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# **Ameren Illinois 1st Quarter 2015 Smart Grid Test Bed Report**

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# Table of Contents

- Executive Summary .....3
- DOE Funding Opportunity Projects .....3
- Other Current Test Bed Projects.....5
- Test Bed Applications .....6
- Industry Participation.....6
- Test Bed Tours .....6
- Smart Grid Test Bed Plan Success .....6

## Executive Summary

Ameren Illinois Company (Ameren Illinois) submits the following Smart Grid Test Bed Quarterly Report in accordance with the Energy Infrastructure Modernization Act (EIMA), 220 ILCS 5/16-108.5 et seq. This report provides updates on the steps Ameren Illinois has taken to implement its test bed plan during the first quarter of 2015. The report includes information on activities Ameren Illinois has undertaken to further develop its “primary” test bed location, discussions with potential test bed customers, and on the testing application process.

## DOE Funding Opportunity Projects

Technology Applications Center (TAC) personnel continue their work on the following DOE funded projects. Work continues on creation of test plans as well as review of each project solutions design.

- **(ARMORE) - Applied Resiliency for More Trustworthy Grid Operation**

Primary Investigator – Grid Protection Alliance

Partners – University of Illinois – Urbana/Champaign (UIUC), Pacific Northwest National Laboratory

An open-source system that can perform inspection of network packets and alarms on communication that does not comply with the specified ARMORE policy. ARMORE will be able to be configured to take action to block network traffic based on deep inspection of common substation communications protocols, such as DNP3.

Ameren Illinois did not engage with this Primary Investigator during this reporting period.

- **(CODEF) - Collaborative Defense of Transmission and Distribution Protection and Control Devices Against Cyber Attacks**

Primary Investigator – ABB

Partners – (UIUC)

This project will advance the state of the art for cyber defense methods for transmission and distribution grid protection and control devices by developing and demonstrating a distributed security domain layer that enables transmission and protection devices to collaboratively defend against cyber-attacks in an IEC 61850 environment.

Ameren Illinois personnel from the Technology Applications Center as well Information Technology Cyber Security department participated in a CODEF project review meeting. Representatives from each project member organization as well as the DOE project

sponsors, Carol Hawk & Ron Staubly were in attendance. Don Borries presented a slide deck that describes the TAC's equipment and testing capabilities. A test plan requirement to allow UIUC researchers to utilize a Doble Test set with their Real Time Digital Power System Simulator was identified. Ameren has offered to lease its Doble Test set to UIUC researchers to fulfill this requirement. Ameren also performed fundamental relay testing training to UIUC researchers to educate researchers on the steps necessary to perform relay testing activities.

- **(PBCONF) – Secure Policy-Based Configuration Framework**

Primary Investigator: Electric Power Research Institute (EPRI)  
Partners –UIUC, Schweitzer Engineering Laboratories

An extensible, policy-based configuration framework to support the secure configuration and remote access of modern and legacy devices from a variety of vendors. The open-source framework will combine a policy engine with a translation engine to address the interoperability challenges of various remote access control methods and provide utilities with a single, organization-wide view of the security configuration for their power delivery devices.

Ameren Illinois personnel continue to work with project member representatives to develop the project solution design criteria as well as identify the test plan activities for this solution. A draft test plan was created that includes each project members test platforms as well as how these testing platforms will be utilized to perform system tests for the projects solution. Also reconfiguration of a portion of the TAC communications network has been identified and is planned to be implemented in 2<sup>nd</sup> quarter 2015 to enable alpha project testing of the solution.

- **(SDN) – Software-Defined Networking**

Primary Investigator: Schweitzer Engineering Laboratories  
Partners –UIUC, Pacific Northwest National Laboratory

SDN allows a programmatic change control platform, which allows the entire network to be managed as a single asset, simplifies the understanding of the network, and enables continuous monitoring in more detail. Control system networks are often more static, while the corporate world is more dynamic.

