The Empire District Electric Company

Missouri Public Service Commission Workshop

AW-2023-0156

Utility Actions Related to Securing Funds

Infrastructure Investment and Jobs Act of 2021 &

Inflation Reduction Act of 2022

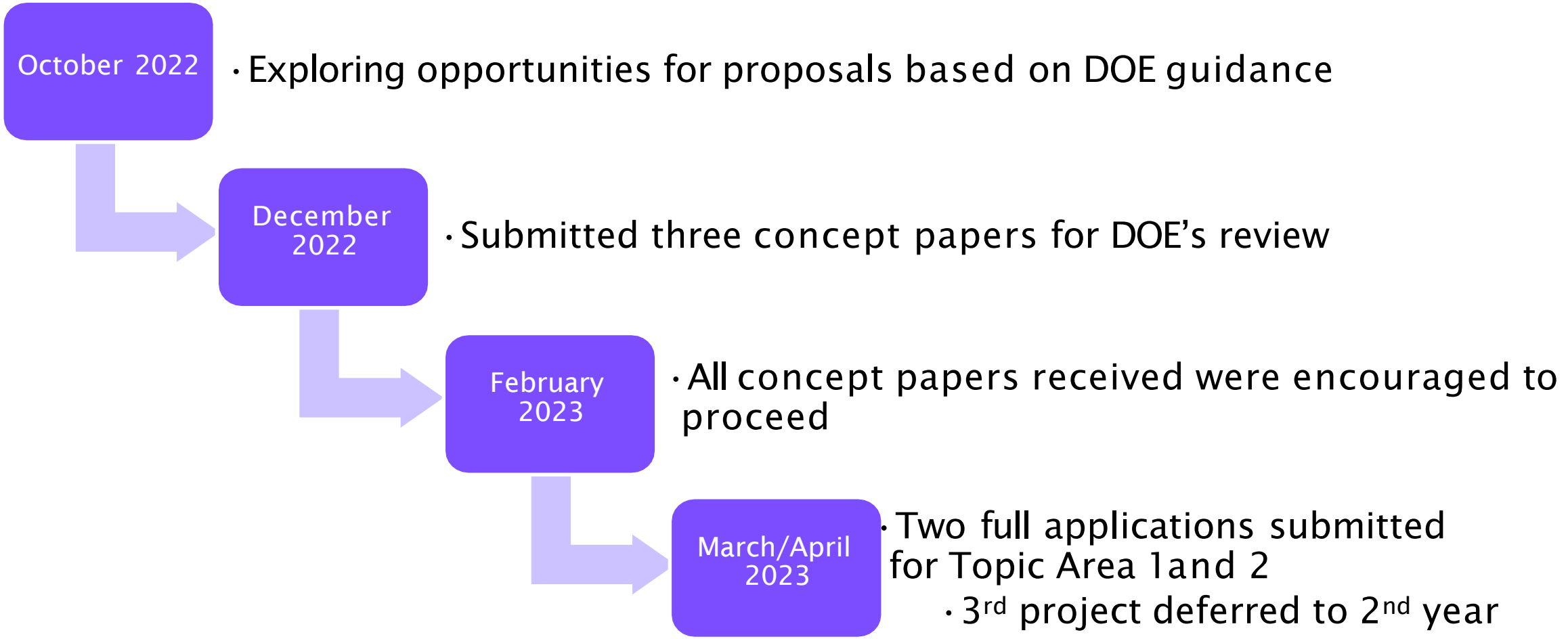
Liberty™

Overview of the Company's Approach to Potential Projects

Focused on projects that improve operational efficiency in Empire's challenging footprint while also considering projects:

- that include a meaningful level of innovative elements (technology or delivery means)
- that support the Company's Grid Modernization initiatives and Innovation Partnerships Program (GRIP) grants offered by the DOE
- with potential to impact the Disadvantaged Communities (DACs) as defined by the DOE

Timeline of the Progress to Date



Project DA: Distribution Automation Deployment

Overview:

- Seeks to install Smart Grid devices capable of automatically restoring system outages across all of Empire's service area.
- 261 new and 49 existing vacuum autoreclosers arranged in 43 clusters across the system would be installed or further integrated, along with telecom, pole and station upgrades.
- Estimated cost: $94.9 million, of which 50% ($47.49 million) is requested from DOE.

