AT A GLANCE

Distribution Asset & Reliability Analytics

Program 180.005

Research Value

- A sound technical basis for decisions about asset selection, maintenance, and replacement

- Improved reliability of electric service

- Controlled life-cycle costs and risks

- Optimized allocation of programs for reliability and resiliency

- Fewer customers impacted by major storms and long interruptions

The distribution system of the future is expected be more automated, more adaptive, more resilient, and more cost-optimized. The key enablers for this aspiration start with good asset and system performance data and the premise that better-informed decisions can be facilitated with advanced data science tools and with new analytic approaches. This research seeks to help utilities understand and implement leading practices to measure and evaluate optimization approaches as they relate to asset management and resilient distribution system performance.

This research focuses on three key areas where data analytics, artificial intelligence, and emerging sensors can help facilitate the distribution system of the future. These areas include:

- Distribution assets and their maintenance, inspection, and performance data

- Power flow and reliability data to facilitate metrics and cost-benefit analytics

- New emergent data sources and data science tools

For more information
scan the QR code or visit
distribution.epri.com/analytics.

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- **Definitions and Data Models for Distribution Asset Analysis** – This task develops and updates data models for efficient and effective extraction, transfer, and loading of inspection, performance, and failure data for use in industry and utility database applications and performance analytics. Data models for padmounted, underground, and network transformers; underground cables; and wood poles will be reviewed. This task plans to work with utilities to develop a comprehensive, prioritized list of additional distribution assets for which data models may be developed in future years.

- **Collection and Analysis of Industrywide Distribution Asset Performance and Failure Data** – This task compiles and analyzes historical failure and performance data on distribution assets in a common format, using information gathered from participating utilities. This research defines and develops metrics and processes for mining and analyzing these datasets. In 2024, EPRI plans to continue developing insights intended to better inform decisions regarding maintenance program development, task and timing selection, benchmarking comparison among utilities, replacement decision support, and specification and selection of new distribution system assets.

- **Analytics for Fleet Management Distribution Assets** – This task investigates and develops performance assessment analytics for distribution assets. The research focuses on enhancements to algorithms and analytic methods for assets such as wood poles, underground cables, and distribution transformers.

- **Reliability and Resiliency Metrics and Analytics** – This task aims to apply data analytics to traditional and emerging distribution system data sources to evaluate reliability and resiliency enhancement opportunities. The analytics approaches used in this research effort enable members to understand historically successful leading practices and how new datasets can bring new insights to address reliability and resiliency challenges.

- **Evaluating Costs and Benefits of Reliability/Resiliency Improvement Options** – This task analyzes different methods to quantify and cost-justify investments in reliability and resiliency improvement. In 2024, the planned focus of this work is to document industry-leading practices for cost-benefit applications and to address avoided-cost analytics. The avoided-cost analysis intends to create useful ratings for storm intensity and associated recovery costs.

- **Geospatial Analytics and Insights** – This task defines, prioritizes, and investigates scenarios where geospatial analysis of distribution assets may provide insights and support decision making. As this research collects data from utilities, EPRI intends to demonstrate different approaches for visualizing the query results over different temporal and spatial ranges.

- **Computer Vision for Asset Health and Inventory** – Utilities can apply imagery, video, LiDAR, and other remotely sensed data to enable improved distribution asset inspection and inventory. EPRI intends to investigate application of artificial intelligence to data collected using existing and emerging inspection technologies.