

Cover Page

Project Title: Wildfire Mitigation and Extreme Weather Resilience for Xcel Energy	
Funding Opportunity: BIL – Grid Resilience and Innovation Partnerships (GRIP)	
Funding Opportunity Number: DE-FOA-0002740	
Topic Area 1: Grid Resilience Grants (40101c)	
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Project Location(s): <ul style="list-style-type: none">• Multiple states and sites including Colorado, New Mexico, Texas, Minnesota, Wisconsin	

1 Project Overview

1.A Background and Introduction

Xcel Energy is a multi-state vertically integrated major U.S. electric and gas utility. This application focuses on its operations in Colorado, New Mexico, Texas, Minnesota and Wisconsin. Through its subsidiaries – Public Service Company of Colorado, Northern States Power (MN), Northern States Power (WI), and Southwestern Public Service Company – Xcel Energy brings a comprehensive portfolio of energy-related products and services to 3.7 million electric customer meters and 2.1 million natural gas customer meters through its regulated operating companies. As described in this application, Xcel Energy intends to implement an integrated suite of 14 grid resiliency projects designed to comprehensively reduce the likelihood and consequences of disruptive events including extreme weather and wildfire. These include enhanced wood pole fire resistance, expanded distribution line undergrounding, additional non-auto reclosing system protection relays, and deployment of multiple innovative resiliency technology solutions.

Over the past 3 years, Xcel Energy has invested more than \$ (b) (4) in resiliency projects across the eight-state transmission system including pole replacements, weatherization, reconductoring, undergrounding and other hardening activities. As noted in Figures 1 and 2, the proposed projects will directly address the risks of wildfire, winter weather risk¹, and

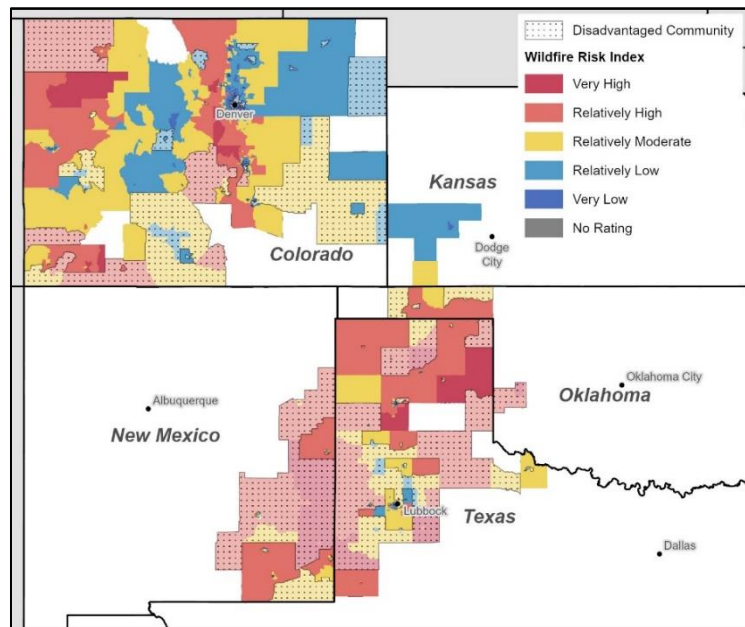


Figure 1 Wildfire risk, Disadvantaged Communities and Xcel Energy Colorado, New Mexico and Texas overlap

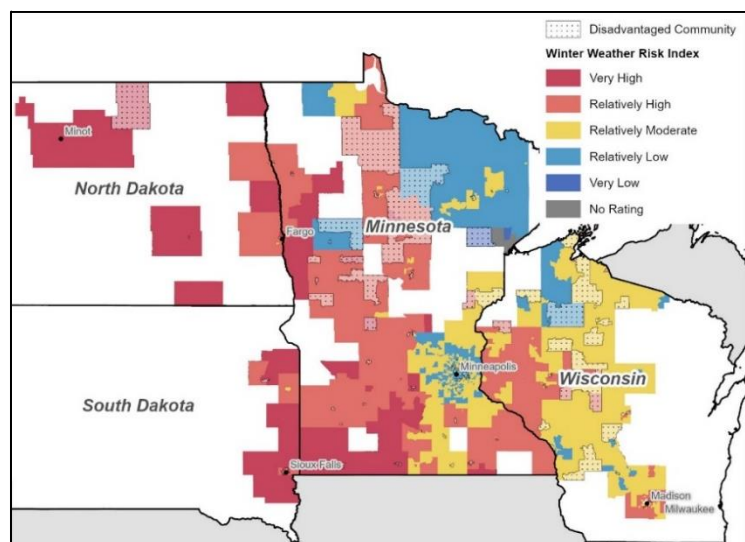


Figure 2 Winter Weather Risk, Disadvantaged Communities and Xcel Energy Minnesota and Wisconsin overlap

