USING GITA'S GEOSPATIAL TECHNOLOGY REPORT AT CENTERPOINT ENERGY

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Abstract

This paper will discuss how, for the past several years, CenterPoint Energy has gained value from the *Geospatial Technology Report* (GTR) published by the Geospatial Information & Technology Association (GITA).

A brief introduction to CenterPoint Energy, Land & Field Services will discuss the value drivers that are key success factors to our business. Following that introduction is a discussion on how we benchmark and identify trends using the report, and why participation is one key to benchmarking.

About the Author

Jeff Myerson is Director of Land & Field Services for CenterPoint Energy. He has more than 20 years' experience in the utility business and is responsible for the people, processes, and technology that provide GIS, surveying, land and right-of-way management, and underground locating services.

Myerson has a bachelor's degree in land surveying from Purdue University and an MBA from the University of Houston. He is a registered professional land surveyor in Texas, and is an active participant on local college and university GIS advisory boards.

Introduction to CenterPoint Energy

CenterPoint Energy is one of the nation's largest integrated gas and electric utilities. The company serves more than 5 million metered customers in the states listed below and has assets of about $20 billion. CenterPoint Energy includes:

- **CenterPoint Energy Arkla**, which serves 730,000 natural gas customers in 621 communities in Arkansas, Mississippi, and Oklahoma, with 27,000 miles of main and service lines.
- **CenterPoint Energy Minnegasco**, which serves 700,000 natural gas customers in 240 Minnesota communities with 22,000 miles of main and service lines.
- **CenterPoint Energy Entex,** which serves 550,000 natural gas customers in 337 communities in Louisiana, Mississippi, and Texas, with 21,000 miles of main and service lines.
- **CenterPoint Energy Houston**, which serves 982,000 natural gas and 1.8 million electric customers with 25,000 miles of overhead distribution lines and 8,000 miles of underground distribution lines, as well as 4,000 miles of overhead transmission lines.

Land & Field Services

At CenterPoint Energy, Geographic Information Services (GIS) is part of the Land & Field Services organization, which is managed through the company's corporate Shared Services. GIS is functionally divided into two parts: Business Solutions, which provides the environment, user support, and consistency across the company; and Data Management, which performs the production work and updates the landbase, gas facilities, and electric facilities.

In addition to Geographic Information Services, which includes the areas of Business Solutions and Data Management, Land & Field Services at CenterPoint Energy includes Surveying & Mapping, Land & Right of Way, and Underground Locating.

GIS at CenterPoint Energy

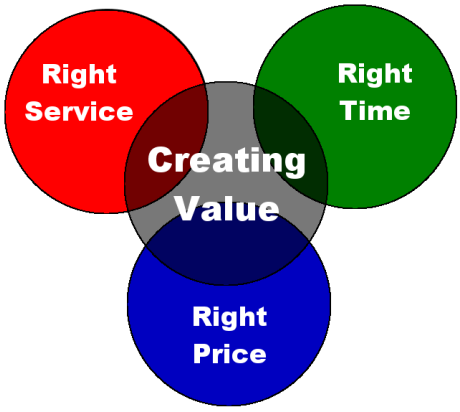
Independently, businesses that are now part of CenterPoint Energy began implementing GIS in the late 1970s and early 1980s. In 1999, CenterPoint Energy began converting all businesses to an enterprise-wide GIS environment. That process was completed in 2004, resulting in the use of common data models, common applications, and common processes. Today, the environment supports CenterPoint Energy's electric utility and four gas local distribution companies.

GIS access is provided to more than 4,500 users with 200 concurrent editors in seven states through a centralized organization in Houston. The GIS environment is integrated with many of CenterPoint Energy's corporate systems, including the outage system, design environment, and load analysis applications for the gas and electric businesses.

Demonstrating Value Assures Satisfaction

In Land & Field Services—and throughout Shared Services—demonstrating value is key to success. There are three components to value: the right service at the right time for the right price.

- **Right Service:** Users must receive what they need to do their job—nothing more, nothing less.
- **Right Time:** Cycle time commitments (for example, posting as-built gas mains within 15 days, posting as-built electric circuit backbone within 24 hours) and availability commitments are critical to operations.
- **Right Price:** It's important to compare costs to what others would charge and to examine how missing data, illegible sketches, conflicting information, and other factors impact those costs.