Ameren Illinois personnel continue to work with project member representatives to verify the project solutions design criteria as well as identify test plan activities & equipment for the TAC infrastructure. Ameren personnel assisted in creation of project status reports for submittal to DOE.

## Other Current Test Bed Projects

- Ameren Illinois continues to evaluate new LED lighting technology by measuring and collection of data via our AMI metering matrix. An internal decision to re-focus LED light testing on a specific LED light category (100 watt equivalent Street Light) occurred during this reporting cycle. Ameren Illinois requested samples from five LED light manufacturers to be utilized for testing at the TAC. Samples were received from four vendors and these lights were installed at the TAC .Testing of these new lights commenced on April 1, 2015 and it is anticipated that this first phase of testing (energy usage) will be concluded in May, 2015. The data being collected will be analyzed for energy consumption to determine if the roadway LED's are recommended for Ameren Illinois future offerings.
- Ameren Illinois finalized its Smart Device validation program that will allow Ameren Illinois to determine the functionality and operability of how end use devices interface with Ameren Illinois's AMI meters. We are currently working on changes to the Ameren Illinois website to include information for Smart Device vendors regarding Ameren Illinois' Smart Device validation program as well as information on how to submit their products for validation.
- EPRI's Field demonstrations of the ANSI/CEA-2045 Modular Communication Interface Standard – Four field demonstration devices (Controllable Thermostat, Hot Water Heater, Pool Pump, and Electric Vehicle Supply Charger) are presently being produced by research partner vendors to enable demand response testing of devices utilizing the modular socket communications platform. . Ameren Illinois plans to test these devices at the TAC once the devices are made available to Ameren Illinois.
- An Energy Foundry representative introduced TAC staff to an Energy Solutions provider who is developing a connected controllable thermostat. TAC representatives contacted the Energy Solutions provider and are working with the vendor to develop a potential testing project for this connected thermostat.
- TAC staff was introduced to a Cybersecurity and Compliance Solutions vendor who has been awarded a Department of Energy Grant to develop a patch and update program for Industrial Control Systems. TAC staff is presently working with the vendor to become a utility partner in this research initiative.
- TAC staff attended a training session provided by manufacturer of remote terminal unit devices to learn more about their product offering. The manufacturer has donated one of their devices to the TAC control building to allow TAC staff to assess their devices capabilities.

## Test Bed Applications

- Ameren Illinois continues to work with an Energy Storage System Integrator for the installation of a battery storage system. Ameren Illinois has reviewed several substation locations and provided the applicant with a possible location where a 5MW energy storage system could be deployed.
- TAC staff coordinated an information exchange between a solar panel manufacturer that is developing a new concentrated solar panel system and representatives from Ameren Missouri's renewable energy group to investigate potential locations for the installation of the device on Ameren Missouri's electric system. At the present time no suitable locations that meet Ameren Missouri's needs were identified. Ameren Illinois is currently waiting on vendor feedback as to whether or not the vendor wishes to have its product tested at the location that Ameren Illinois has provided to the vendor

## Industry Participation

Ameren Illinois representatives attended the 2015 Distributech conference from February 3-6, 2015 where Ameren Illinois hosted a booth to educate attendees about the Technology Applications Center testing capabilities. Thirty three individuals representing 27 companies visited the Ameren Illinois booth during this event. A post Distributech conference email was sent to each booth attendee as well as TAC staff have continued conversations with five smart device manufacturers that provide home area network devices.

## Test Bed Tours

- On March 18, 2015, TAC staff provided a tour of the Technology Applications Center to a representative from UIUC and the president of a major Illinois utility equipment manufacturer.
- On March 24, 2015, TAC staff hosted faculty members from Lincoln Land Community College for a tour of the Technology Applications Center.

## Smart Grid Test Bed Plan Success

Ameren Illinois' commitment to the successful implementation of its Smart Grid Test Bed plan is strong. However, as set forth above, Ameren Illinois reserves the right to modify, amend or alter this plan, as necessary and consistent with the law, to meet the requirements and objectives of the EIMA and other related provisions. Additionally, Ameren Illinois reserves its right to terminate this plan.