¹ <https://hazards.fema.gov/nri/data-resources>

extreme weather disasters throughout our service territory, including numerous disadvantaged communities²

1.B Project Goal

Grid Resiliency Challenges Addressed by this Project. Xcel Energy's footprint in Colorado, New Mexico and northwest Texas are all areas of high and increasing wildfire risk. Further, Xcel Energy serves customers in the upper Midwest including Minnesota and Wisconsin and these geographies are experiencing increasing severity of winter weather as well as increased flood risk and significant wind and hail events. Events like those are "high impact, low probability" incidents (HILP) with a low likelihood of occurring but posing significant safety, financial, and/or operational risk. Climate change is increasing the severity and frequency of HILP events, and they are projected to increase in future years. The company discloses and reports on these and other climate-related risks in alignment with the recommendations of the Taskforce on Climate Related Financial Disclosures (TCFD).³ We understand the increasing risk HILP events pose to our operations and the need for mitigation and resiliency. Moreover, HILP weather events can disproportionately impact certain populations – e.g., Black, Indigenous and People of Color communities that tend to be more vulnerable to such emergencies.

The projects in this application fall under three main workstreams: 1) Grid Resiliency, 2) Monitoring Technology, and 3) Community Resiliency. These projects are aimed at either wildfire or extreme weather and HILP event risk:

Wildfire Risk Reduction Projects

Xcel Energy will implement seven projects in our Colorado, New Mexico and Texas service territory which will provide system-wide wildfire risk mitigation including: non-expulsion fuses, 6,000 wood pole fire resistant coating, wildfire safety settings for restoration response, undergrounding 14 miles of high-risk distribution circuits, hazard tree clearing, wind strength testing and fire spread modeling. Further, we will partner with the World Resources Institute to demonstrate a school bus-to-building EV demonstration project providing a facility that will maintain power in the event of a wildfire-caused system disruption. Lastly, in partnership with WeaveGrid, we will develop an EV charging program to ensure vehicles that may be needed to evacuate a fire area are charged and ready to go.

Extreme Weather, High Heating and Cooling Days in the Upper Midwest

In our Upper Midwest territory, our proposed projects related to mitigating the increasing risks of extreme weather events include advanced technology deployment of satellite imagery for hazard tree identification, and ultimate removal; undergrounding for storm resiliency for select distribution infrastructure segments; microgrid development for Black, Indigenous, and People

² [Explore the map - Climate & Economic Justice Screening Tool \(geoplatform.gov\)](#)

³ Xcel Energy (2022), "Managing Risks and Opportunities in the Transition to a Net-Zero Future." [Managing-Risks-Opportunities-in-the-Net-Zero-Transition-\(TCFD-Response\).pdf \(q4cdn.com\)](#)

of Color community centers in Minnesota; and a system resilience installation for a water treatment plant, a critical infrastructure component in Wisconsin.

1.C DOE Impact

Xcel Energy seeks \$100 million through the Grid Resiliency and Innovation Partnerships program to support a total investment of (b) (4) in the Wildfire Mitigation and Extreme Weather Resiliency project to expand and accelerate grid resiliency improvements throughout our service territory. Specifically, DOE funding will enable Xcel Energy to expand and accelerate deployment of wildfire risk reduction, system hardening and undergrounding projects which otherwise will likely be delayed and implemented at a much smaller scale. DOE funding will leverage Xcel Energy's currently planned resiliency investments over the next five years, increasing the total investment in these activities from \$ (b) (4) to (b) (4).

After historic wildfire and extreme winter weather events experienced in Colorado, wildfires in New Mexico, or Winter Storm Uri in Texas, Xcel Energy is committed to making significant investments to strengthen our electric system and make the grid more resilient to wildfires and extreme weather. Our state regulators support our pursuit of a more resilient system. Collaboration with DOE under the GRIP program will help us balance the cost of system improvements and advance a more resilient grid. Finally, this project will demonstrate a highly scalable and replicable model of robust wildfire mitigation and system hardening solutions for other utilities to adopt: **Xcel Energy is a thought leader in the industry and is one of the top 10 US utilities by market capitalization⁴**; others frequently seek to emulate Xcel Energy's initiatives.

