

AT A GLANCE



Distribution Systems

Program 180

Research Value

- Enhance safety, both for utility workers and the public
- Improve specifications for new assets
- Develop maintenance practices with a strong technical basis
- Reduce maintenance costs
- Proactively plan capital and maintenance budgets
- Increase distribution system resilience
- Improve asset and system reliability

Member Benefits

- Provide guidance on design and performance of overhead structures
- Access to industry-references on underground distribution and automation
- Insights into leading grounding and arc flash practices
- Evaluate virtual inspection techniques for distribution automation assets
- Exposure and evaluation of new and emerging technologies
- Understand how to apply data science techniques to distribution asset data for wood poles and transformers

Grid modernization and electrification are driving substantial change in how the distribution system is designed, constructed, maintained, and managed. The EPRI Distribution Systems research team performs industry-leading R&D to enable and inform utilities in their design and effective management of the distribution system. The research focuses on distribution assets, such as poles, transformers, reclosers, and cable systems, across their entire life cycle, from specification to removal.

This program produces advanced knowledge, technologies, and tools to inform decisions regarding distribution assets' life cycles. Researchers produce these results by identifying high-value research opportunities, creating and executing robust research projects, and implementing results with utilities. Researchers use various approaches to produce these results, including:

- Laboratory testing of new, aged, and failed equipment
- Evaluation of emerging technologies
- Investigations into equipment failure modes and degradation mechanisms
- Collection and assessment of utility practices
- Accelerated aging of components
- Assessment of asset performance

See more about the research at distribution.epri.com.

EPRI Technical Contact

JOSEPH POTVIN, *Program Manager*

413.445.3709, jpotvin@epri.com

Research Highlights



Overhead Distribution Assets

- Testing alternative structural materials, such as composite poles and crossarms
- Testing emerging solid-state distribution transformers to better understand overloading capability
- Evaluating the performance and application of online condition monitoring technologies
- Investigating the application and accuracy of pole inspection technologies.



Underground Distribution Assets

- Investigating new cable materials such as lead-free EPR and EAM.
- Performing failure analyses on cable accessories to identify opportunities to improve design, material selection, and installation practices
- Examining the heating characteristics of defective medium-voltage cable splices to facilitate improved temperature criteria for triggering maintenance and replacement
- Gathering and sharing industry underground practices for topics such as proactive undergrounding



Distribution Automation Assets

- Assessing the performance of new single-phase switching devices through rigorous laboratory testing
- Investigating causes of recloser cable failure and identifying opportunities to improve performance and longevity
- Performing failure analyses of line reclosers to enable improved specifications and design testing methodologies
- Gathering and sharing the latest approaches to distribution automation fleet management and field operation



Safety and Work Practices

- Facilitating industry knowledge sharing of serious injury and fatality (SIF) events to enable utilities to improve safety practices
- Evaluating the effectiveness and accuracy of live downed conductor detection technologies through laboratory testing
- Investigating how arc-rated clothing should be applied based on test results showing underperforming products
- Researching practices and technologies to improve vehicle safety



Asset and Reliability Analytics

- Developing metrics to better assess and evaluate equipment and system performance.
- Documenting the application of EPRI research for utility business intelligence (BI) use cases
- Investigating the application of emerging data science techniques such as artificial intelligence/machine learning

Supplemental Projects

- *Impact of Electrification on Distribution Assets* ([3002031158](#))
- *Performance and Operation of Ground Level Distribution Systems Distribution Solid-State Transformers* ([3002030675](#))
- *Conductor Burndowns and Wildfire Mitigation when using Compact Single Phase Reclosers* ([3002029148](#))
- *Improving Grid Safety and Resilience to Mitigate Ignition Incident and Fire Risks* ([3002026177](#))

For more information, contact:

EPRI Customer Assistance Center
800.313.3774 • askepri@epri.com



3002031023

January 2025

EPRI

3420 Hillview Avenue, Palo Alto, California 94304-1338 USA • 650.855.2121 • www.epri.com

© 2025 Electric Power Research Institute (EPRI), Inc. All rights reserved. Electric Power Research Institute, EPRI, and TOGETHER...SHAPING THE FUTURE OF ENERGY are registered marks of the Electric Power Research Institute, Inc. in the U.S. and worldwide.

