

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 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 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 2014, 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:

- 1) Manage program involvement against a detailed annual plan that captures the information obtained from advisor and council meetings, and tracks actions determined out of 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 guide developing actions for BPA to leverage better value and applicability of EPRI R&D.
- 2) Continue to add the results of current EPRI R&D projects to BPA maintenance and asset management practices.
- 3) Contribute BPA's expertise to EPRI collaboration model in the following areas: Sulfur hexafluoride (SF6) management, transformer health and life expectancy management, condition-based substation equipment maintenance, switching safety, and protective relaying configuration management.
- 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.

Continuing attention is being given to more accurately correlate individual project values with BPA needs and to assemble sufficient manpower to complete project goals.

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Project Start Date: January 1, 2014

Project End Date: December 31, 2016

Funding

BPA FY2016 Membership: \$313,180

Reports & References

Current Project Sets:

- 37.101 Transformer Life Management*
- 37.102 Circuit Breaker Life Management*
- 37.103 Protection and Control*
- 37.104 Substation Ground Grid Research*
- 37.105 Other Substation Equipment*
- 37.108 SF6 Environmental Management*
- 37.110 Switching Safety and Reliability*
- 37.111 Risk Based Substation Equipment Asset Management*
- 37.112 Industry-wide Equipment Performance Database*
- 37.113 Next Generation Condition Monitoring and Diagnostics*
- 37.TC Supplemental Projects*

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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
American Electric Power Service Corp.
American Transmission Co.
Arkansas Electric Cooperative Corp.
Bonneville Power Administration
CenterPoint Energy, Inc.
Central Hudson Gas & Electric Corp.
Consolidated Edison, Inc.
CPS Energy
Dairyland Power Cooperative
Detroit Edison Co.
Duke Energy Corp.
Entergy Services, Inc.
Exelon Corporation
FirstEnergy Corp.
Great Plains Energy Services, Inc.

Great River Energy
Hawaiian Electric Co., Inc.
Hetch Hetchy Water & Power
Hoosier Energy Rural Elect Coop., Inc
Hydro One Networks, Inc.
Integrus Energy Group, Inc.
Korea Electric Power Corp.
LG&E and KU Energy LLC
Lincoln Electric System
Long Island Power Authority
Los Angeles Dept. of Water & Power
National Grid UK, Ltd.
Nebraska Public Power District
New York Power Authority
PNM Resources, Inc.
PowerLink Queensland Cooperative
PowerSouth Energy Cooperative

RED Electrica de Espana S.A.
Salt River Project
San Diego Gas & Electric Co.
Sarawak Energy Berhad
Snohomish County Public Util. Dist. No 1
South Carolina Electric & Gas Co.
Southern Company
Taiwan Power Company
Tennessee Valley Authority (TVA)
The United Illuminating Company
Tri-State Generation & Transmission Association, Inc.
We Energies
Western Area Power Administration
Xcel Energy Services, Inc.