1.D Community Benefits Plan: Job Quality and Equity

Xcel Energy's service territory includes 2,376 census tracts that are Disadvantaged Communities identified in the Climate and Economic Justice Screening Tool (CEJST). The funding from DOE for this project will ensure that more of those residents are receiving the safe, reliable, and resilient energy service they need, and support Disadvantaged Communities' ability to be more resilient themselves by providing critical services before, during and after an emergency. Further details on the plans for these projects to support labor engagement, job quality, workforce development and training, diversity, equity, inclusion and accessibility, supply chain and Justice40 are included in the Community Benefits Plan documents in the application.

1.E Potential Long-Term Constraints on Resources and/or Clean-up Strategy

Grid resiliency and monitoring technology activities will be confined to existing Xcel Energy property and rights-of-way, while some community resilience activities (e.g., microgrids) will be installed on customer property. Proposed equipment installations will be conducted on existing Xcel Energy infrastructure or in collaboration with customers on their property and will not entail construction of new facilities and will not cause disturbance to new land or community resources.

⁴ Xcel Energy named a World's Most Admired Company by Forbes magazine: [Corporate Recognition | Xcel Energy](#)

1.F Climate Resiliency Strategy

Xcel Energy is committed to being a net-zero greenhouse gas energy provider by 2050 including net-zero energy delivery to its gas LDC customers and zero-carbon service to its electric customers by 2050. This ambitious goal, developed with input from IPCC climate scientists, will only be achieved if the customer service continues to be affordable and reliable⁵. The resiliency solutions described in this application are directly supportive of our overall climate resiliency strategy and our ongoing commitment to reliable service in all of our served communities.

2 Technical Description, Innovation, and Impact

2.A Relevance and Outcomes

Xcel Energy proposes to undertake the following specific activities to expand and accelerate our efforts to mitigate wildfire and extreme weather impacts in our service areas and to demonstrate transformational technologies that fundamentally change the cost paradigm for enhancing grid resilience. This project will provide case studies reducing the perceived risk of adoption, demonstrate each value proposition, and promote replication and private sector investment. Table 1 shows the comprehensive approach taken with each item described below.

Hazard	Grid Resiliency	Monitoring Technology	Community Resilience
Wildfire	Wood Pole Fire Resistant Coating Non-Auto Reclosing System Non-Expulsion Fuses Undergrounding	UAS Inspection with AI Processing and Integration WSS Restoration Response Fire Spread Modeling Wind Strength Testing	PSPS – EV Charging PSPS – Community Center Resiliency
Extreme Weather	USFS Hazard Tree Clearing Undergrounding Vegetation Management	Satellite Imagery Identification of Hazard Trees	BIPOC DER/MG Backup Power and Adaptive Capacity Water Treatment Plant Resiliency

Grid Resiliency

1. Wood Pole Fire Resistant Coating: Xcel Energy will expand and accelerate its program for application of a fire-resistant coating or wrap to its wood pole infrastructure. This treatment increases wood pole resiliency and survivability against wildfire. Across the company's three state primary wildfire risk areas, the company will target 6,000 wood poles for treatment. The communities that will benefit from this program are those in or near the areas with elevated wildfire risk such as the northern panhandle region in Texas, southeastern New Mexico, and the heavily forested regions of the Western and Eastern Slopes in Colorado. Xcel Energy will evaluate and prioritize projects in identified disadvantaged areas.

⁵ [2019 Leading%20the%20Clean%20Energy%20Future_CRR.pd \(xcelenergy.com\)](#)