Example proposed autorecloser device

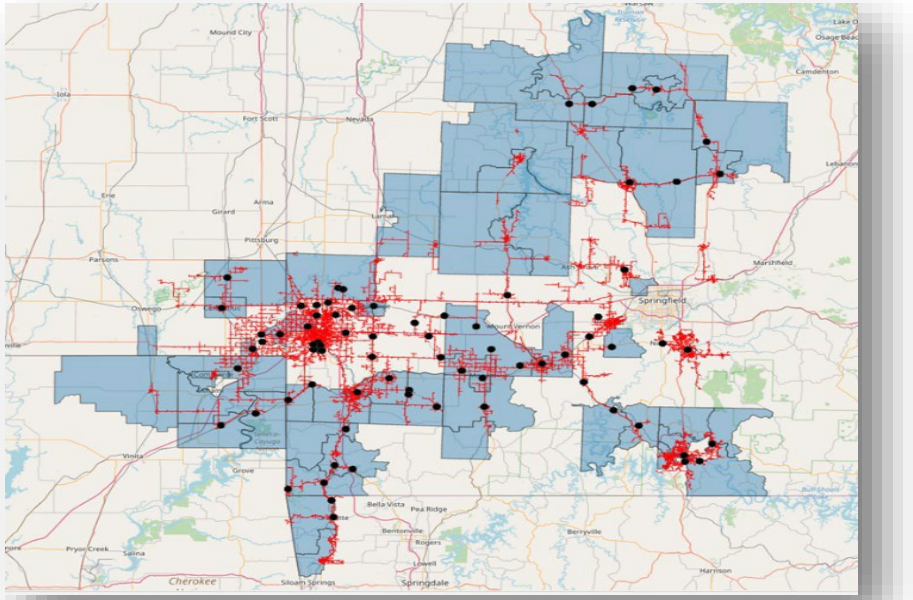
Project DA: Distribution Automation Deployment

Technology Summary:

- Autoreclosers to be placed in “clusters” in strategic locations with feeders undergoing sectionalization and supporting pole line infrastructure renewal in the vicinity.

- Empire technology is mostly manual gang-operated switches and a small population of Scada-Mate radio switches installed in the 1990s.

- Autoreclosers are a well-understood, commercially tested distribution system component that has been on the market for over a decade, including on Empire’s system.



Project Area: Dots identify recloser locations. Blue shading denotes DAC census tracts.

Current Status:

Full application submitted on March 17, 2023

Project Most Vulnerable Feeder ("MVF"): Hardening Supported by Crowd-Sourced Digital Imagery Analysis

