

Distribution Geographic Information System and Grid Model Data Management



Effective grid model management: enabling the future grid vision

Background, Objectives, and New Learnings

Effective management of geospatial and grid model data is one of the major challenges facing electric distribution utilities today. Siloed software systems create fractured data storage, duplicated data entry, one-off point-to-point interfaces, and convoluted business processes. Utilities struggle with incorrect or missing geographic information system (GIS) data, difficult-to-maintain grid models, and information that is out-of-sync with the field. Negative impacts include:

- System average interruption duration index, customer average interruption duration index, and system average interruption frequency index metrics reflect inefficiencies caused by faulty data.
- Increased service restoration times from erroneous outage location data and damage assessments.
- Compromised field crew safety from incorrect information.
- Inadequate capital investments based on inaccurate system knowledge.
- Decreased customer satisfaction over slowed interconnection requests due to unreliable data.
- Lost productivity to duplicative data entry and corrections.

- Reduce enterprise-wide operations and maintenance inefficiencies caused by inaccurate data and duplicative data entry as distribution grid interconnection requests increase.
- Demonstrate strategies for achieving and maintaining accurate GIS data and consistent grid models for use across distribution planning, engineering, and operations.
- Create industry consensus on tools required to support distribution grid models.
- Create grid model data foundations to improve field crew productivity and safety.
- Create industry architecture for distribution geospatial and grid model data management.

These problems will scale up as levels of distributed energy resource penetration increase and distribution grids grow increasingly complex. Utilities will need solid foundations of well-managed geospatial and grid model data to remedy these issues.

Benefits

Participants in this project will develop practical knowledge, guidelines, and experience to build and maintain accurate, up-to-date distribution grid models that can be used enterprise-wide.

By working hand-in-hand with other utilities and with tool vendors, participants will also help develop an industry vision for effective GIS and grid model data management. The vision will inform interoperability standard improvements and vendor product enhancements that will enable the real-world deployment of effective GIS and grid model management strategies at distribution utilities.

The public will benefit from improved operating efficiencies, improved productivity, and improved data used in tools that manage an increasingly dynamic grid.

Project Approach and Summary

The project contains three parallel research tracks: GIS data cleanup, field enablement, and grid model data management across the enterprise.

- **GIS Data Cleanup**—Our research includes:
 - *Exploration of technologies with potential for GIS data cleanup.* Identification, exploration, and testing of three to four promising technologies in GIS data cleanup.
 - *Documentation of geospatial model population best practices.* Recommendation of general and product-specific best practices for data population using tested GIS tools.
- **Field Crew Enablement**—EPRI research will create:
 - *Alternative solution architectures report.* Identification and analysis of alternative data architectures for field worker enablement.
 - *Demonstration project.* One to two utility-hosted demonstration projects implementing field enablement pilots that leverage data exchange standards and test the identified architectures.
- **Distribution Grid Model Management**—EPRI will undertake:
 - *Geospatial and grid model data management investigation.* Deep-dive investigation of existing practices in geospatial and grid model data management, identification of common challenges/requirements, and the articulation of a widely-applicable data management architecture. This activity will provide foundational knowledge that will be leveraged by other project activities. Limited to five utilities and requires Level 2 funding.
 - *CIM standards development work.* Improvement of salient International Electrotechnical Commission Common Information Model (CIM) standards to support the articulated data management architecture and to encourage vendor development of products and interfaces.
 - *GIS Grid Model Manager Technical Market Requirements report.* A definition of functions a GIS (or related system) must implement to support the creation of grid models from geospatial/engineering design data.

Deliverables

Project deliverables will be phased throughout the project and will include:

- GIS data clean up best practices reference guide
- Mobile solution architectures report

- Demonstration project summaries
- Grid model data management improvement “how-to” guide
- CIM standards engagement
- Grid model management tool technical requirements report

Price of Project

Minimum number of participants: five utilities

Three (3)-year commitment with two (2) Levels:

- Level 1 – Basic

Size	GWh range (served directly or indirectly)	Total Price \$
Small	Less than 22,000	\$100,000
Medium	22,000 to 45,000	\$150,000
Large	More than 45,000	\$200,000

- Level 2 – This level is now closed out. For additional information, contact one of the Technical Advisors listed below.

Project Status and Schedule

The project is expected to run for 30 months. Initial group of participants will help define project task and deliverable scheduling.

Who Should Join

Any distribution utility considering or implementing a major improvement (new distribution management system, new GIS, improved data management, or application integration) within the suite of applications serving the distribution planning, engineering and operations functions

Contact Information

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com) or your Technical Advisor:

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