data base file
• Placing coordinates on rectified image
• Adding attributes to shapefiles
• Generating queries
# Field work

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Conversion of coordinates by using iilwis software
Images from google earth pro
After georeferencing and rectification
Creating coordinates

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Adding attribute table
Generating queries
Conclusions

• A Database management system integrated with Geographical Information System can help find solutions like identification of each and every consumer and their locations with their connectivity in the area.

• Such database shall be able to provide each and every consumer bill payment and find the average annual distribute and utilized power

• This model provides the shortest route from the office to the problem location
Thank you