Benchmarking GIS: Many Diverse Categories

There are a variety of different types of tasks performed in CenterPoint Energy's GIS organization, so those tasks are categorized into two areas: Data Maintenance and Systems & Support.

On the Data Maintenance or production side, there are two main factors to benchmark: production updates and data quality. Production work includes landbase, electric facilities, and gas facilities, while data quality compares the data to as-built information.

On the Systems & Support side, there are three main areas to benchmark: applications and interfaces, availability and accessibility, and user support. Applications and interfaces refers to the number and sophistication of the technology; availability and accessibility is concerned with the number of users as well as providing Web, mobile, and LAN access; and user support offers training and issue resolution.

Production Data Maintenance Summary—Gas, Electric, Land

Listed below are the value factors that apply to data maintenance.

- **Right Service:** What data elements are maintained? These may include gas services, gas mains, electric primary, electric secondary, road rights of way, road centerlines, and other elements. And what is the accuracy of the data maintained? This might include absolute and/or relative positional accuracy, connectivity, or attributes. Attaining the right mix of data and accuracy is important, because there is a cost to everything that CenterPoint Energy maintains.
- **Right Time:** Are backlogs of data acceptable, and how quickly after facilities are made "hot" in the field should the data appear in GIS?
- **Right Price:** For maintenance work, the mix of data elements, accuracy, and currency result in a price. For conversion work, the currency factor drops out, but the price remains dependent on the other factors.

Production Data Maintenance—
Right Service Comparisons in the Geospatial Technology Report

In the 2003-2004 *Geospatial Technology Report*, there is excellent information listing the data elements maintained for gas, electric, and landbase. For example, for electric utilities, there is a chart that shows 96 percent of participants have primary connectivity in their GIS, but only 68 percent have secondary connectivity and 62 percent have service connectivity.

Public sector users may have fewer applications requiring a connected network; thus, the chart for that sector shows 56 percent system connectivity and 26 percent service connectivity.

Telecommunications facilities generally used the most sophisticated data model, with the chart for that vertical market showing 100 percent fiber connectivity, 17 percent wireless connectivity, and 75 percent validating connectivity rules. Telecom showed a significant change in implementation of more stringent rule-based data entry validation, up to 58 percent from 17 percent in the previous report.

The water/wastewater industry shows a large jump from the previous year in connectivity through fitting—up from 43 percent to 60 percent—and verification of facility rulebase, up from 30 percent to 48 percent.

There is substantial discussion of absolute accuracy of landbase. Gas industry participants report the amount of landbase with an accuracy of +/- 50 feet is 58 percent; for +/- 2 feet, the figure is only 18 percent.

The pipeline industry manages corridors over vast distances and thus tends to use low-case landbase data with accuracy levels from +/- 10 feet (20 percent of respondents) to +/- 50 feet (60 percent). Three of the 10 responding pipeline companies indicated they had +/- 5-foot stereo-compiled data.

Water/wastewater charts indicate the most cost-effective accuracy level that still provides required slope data is the +/- 10-foot category. This year's data indicate that public sector GIS users have a broad range of accuracy needs, with 26 percent using and maintaining landbase data at more than one accuracy level. Most common accuracies were 66 percent maintaining landbases at +/- 50-foot and 26 percent at +/- 5-foot levels. This year the survey collected square-mile information regarding sources of data, revealing the emerging large market for satellite-based data.

Production Data Maintenance—
Right Time Comparisons in the *Geospatial Technology Report*

The 2003-2004 *Geospatial Technology Report* also has strong metric data regarding cycle times for all types of GIS data.

For example, only 11 percent of electric respondents update their facilities data within a week and 24 percent update within a month; whereas 36 percent of gas respondents update their facilities within a week and 77 percent within a month. For comparison, CenterPoint Energy updates 45 percent of electric facilities within a week and 89 percent within a month, while 89 percent of gas facilities data are updated within a week and 99 percent within a month.

In line with the static nature of the network, the pipeline facilities data maintenance cycle is longer than that of other market sectors, showing 60 percent taking longer than a month for updates. The public sector tends to use facilities data for reference and also has a more infrequent maintenance cycle, with 65 percent taking longer than a month.

At the other extreme, current information on network configuration is vital to telecommunications. Although none were able to update facilities data within a day, 84 percent were able to do so in less than a month, and half of those within a week.