- 2. Hazard Tree Clearing Program:** Xcel Energy has been working for some time on hazard tree clearing, including a collaborative effort with the United States Forest Service (USFS) to support vegetation management on assets in USFS lands. This project seeks to expand and accelerate Xcel Energy's tree clearing program by increasing the frequency of inspection and mitigation activity from the current bi-annual periodicity to make it an annually reoccurring priority. This program is focused on mitigation of dead and dying trees, as well as healthy trees that have an obvious defect which could lead to eventual failure.
- 3. Non-Auto Reclosing System Protection Program:** The objective of non-auto reclosing system protection is to enable our system to operate more conservatively in areas with increased wildfire risk. In this program, the settings on powerline protection equipment provide greater sensitivity and faster tripping when wildfire risk is elevated. This protection equipment interrupts the current flow on the line segment when it detects a fault or other issue, such as a tree branch contacting a power line or power lines galloping due to high wind. With enhanced powerline safety settings, the line will remain de-energized until crews can patrol the area and ensure it is safe to restore service.
- 4. Non-Expulsion Fuses:** The devices addressed in this project are primarily fuses and lightning arresters that have the potential to cause ignition during operation or failure. An expulsion fuse is designed to quench a fault with water vapor from internal elements. Traditional fuses can have hot particles expelled from the fuse tube when it operates, which can lead to ignition. Arresters are devices that are designed to mitigate lightning surges by providing a path to the ground, away from conductors. They can be a potential source of ignition when they fail, when a lightning surge produces energy beyond the capacity of the arrester. Fuses and arresters are found adjacent to every overhead transformer, every transition point from overhead to underground lines, and many other pieces of equipment. This project will install non-expulsion devices, which have been tested and proven not to ignite flammable material in standard operation or in failure mode.
- 5. Undergrounding High Risk Circuits on the Distribution System:** Undergrounding of distribution lines removes the fire ignition risk and improves system reliability and resiliency against extreme weather events. Under this project, Xcel Energy will expand and accelerate its planned undergrounding program to include additional undergrounding projects for 14 miles of overhead distribution lines in high-risk areas near critical community infrastructure and high-density residential complexes.
- 6. Undergrounding for Storm Resilience on the Distribution System in Minnesota and Wisconsin:** This program will convert overhead distribution lines that are subject to frequent storm related outages to underground. The goal is to harden the system and reduce overall impact from storms on customers and Company resources. Key distribution lines will be converted in areas with high storm and vegetation exposure. The company has extensive experience with undergrounding projects; however, this project targets system resiliency

benefits and looks to scale the process. In addition to undergrounding, covered conductor and other construction methods will be considered.

7. **Vegetation Management Mainline Reclamation in High Reliability Risk Circuits:** In areas of repeated vegetation outages or low tolerance for outages, Xcel Energy's VM department will target key sections of the distribution system for the removal of larger trees or establishment of wider clearances between the conductor and vegetation at the time of maintenance work. This will improve the electric reliability of the system by reducing the likelihood of vegetation-caused faults, including long duration outages due to damaged poles and conductors.

Monitoring Technology

1. **Unmanned Aerial System (UAS) Advanced Use: Pole Inspection for Distribution Assets:** The Electric Distribution Wildfire Risk Mitigation Pole Inspection Program will use UAS technology, a streamlined 'virtual inspection' process for drone-collected data, and automated generation of downstream work notifications to enable scaled operations for pre-wildfire season inspection and mitigation work related to poles and associated distribution equipment. This monitoring program will implement strategic planning, scheduling, and execution of UAS missions to annually inspect 25% of distribution poles in areas of wildfire risk—a much higher-frequency and lower-cost solution than what has been done using phased foot patrol inspections in the past. Artificial intelligence (AI) models will process thousands of images to contextualize and classify them, automatically annotating and prioritizing defects. Engineers will review defects through a collaborative process, where they can adjust annotations, contributing toward machine learning by further training the AI models. Work notifications will seamlessly integrate into Xcel Energy's enterprise work management system, sending the contextual information needed to resolve defects.
2. **Wildfire Safety Settings (WSS) Restoration Response Program for Electric Transmission and Distribution Lines:** The Wildfire Enhanced Powerline Safety Settings (WSS) Restoration Response Program will focus on a strategic shift in how Xcel Energy conducts outage inspections and response activities, from current conventional methods such as foot patrols and helicopter flights, toward the use of UAS and beyond visual line of sight (BVLOS) operations leveraging remotely deployed, autonomous UAS. When powerlines in areas of elevated wildfire risk are impacted by a fault condition or foreign object strike, WSS equipment interrupts the power supply to the affected line until the line can be patrolled and confirmed safe for restoring power. Restoration response currently involves foot patrols or aerial inspection by helicopter, and in some cases UAS flights performed by an onsite pilot; the response time duration may be hours, depending on environmental conditions and accessibility. This program will seek to improve and accelerate WSS restoration response, beginning with the introduction of technology to support automated drone inspections with predetermined flight routines for affected powerline segments, operated by onsite pilots. The program will also introduce enhanced automation of restoration response operations, where strategically placed drones are deployed remotely to fly pre-defined routines for

inspection data capture on affected powerline segments; this will include a third-party consultation engagement to pursue and secure the appropriate FAA waivers and exemptions to support BVLOS mission flights with ranges of 100 miles or more. The program will further enable BVLOS operations through the acquisition and implementation of local radar systems, ADSB receivers and transmitters, and a Detect-and-Avoid (or similar) technology system. The program will also deliver a streamlined workflow that uses artificial intelligence models for identifying, classifying, and confirming defects that require immediate action, along with integration of priority work orders into the enterprise work management system to address these defects.

