

ACCELERATING GRID EXPANSION

Independent Evaluation of Line Siting Technologies



Exploring digital tools to streamline transmission line siting and routing.

PROJECT HIGHLIGHTS

- Transmission investments are projected to exceed \$360B by 2030 and \$2.4T by 2050.
- Complex siting processes result in long timelines for completion, with new transmission lines often requiring 10-20 years from conception to completion.
- Utilities urgently need faster, defensible routing methods to accelerate expansion.
- Emerging digital tools claim to streamline routing but lack independent evaluation.
- This project will provide a structured, comparative assessment and practical guidance for tool adoption.

Background, Objectives, and New Learnings

Transmission line siting is one of the most time-consuming and challenging steps in transmission development. Timelines of 10–20 years are common, driven by lengthy permitting, legal challenges, and re-routing. As utilities face unprecedented grid expansion needs, there is growing interest in emerging digital routing tools that claim to accelerate and improve siting decisions. While promising, these solutions have not yet undergone independent evaluation, leaving key questions unanswered.

The objective of this project is to address critical questions surrounding these technologies. It will examine how routing tools function compared to the established EPRI-GTC methodology, what algorithms and data sources they rely on, and whether their methods are sufficiently transparent to support defensible decision-making. The evaluation will also explore how well these tools can accommodate utility-specific criteria, stakeholder preferences, and regulatory requirements. Just as important, the project will assess whether the outputs—ranging from maps and dashboards to risk scores and cost estimates—are actionable and scalable across projects of varying size and complexity. Finally, the work will investigate whether these tools can meaningfully reduce siting timelines, lower costs, and mitigate stakeholder conflicts.

This project plans to deliver independent insights into the strengths and limitations of emerging routing tools, providing utilities with the knowledge to make informed adoption decisions. Participants will gain greater clarity on whether these technologies can help accelerate siting, reduce project risk, and improve defensibility in an evolving regulatory and stakeholder landscape.

Benefits

Public Benefits: A faster siting and routing process could help bring clean, reliable power to customers sooner and at lower cost. Shortening delays may also reduce the risk of prolonged community disputes and limit environmental impacts by enabling more transparent and consistent routing decisions.

Funder Benefits: Members will gain access to an independent, comparative view of emerging routing tools to assess whether they

meaningfully accelerate the siting and routing process. The project may also provide clearer insights into tool capabilities, risks, and regulatory fit, and help preserve institutional knowledge to inform future siting efforts.

Project Approach and Summary

This project will use a structure framework to examine emerging transmission line routing tools. The work aims to include:

1. **Retrospective Testing:** Apply tools to completed project data and compare generated routes to actual outcomes, considering route similarity, constraint handling, and timeline implications.
2. **Prospective Testing:** Use conceptual or new project data to generate alternative routes and explore scoring logic, diversity, and stakeholder readiness.
3. **Comparison with Traditional Methods:** Review tool outputs alongside the EPRI-GTC methodology and traditional utility practices to understand differences, potential time savings, and added value.
4. **Sensitivity Analysis:** Evaluate robustness, transparency, and flexibility of each tool by testing response to changes in constraints, criteria weighting, data quality, and stakeholder preferences.

This approach will offer members a clearer view of how these tools function, where they add value, and what limitations could affect adoption.

Deliverables

This section lists the deliverables you may expect to get from this project.

- **Technology Assessment.** A comparative assessment of routing tool performance, including evaluation of potential time savings against traditional methods. A technical brief may summarize key insights and lessons learned.
- **Case Studies.** A library of case studies developed through the project, including at least two utility-specific analyses that apply retrospective and prospective routing scenarios.

- **Workshops.** Member workshops with each vendor, featuring live demonstrations using utility data. Where possible, members may also be given access to platforms to experiment with tool functionality.

Price of Project

The proposed price to participate in this supplemental project is \$60,000 per member company. A minimum of two funders is needed to start the project and six funders to support the full scope of the work.

Project Status and Schedule

This is a new supplemental project set to launch in Q4 2025, with the work planned for 2026.

Who Should Join

This project is suited for utilities planning or siting new transmission lines, especially where renewable integration, electrification, or data center growth are driving demand.

Contact Information

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