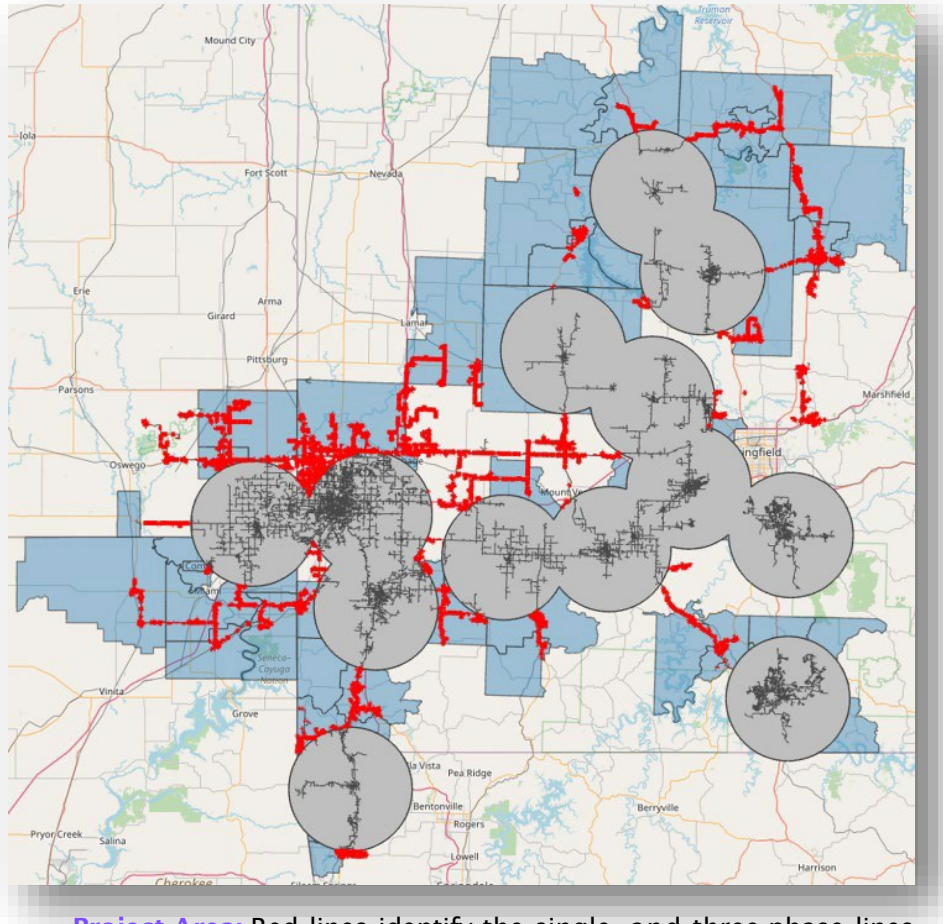
Overview:

Project MVF consists of two core components:

- Physical resilience: rebuilding / reinforcing 400 line miles of OH feeders and undergrounding 2,500 service lines from an initial 1,330-mile study area made up of distant, hardest to access and most deteriorated rural circuits predominantly in DAC communities.

- Technological transformation: developing a crowd-sourced, machine learning-backed visual asset inspection analysis tool designed to reduce O&M costs and help identify the most at-risk "vulnerable" circuits and services for reinforcement work.

- Estimated cost: $185.7 million, of which 50% ($92.8 million) is requested from DOE.

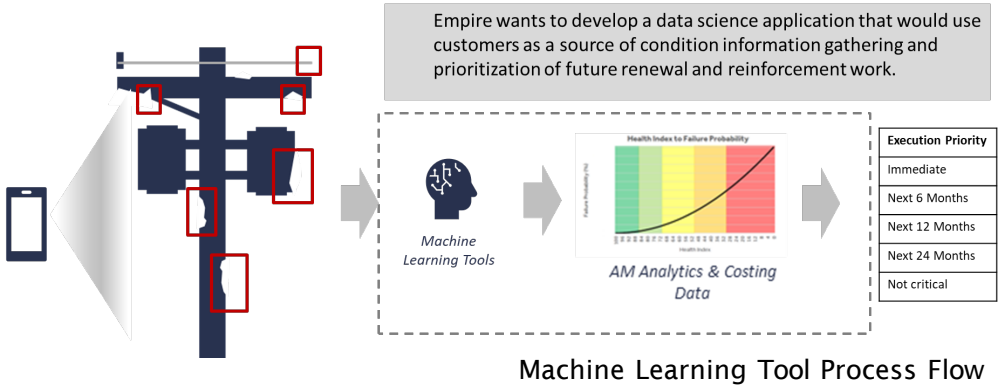


Project Area: Red lines identify the single- and three-phase lines in the initial Study Area from which the most vulnerable feeders will be selected. Blue shading denotes DAC tracts. Gray circles highlight 10-mile radius from the company's service centers.

Project Most Vulnerable Feeder ("MVF"): Hardening Supported by Crowd-Sourced Digital Imagery Analysis

Technology summary:

- Physical circuit enhancement work will entail pole line rebuilds, reconductoring and selective undergrounding of customer service lines using contemporary equipment & latest standards.
- The technology application will entail a combination of computer vision and classification algorithms along with a stack involving a mobile app, desktop app, and cloud-based backend.
    - Altruistic Innovation Inc. is a data science partner on the project.