- 3. Fire Spread Modeling Software:** This project will refine and update the existing static wildfire risk model currently used by the Company and replace it with industry-leading wildfire risk modeling software. This wildfire risk modeling software utilizes advanced fire spread prediction algorithms and dynamic weather data inputs to achieve enhanced wildfire risk identification and consequence estimates. Each day this fire spread modeling software evaluates the current and 3-day forecasted weather conditions along with data for wind speed/direction, moisture levels, and ground fuel conditions to predict where a wildfire might spread if an ignition were to occur and provides valuable insight on the potential consequences of wildfires on the Company's electric transmission and distribution grids. The dynamic nature of this wildfire risk modelling method enables the Company to continually identify the key areas and electric assets with the greatest risk.
- 4. Wind Strength Testing:** Overhead power lines must be able to withstand a variety of conditions. Line strength and the ability to meet standards can be affected by age, environment, and modifications to the lines themselves. The Distribution Wind Strength Reviews ensure that the NESC standards are met or exceeded, with a particular emphasis on lines that have increased wildfire risk. The objective of the wind strength reviews is to identify the physical strength of the distribution structures and clearance of the supported overhead lines. This is accomplished by using LiDAR data to build accurate models using Power Line System Computer-Aided Drafting and Design (PLS-CADD) software. The models provide an accurate assessment of an asset's strength capacity using the as-built condition and identifies structures with insufficient strength to withstand extreme wind conditions. The Distribution Wind Strength reviews will enhance Xcel Energy's ability to identify potential structural weaknesses before failure by evaluating the results and utilizing predictive analysis to determine where to apply various system hardening techniques.
- 5. Hazard Tree Identification Using Satellite Imagery Analysis:** The Vegetation Management (VM) department, in collaboration with technology vendor, **AiDash**, will use recently procured high resolution satellite imagery and compare against a georectified GIS conductor centerline shapefile to identify fall-in risk trees and trees that appear to be dead or declining in health, and will analyze contractor trimming-clearances achieved. This functionality will provide situational awareness that would otherwise only be available by manual field

assessments, which are less reliable and more costly and will enable Xcel Energy to schedule projects based on highest risk potential of electric reliability impacts.

Community Resiliency

1. **Efficient and Effective Public Safety Power Shutoffs Solutions:** In the event of immediate fire danger to assets and communities, public safety power shutoffs (PSPS) may be necessary and deployed. The impact of these disruptions in service needs to be minimized. To help do so, Xcel Energy will undertake the following activities to develop or enhance PSPS processes and protocols across our service territory:
 - a) **Electric Vehicle Drivers:** In collaboration with its technology partner, **WeaveGrid**, Xcel Energy will develop tools to ensure that electric vehicle (EV) drivers are alerted, and the company is aware of their charging needs as PSPS is deployed. Building upon the Company's rates and managed charging programs, this project will encourage EV charging during times outside of wildfires and safety events. Customers in this project will be prompted to allow Xcel Energy (via WeaveGrid) to collect EV charging data through vehicle telematics and charging equipment. Insights from telematics and charging equipment data will enable a more tailored approach to notifying participants of wildfires and safety events that may impact their EV charging experience and encourage them to charge ahead of events and through high-risk periods. Customers enrolled in active managed charging programs (e.g., Charging Perks) in Xcel Energy's territories will be able to opt into automated charging schedules that would be optimized for wildfires and safety events.
 - b) **Community Center Power:** During PSPS events, it will be vital to establish emergency evacuation centers where impacted citizens will have access to food, shelter, and communications should they be required to leave their homes. These sites should be equipped with reliable back-up power systems, preferably with ones that reduce negative environmental impacts and can be implemented cost effectively. A potential solution is to utilize electric school buses as emergency back-up power supplies. As school districts electrify their fleets, the availability of electric school buses (e-bus) in rural communities will become ubiquitous. Bus manufacturers are incorporating bi-directional (charge/discharge) capabilities into electric buses as a standard feature. In collaboration with **World Resources Institute (WRI)** and our school district and industry partners, Xcel Energy will develop an e-bus back-up power solution to serve critical loads within a designated resiliency center. This design can be used as a blueprint to enable similar installations throughout at-risk communities.
2. **Microgrids Supporting Black, Indigenous, People of Color (BIPOC) Community Resilience:** Xcel Energy is currently planning for the Resilient Minneapolis Project (RMP) which will install solar/battery microgrids at three BIPOC community centers that will serve as "resilience hubs" to provide critical services (cooling/heating, food services, communications, medical

