

Technology Innovation Project



Project Brief

TIP 25: EPRI Program 37 – Substations

Context

Utilities are faced with a number of issues in managing their assets. They seek to enhance safety, reliability and performance, as well as, extend equipment life to defer capital expenditures and control costs. BPA is partnering with the Electric Power Research Institute (EPRI) to accomplish these goals.

This program represents organizational efforts to better coordinate BPA/EPRI research activities for increased efficiency and productivity. Membership association with EPRI allows BPA to go far beyond what BPA's own facilities could provide in terms of duration and extremity of testing and subject matter considered. For Program 37 (Substations), the strategy for EPRI involvement is to promote R&D through EPRI program projects and supplemental projects that are directly applicable to BPA's business lines and agency obligations. Pure knowledge from data gathered is, of course, gained through this affiliation; but the primary focus is on finding and promoting EPRI projects that directly apply to bulk power transmission owners like BPA. BPA participants are selected for their expertise in a particular area as well as the relevance of that subject to BPA's needs, and are expected to facilitate the involvement of other Subject Matter Experts (SMEs) in projects that can produce a demonstrable return on BPA investment.

This is a programmatic effort to formalize BPA's collaboration with EPRI so that the effort is more focused, with careful attention to a project's value added.

Description

BPA participates in EPRI's Power Delivery and Utilization sector of which we fund research in their program 37 *Substations* R&D portfolio. The R&D projects under this program consist of single and multiple year projects that are added or concluded during each program year.

In 2011, BPA is utilizing EPRI Program 37 for the following functions: Transformer life management; circuit breaker life management; substation maintenance management; SF-6 environmental management; emerging technology for protection and control; and other miscellaneous projects within the program portfolio.

This program offers a complete portfolio of tools and technologies along with resources such as failure databases and aging models to improve transformer and circuit breaker life management along with providing operation and maintenance engineers access to research results for developing strategies in extending equipment life, optimizing maintenance costs and reducing outages.

Why It Matters

BPA's participation in Program 37 allows the agency to collaborate with other national and international experts. Membership also provides access to a substantial library of written resources and technical reports; networking opportunities EPRI member utilities from around the world; and assures agency development of maintenance and design practices with a broader view of what issues, problems and/or limitations need to be addressed.

Goals and Objectives

BPA expects Program 37 to accomplish the following objectives in 2011:

- 1) Provide a detailed annual plan that captures the information from advisor and council meetings, and tracks involvement in task force meetings. The plan includes reporting of development activities and application of deliverables, such as diagnostic research, EPRI technical books, maintenance guides, and equipment life extension findings, along with status reports on budget and execution of BPA's EPRI action plan. This plan will also develop a list of R&D activities and projects of interest to BPA, and take actions to leverage them for R&D action by EPRI.
- 2) Continue to add the results of current EPRI R&D projects to BPA maintenance practices.
- 3) Contribute BPA's expertise to EPRI members in the following areas: Sulfur hexafluoride (SF₆) management, transformer health and life expectancy management, and condition-based substation equipment maintenance.
- 4) Report program status to management and the Collaborative Working Group.
- 5) Retain ability to become involved in future EPRI R&D projects, which is only available to active members.

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Project Start Date: October 2008

Project End Date: December 2015

Reports & References

Current Project Sets:

PS37A – Transformer Life Management

PS37B – Improve Overall Substation Maintenance Management

PS37C – SF6 Environmental Management

PS37E – Switching Safety and Reliability

PS37F – Circuit Breaker Life Management

PS37H – Protection and Control

PS37I – Fault Current Management and Substation Grounding

Funding

Total Project Cost: \$7,755,028

BPA Share: \$2,755,028

External Share: \$5,000,000

BPA FY2012 Budget: \$404,813

For More Information Contact:

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Links

EPRI Reports are available to BPA employees here
<http://internal.bpa.gov/Services/Library/Pages/Databases.aspx>

Further information on EPRI Program 37
http://mydocs.epri.com/docs/Portfolio/PDF/2010_P037.pdf

Participating Organizations

Alliant Energy Corporation
 Arkansas Electric Cooperative Corp.
 CenterPoint Energy, Inc.
 CPS Energy
 Duke Energy Corp.
 Exelon Corporation
 Great River Energy
 Hoosier Energy Rural Electric Coop., Inc
 Long Island Power Authority
 NamPower, Ltd.
 New York Power Authority
 Pinnacle West Capital Corporation
 PowerSouth Energy Cooperative
 Snohomish County Public Util. Dist. No 1
 SP Power Systems, Ltd.
 Tri-State Generation & Transmission Association, Inc.
 ZZZ EPRI Testing Company

American Electric Power Service Corp.
 Bonneville Power Administration (BPA)
 Central Hudson Gas & Electric Corp.
 Dairyland Power Cooperative
 Electric Power of Henan
 FirstEnergy Corp.
 Hawaiian Electric Co., Inc.
 Hydro One Networks, Inc.
 Lower Colorado River Authority
 National Grid UK, Ltd.
 Northeast Utilities
 PNM Resources, Inc.
 Salt River Project
 South Carolina Electric & Gas Co.
 Tennessee Valley Authority (TVA)
 We Energies

American Transmission Co.
 California Dept. of Water Resources
 Consolidated Edison, Inc.
 Detroit Edison Co.
 Entergy Services, Inc.
 Great Plains Energy Services, Inc.
 Hetch Hetchy Water & Power
 Lincoln Electric System
 MidAmerican Energy Holdings Co.
 Nebraska Public Power District
 NorthWestern Corp.
 PowerLink Queensland
 San Diego Gas & Electric Co.
 Southern Company
 The United Illuminating Company
 Western Area Power Administration