Machine Learning Tool Process Flow

Current status:

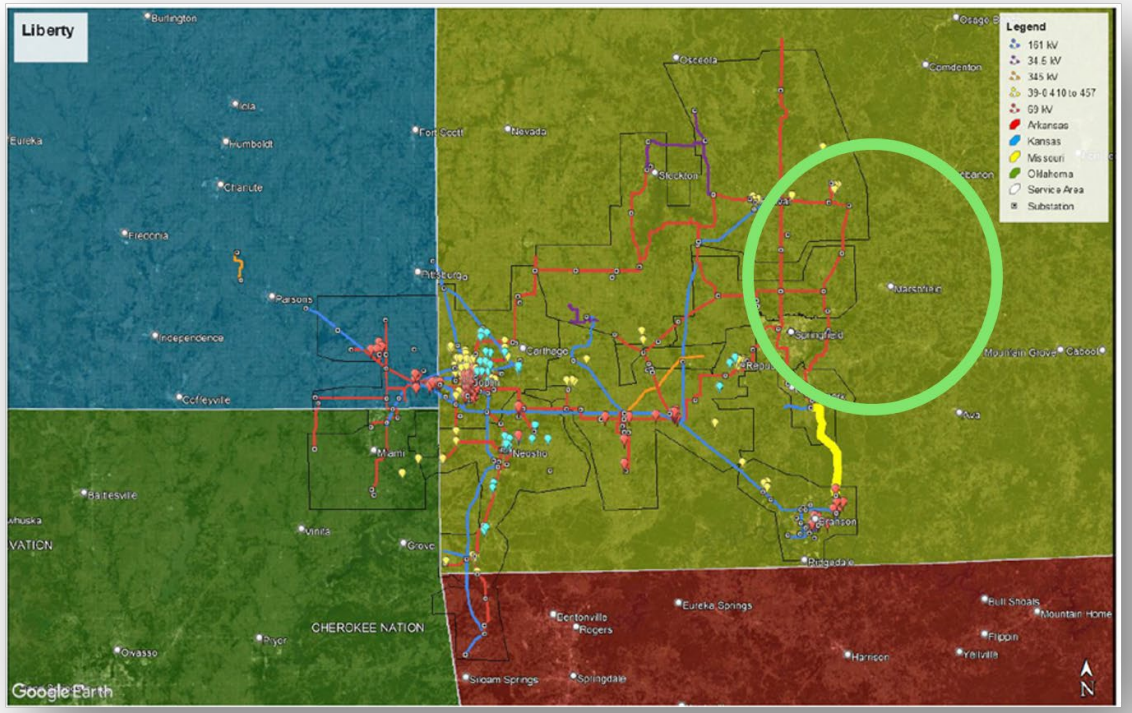
Full application submitted on April 6, 2023.

Project Ozark Line 39-0 Rebuild

Overview:

- The 69-kV existing line 39-0 running 23 miles between Forsyth and Ozark is proposed to be rebuilt and uprated to a higher 161 kV voltage using modern equipment plus substation upgrades.

- The line runs through the Mark Twain national forest.



Project Ozark Line 39-0 Rebuild

Benefits of the rebuilt and upgraded facilities:

- Return to the looped system redundancy lost due to Line 39-0 de-energization
- SPP congestion cost management relief
- Inter-RTO energy transfers enhancements (SPP, SWPA, AECI, MISO)
- Wildlife protection and fire hazard mitigation
- Higher renewables integration capacity

•Estimated cost: TBD upon completion of full application

Figure 1: A-Frame Sructure Configuration used on Line 69-0

Current status:

Concept paper received DOE encouragement to proceed to full application. Currently the Company is deferring its application to further study and validate benefits. We expect to submit the full application in the 2nd GRIP intake window (Spring 2024).

Thank you