services, etc.) to vulnerable populations in the event of an electric system outage.⁶ We intend to expand on this same model by using DOE funds to install one additional solar/battery microgrid(s) working with BIPOC partners in our Minnesota service territory. Considering the desire to deliver resilience improvements to the most people possible, for the fourth site we will prioritize one larger microgrid incorporating several different buildings and load types, rather than multiple small microgrids on the RMP model. Together, all four microgrids will incorporate solar PV generation, battery energy storage systems (BESS), microgrid controllers, associated hardware (switchgear, transformers, inverters), and interconnection to an existing feeder. The fourth microgrid may additionally include technologies appropriate for the location and community, not included in the RMP, such as electric vehicle charging and electric heating/cooling systems. The primary grid outcome sought will be backup power and adaptive capacity to support critical services in an emergency. For all four microgrids, when in non-emergency conditions, the BESS will be used for different grid services, such as managing system- and feeder-level peaks, demand management, solar time shifting, voltage and reactive power support, and revenue generation via charging off-peak and discharging on-peak. Going beyond the RMP, we will incorporate a workforce training and career pathways program for installation, operation and maintenance of the distributed energy technologies included in the microgrids.

3. **LaCrosse, Wisconsin Water Treatment Plant Resiliency Project:** Xcel Energy will work with the city of LaCrosse to install a microgrid at the local wastewater treatment plant. This project is innovative in that it pairs a previously planned clean energy digester gas combined heat and power (CHP) system with a BESS and microgrid controller to maximize the use of this clean energy source. This means that the plant can reduce its carbon footprint and decrease its dependence on fossil fuels. In the event of a grid failure, the microgrid can continue to provide power to the plant, ensuring that critical operations such as sewage treatment can continue uninterrupted. This project aims to serve as a model for other similar facilities in the region and beyond.

2.B Feasibility

Xcel Energy's operational workforce, largely represented by the International Brotherhood of Electrical Workers, would complete much of the work detailed within this application allowing for speed to completion that would benefit the resilience efforts. We have already tested and demonstrated every system-wide solution proposed within this application and are ready for full deployment of those solutions at scale.

The project Microgrids Supporting BIPOC Community Resilience uses commercial technologies – solar PV, energy storage systems, microgrid controls, etc. – but combines them in new ways to support the ability of BIPOC community centers to serve as “resilience hubs” for vulnerable populations. A resilience hub is a facility designed to support residents and coordinate resource

⁶ Resilient Minneapolis Projects - City of Minneapolis (minneapolismn.gov)

distribution and services before, during, or after a natural hazard event; it can also be used year-round as a neighborhood center for community-building and revitalization, to reduce GHG emissions, and improve local quality of life.⁷ Xcel Energy has prior experience working with BIPOC community organizations to create such resilience hubs both in Colorado (the Community Resilience Initiative, with microgrids at 6 community sites⁸) and in Minnesota (the Resilient Minneapolis Project, microgrids at 3 sites working with African American and Native community organizations⁹). These microgrids will be installed in an urban/suburban setting, and we anticipate no major new transmission or distribution infrastructure.

For the UAS projects, Xcel Energy has a long-standing history of working with the Federal Aviation Administration to develop and expand the capabilities of UAS operations in the national air space. We have held an “Integration Partnership Agreement” or “Partnership for Safety Plan” for the past 6 years and currently maintain our existing one. The technology aligns with the goal of the company to improve resilience/reliability, bring technology to the field, and reduce our customers’ bills. The company’s UAS program is growing in resources and capabilities, and we continue to have active projects to implement new tools, technology, processes, and workflows into our business including further build out of a data management solution for remote sensing data. Our projects will build a foundation for exponential growth in the future. Data collection is easy but gaining value from the data at scale is the problem.

2.C Innovation and Impacts

2.C.1 Innovation and Overall Impacts

Through implementation of these projects, Xcel Energy will extend and accelerate the grid resiliency benefits of its wildfire mitigation, undergrounding, system hardening, and vegetation management programs. Specific outcomes and benefits will include:

Reduction in outage frequency: Enhanced and accelerated wildfire mitigation and related vegetation management activities will reduce the frequency and risk of long duration outages from wildfires and other vegetation related impacts. Applying a fire-resistant coating or wrap on existing wood pole assets will increase pole survivability against wildfires. Additional resilient structures in our system reduce the likelihood of sustained outages and lead to faster restoration time for our customers.