Landbase update cycle differences are similar in electric and gas industries, with 30 percent of the updates within a week for electric, and 46 percent within a week for gas. Again for comparison, at CenterPoint Energy, the landbase updates (gas or electric) are 81 percent within a week and 98 percent within a month.

Telecoms continue to make less frequent updates in landbase, with only 42 percent making changes within a month. More than 58 percent of public sector respondents update their landbase data within a month of changes.

Production Data Maintenance— Right Cost Comparisons in the Geospatial Technology Report

The report contains total data conversion costs for landbase and electric or gas facilities. Although 54 percent of electric participants' total data conversion costs are now at the lowest end of the spectrum (less than $150,000), at the other extreme, 24 percent had costs great than $1 million. Only 23 percent of gas participants' total data conversion costs are under $150,000, with 51 percent having costs great than $1 million.

In the public sector, 64 percent incurred total data conversion costs under $150,000. One factor in keeping costs down is performing conversion in-house, which 66 percent of public sector participants are doing. Similarly in water/wastewater, 73 percent indicated total data conversion costs under $150,000, with 57 percent performing conversion in-house.

In the telecommunications sector, 74 percent incurred data conversion costs under $500,000, with half of respondents performing data conversion in-house. Annual telecom maintenance/lease costs were under $150,000 for 67 percent of respondents, $150,000 to $300,000 for 25 percent, and the remaining 8 percent spending $750,000 to $1 million.

Over 70 percent of pipeline projects used conversion vendors. However, more than 50 percent incurred total conversion costs under $150,000. There is a trend toward using third parties to provide services on a contract or lease basis, with at least one respondent outsourcing all maintenance activity. At pipelines, 10 percent spent between $750,000 and $1 million on maintenance, and 20 percent spent between $150,000 and $300,000; the remaining 70 percent were in the lowest category of under $150,000.

System and Support—Applications & Interfaces Comparisons in the Geospatial Technology Report

	Electric	Gas
• Right Service		
• Top 10 applications (Trouble calls, design, field automation, etc.)	✔	✔
• Right Time		
• Implementation lifecycle (Implemented, developed, designed, nothing)	✔	✔
• Right Price		
• Cost to implement	✘	✘
• Cost to support	✘	✘

✔ — Information is included in the 2003-2004 *Geospatial Technology Report*
✘ — Information is not included in the 2003-2004 *Geospatial Technology Report*

The discussions and analysis in the 2003-2004 *Geospatial Technology Report* excel with regard to applications and interfaces. In particular, the listing of top applications together with the implementation lifecycle (implemented, developed, designed, or nothing yet) is very informative. This listing allows a clear picture of the applications valued most by participants, and provides guidance to those looking to prioritize development activities. CenterPoint Energy's applications and interfaces match up very well with those listed in the report.

This year, the survey changed the source of information for the top 10 applications and technologies, moving from the annual Industry Trends and Analysis Group (ITAG) Committee ratings to input directly from users. Although this broadened the level of input, it had little effect on the outcomes. Trouble call/outage analysis has remained the top application at electric utilities for the past three years, followed by engineering work order design and field/workforce automation. CIS integration has been the top application at gas utilities for the past three years, followed by work management.

In top technologies, pen/mobile computing took the lead at electric and gas utilities, replacing Internet/intranet.

The report shows a slight trend at electric utilities away from enterprise implementations (down to 51 percent from a high of 63 percent in 2000), in favor of departmental (up from 32 percent to 38 percent) and service implementations (up from 5 percent to 11 percent), possibly as a result of Web-based application distribution.

The 2003-2004 report presents a much finer level of granularity, breaking down project costs into software, hardware, data, and services, with a special emphasis and detail regarding data. These data indicate that although 20 percent of the electric utility respondents have spent over $1 million on core GIS software and applications, 34 percent have incurred costs less than $150,000. At gas utilities, 37 percent of the survey respondents have spent over $1 million on core software and applications, while 18 percent have spent less than $150,000.

The range of electric utility implementation service costs is wide, with 68 percent of respondents spending less than $150,000 but 6 percent spending over $3 million.

System and Support—Availability & Accessibility Comparisons in the *Geospatial Technology Report*

	Electric	Gas
• Right Service		
• Top 10 technologies (Mobile computing, web access, portability, GPS, etc.)	✔	✔
• Right Time		
• Implementation lifecycle (Implemented, developed, designed, nothing)	✔	✔
• Right Price		
• Cost to implement	✘	✘
• Cost to support	✘	✘

Availability and accessibility to GIS data is just as important as the applications and interfaces. The 2003-2004 *Geospatial Technology Report* does a fine job of identifying how participants make their data available using maps, Web viewers, mobile data, and other interfaces. Again, this data is combined with implementation lifecycle percentages, so it's easy to see whether a utility is just designing the implementation or whether they have it in production.

