

Project DA: Distribution Automation Deployment In Missouri, Kansas, Arkansas, and Oklahoma.

Project Overview

Project DA seeks to modernize the distribution system of The Empire District Electric Company (the applicant) by adding approximately 261 new and further integrating existing 49 Smart Grid devices known as Autoreclosers and conducting prerequisite upgrades to adjacent distribution line (poles, crossarms, conductor) and the upstream substation facilities. The project's intended sites across the four corners of the adjacent states that Empire serves (MO, KS, AR, OK) stand to directly benefit 39 Disadvantaged Communities (DACs) by improving their reliability, facilitating direct and indirect job creation, and increasing local capacity to accommodate renewables. The project would be managed, by Mr. Sam McGarrah, Empire's Director of System Performance, who is a Professional Engineer and holds a master's degree in Electrical Engineering.

Technology and Construction Methods Employed

Autoreclosers are an example of Distribution Automation (DA) that help reduce the size and duration of outages by communicating with similar nearby devices when one of them senses an electrical fault. By working in unison, DA devices can identify the section of the line where the fault has occurred, automatically isolate it by opening the reclosers on either side of the fault, and quickly restore the service to the surrounding areas via other available supply paths. In this manner, outage impact is limited to a much smaller portion of the local system and less customers are subjected to a lengthy outage. While system response crews still need to be dispatched to fix the fault in the isolated area, their trips would be significantly shorter. Shorter outage crew trips ultimately mean lower reactive expenditures, and faster restoration times for customers whose power could not be restored automatically. Project construction sequencing will proceed in the following manner (a) Upgrade distribution pole and conductor in the vicinity of proposed DA sites; (b) upgrade substation infrastructure (when required); and (c) install DA schemes and the associated telecom equipment to enable device-to-device communication.

Project Impact and Outcomes

By completing the project, the applicant expects to achieve a 33% reduction in annual Customer Minutes of Interruption (CMI) on the feeders where upgrades take place. Many of these feeders supply the DACs in Empire's service territory, where improved reliability will help generate new economic activity and reduce the impact of outages on the existing homes and businesses. The proposed upgrades to line equipment and installation of higher capacity conductor will increase the system's resistance to storms and add capacity and flexibility – including to accommodate more distribution-connected renewable generation and better pace the available station capacity. In addition, a focused 5-year effort to install several hundred of Smart Grid devices on what is now a predominantly manually switched distribution system will require augmentation of the company's field operating practices and additional skills training for the company's unionized line crews (who have been previously engaged and support the project). These process design milestones represent critical engagement opportunities for engineering and field staff to collaborate on developing process changes and conducting cross-training that will maximize the benefits of the new technology across the system.