Reduction in cost and time for system asset diagnostics, upgrades and replacements: The Unmanned Aerial System (UAS) Pole Inspection for Distribution Assets Program will support grid resiliency through the proactive identification and resolution of pole and equipment defects, yielding a more up-to-date system built with new materials and updated standards to withstand

⁷ See Urban Sustainability Directors Network, 2018. *Resilience Hubs: Shifting Power to Communities and Increasing Community Capacity*, <https://ppp-ejcc.com/wp-content/uploads/2020/03/USDN-Resilience-Hubs-2018.pdf>.

⁸ The six Community Resilience Initiative sites are Alamosa Recreation Center, the Arvada Center for Arts and Humanities, Denver International Airport, the Denver Rescue Mission, the National Western Center, and the Nederland Community Center.

⁹ The three Resilient Minneapolis Project sites are Sabathani Community Center, Minneapolis American Indian Center, and the North Minneapolis Community Resiliency Microgrid.

environmental impacts and operational issues far more effectively than aged, degraded equipment. The ability to inspect a growing percentage ($\geq 20\%$) of Xcel distribution pole assets in wildfire risk areas on an annual basis will increase resiliency through accelerated identification of and resolution of defects. UAS will also decrease outage restoration and patrol times in difficult terrain like heavily vegetated areas or mountains. These areas typically come with high wildfire risks but also longer than usual outages due to the terrain. Our effort aims to reduce outage restoration durations as well as decrease the overall count of outages.

Improved critical infrastructure resilience: Implementation of the undergrounding and system hardening projects in the proximity of hospitals, police stations, fire stations, water treatment facilities, community emergency operations centers, and high-density residential complexes will contribute directly to enhancing the resiliency of critical community infrastructure. Community Resiliency projects will allow operation of critical infrastructure even when large outages occur.

Enhanced public safety: Enhanced processes and tools as protocols for managing public safety power shutoffs (PSPS) will reduce the risk related to immediate wildfire danger to grid assets and communities.

Support for resilience hubs: The benefits for the communities surrounding the microgrid resilience hubs and PSPS projects will be immediate and long lasting. Solar/battery microgrids at four total sites providing adaptive capacity to community centers will enable these sites to function as resilience hubs for their neighborhood, continuing to provide critical services (shelter, cooling/heating, food provision, communications) in the event of a grid outage caused by a high-impact, low-probability weather event. We also intend to explore the feasibility of connecting a greater number of facilities in a single microgrid, increasing the size and diversity of loads supported and the potential benefits of the microgrid to a partner community.

2.C.2 Alignment with State, Local, Tribal, Regional, and National Goals

Xcel Energy is committed to continuous improvement of grid resilience and has invested significantly in grid modernization projects over the past decade. The wildfire mitigation, system hardening, and targeted undergrounding projects will expand and accelerate our efforts to improve service reliability and system resilience across our multi-state service territory. Grid resiliency will be improved both in specific locations and at the system level, benefitting all customers and contributing directly to enhanced regional grid resiliency.

Wildfire Mitigation Impacts on Community and Regional Resilience. Wildfire in Colorado is an increasing threat to the lives and livelihoods of the state's residents. Sixteen of the 20 largest fires in the state's history have occurred in the last 13 years.¹⁰ Xcel Energy Colorado developed its first wildfire mitigation plan and submitted it to the Colorado Public Utilities Commission in 2019 and again in 2021. The Commission has approved projects and proposals to reduce wildfire risk. While the work has continued in earnest, wildfire continues to be a priority for the state and Xcel Energy to reduce wildfire risk either to or caused by energy infrastructure.¹¹ In 2022 New

¹⁰ [Historical Wildfire Information | Fire Prevention and Control \(colorado.gov\)](https://colorado.gov/government/departments/department-of-natural-resources/wildfire-prevention-and-control)

¹¹ [Coloradans Urged to Reduce Wildfire Risk During Wildfire Awareness Month - Colorado State Forest Service \(colostate.edu\)](https://colostate.edu/news/coloradans-urged-to-reduce-wildfire-risk-during-wildfire-awareness-month)

Mexico suffered from raging wildfires across the state, with blazes driven by high winds, exceptionally dry vegetation and low humidity. Collaboration with our regulators on wildfire mitigation projects and discussion of plans benefitting at risk communities is key to our strategy.