Electric utilities show change from previous trend of Web distribution (25 percent have implemented in 2003-2004) to an increase in field viewers (55 percent have implemented). At gas utilities, 59 percent have implemented field viewers and 55 percent have Web distribution. In the public sector, 18 percent have implemented field viewers and 30 percent have Web distribution. In telecommunications, 33 percent have field viewers, 42 percent have Web distribution, 25 percent use GPS and 25 percent have wireless distribution. In water/wastewater, 38 percent have implemented field viewers, 28 percent have Web distribution, 20 percent use GPS, and 10 percent have wireless distribution.

System and Support—User Support Comparisons in the *Geospatial Technology Report*

	Electric	Gas
• Right Service		
• Number of users supported (editors, viewers, mobile)	✕	✕
• System availability	✕	✕
• Training offered	✕	✕
• Right Time		
• Issue response	✕	✕
• Right Price		
• Cost per user supported	✕	✕

Providing support to users is a key measure that impacts any implemented GIS environment. As illustrated, there are several measures under Right Service that would provide good comparisons, and there are also suggested measures under Right Time and Right Price.

These are all measures in use or under consideration at CenterPoint Energy.

Identification of Trends in the *Geospatial Technology Report*

One of the strengths of the *Geospatial Technology Report* is that it now has collected sufficient years of data to support trend analysis. The 2003-2004 report compares three years of technologies and applications, showing the shift over time. An interesting shift noted is from single platform implementations to multi-platform implementations. The report asked the one-third to one-half of participants with multiplatform GIS implementations if and how they were sharing data between the systems. Two-thirds of these reported data sharing, with a significant number reporting use of native functionality inherent to their GIS (not requiring additional software to share data).

There was a dramatic increase in participation by water/wastewater utilities beginning with the 2002-2003 report. An increase in public sector participation prompted it to have a vertical section beginning with the 2003-2004 report.

There is significant new detail in the 2003-2004 report. The survey requested respondents to break down their costs into the categories of most interest to readers, including software, hardware, services, and data, with particular attention to separating expenditures on data into conversion costs versus purchased data of various types. This year's survey also gathered new data about software and hardware—full-use seats versus view-only seats, by provider; and workstations versus servers, including operating systems and manufacturers.

Users in all markets are moving toward varying landbase accuracy standards according to population density and distribution networks. Pipeline companies are subject to a diverse mix of regulatory reporting and gather data, including landbase degree of accuracy, specific to each reporting requirement.

The report indicates that prioritizing areas for GIS application implementation is a major concern to strategic planners so the system can begin to realize return on investment as soon as possible. Interest in calculating return on investment is very high among current participants.

Implementation costs, and the downward trends of these costs over time, is discussed and is an important change. The report looks ahead to 2004-2005 and noted that annual budget costs will be examined next year.

Participation is Key to Benchmarking

There are several reasons why CenterPoint Energy participates each year in this report, as referenced in the list below. Each of these is an important factor, but two are worthy of special highlights. The first is that the report has a very specific and narrow focua, and is very much on target for those of us who have GIS responsibilities. The second is that the list of participants allows networking, which I encourage as a means to share more detailed information.

- Report is produced by recognized, non-biased expert
- Provides data at reasonable price
- Non-vendor specific, non-platform specific
- Narrow focus on specific utility sectors
- Increasing detail each year
- Focus shifts to align with changes over time
- By listing participants, networking is encouraged

Summary of the *Geospatial Technology Report*

In summary, the report provides clear, targeted data with respect to data, maintenance cycles, and implementations. The analysis is interesting and valid, and in general the report is very useful.

Key attributes

- Trend analysis
- Data sophistication analysis
- Implementation lifecycle
- Maintenance cycles

Opportunities

- Data accuracy comparisons
- Annual maintenance costs
- Training and support
  - Method and costs
  - Number/type of users
- System availability

In the future the report will pick up some additional areas that will enhance its usefulness as the GIS landscape changes. This evolution is within the scope of *Geospatial Technology Report*, and will keep the report aligned with the evolving industry.