Extreme Weather Mitigation Impacts on Community and Regional Resilience. More than four billion dollars of damage events from extreme weather occurred in our Midwest territory in 2022¹². The increasing likelihood and frequency of extreme weather events in Xcel Energy's upper Midwest service territories further illustrates the need for the expansion and acceleration of our overhead to underground conversion and system hardening efforts. DOE funding will support expansion and acceleration of these plans to expedite the transition to underground lines with higher resiliency during storms and extreme weather and will expedite our pole management and vegetation management projects, all of which will contribute directly to enhanced local and regional resilience. The first three, RMP microgrids are located at BIPOC-led organizations in BIPOC-majority neighborhoods. The additional fourth location will be developed with one or more BIPOC communities in our Minnesota service territory.

2.C.3 Impact on Reducing Risk, Further Deployment, and Private Investment

Xcel Energy is committed to making long-term investments in advancing proven solutions as well as novel initiatives to improve and accelerate electric grid resiliency and grid modernization. Some of the proposed projects involve deploying proven technology in new applications or under more extreme conditions. For example, the project involving fire resistant coating on utility poles will help us understand the feasibility and challenges of applying the coating or wraps in rugged mountainous terrain or in areas with limited access to the structures. Some of the projects involve deploying new advanced technologies to prove viability and scalability of advanced resiliency technologies, such as the UAS inspection project with enhanced AI models. Successful implementation and demonstration of these technology solutions will provide highly transportable and scalable solutions that can be adopted across the utility sector. This project will demonstrate a highly scalable and replicable model of robust wildfire mitigation and system hardening solutions for other utilities to adopt.

2.C.4 Reducing Likelihood and Consequences of Disruptive Events

As discussed in the prior sections, all three workstreams will leverage enabling technologies and partnerships to increase resiliency of the grid and mitigate the consequences of disruptive events. Improving our asset resiliency minimizes the catastrophic and cascading impacts of a single point of failure.

The Microgrids will reduce the likelihood and consequences of power outages caused by extreme weather. While outages are relatively rare on Xcel Energy's electrical grid overall, they could become more common in the future as climate change creates more extreme weather and more intense precipitation. Community centers able to "island" from the larger grid, restoring power within a few seconds when an outage occurs, will have dramatically lower likelihood of extended outages than the surrounding area. More importantly, microgrids will reduce the consequences

¹² Oak Ridge National Laboratory analysis of events causing disturbance affecting at least 50,000 customers.

of such outages for vulnerable populations. Community members previously disproportionately impacted by outages – due to economic circumstances, lack of air conditioning/heating or access to food, inability to relocate temporarily, lack of a financial buffer for emergencies, pre-existing health vulnerabilities and needs for medical assistance, etc. – will now have a secure location to take refuge and receive services until power is restored.

Using UAS as another tool for electric and gas infrastructure inspections allows for inspections to be completed more safely, more efficiently, more frequently, and with less environmental impact. This approach allows the company to better maintain the health of its assets, ensuring that risk- and operational-based decisions are made with the most accurate data available.

2.C.5 Impact on Mitigating Hazards, Wildfire, and/or Consequences of Outages

1) **Grid Resiliency** – These projects aim to increase resiliency and mitigate the risk of wildfire and HILP events on electric assets. By increasing the resiliency of assets by projects such as undergrounding or fire-resistant pole coatings, and by decreasing wildfire risk with projects such as hazard tree clearing, overall risk management and resiliency to HILP and wildfire events will be greatly increased.

2) **Monitoring Technology** – These projects will install new technologies, software, artificial intelligence, and processes to enable more efficient monitoring of resiliency work. Aerial patrols (UAS, helicopter, airplane) increase the identification of overhead electric power infrastructure 40-60% over traditional ground/foot patrols. Xcel Energy is setting up programmatic inspections to increase the ability, capability, and scale of overhead inspections to further identify risks and remove them from the system. Fire spread modeling software will allow the company to identify key areas with greatest risk and prioritize resiliency projects better and more efficiently.

3) **Community Resiliency** – These projects, including the microgrid solutions and the PSPS projects, will help increase the grid resiliency of the communities. These projects will allow impacted communities to island from the larger grid for a short or extended outage and support the continued delivery of critical services by a community center serving as a “resilience hub” for vulnerable populations, increasing the grid resiliency of local areas.

2.C.6 Additionality of Grant Funding

DOE funding will enable Xcel Energy to expand and accelerate deployment of wildfire and HILP event risk reduction, system hardening, and undergrounding projects which otherwise will likely be delayed and implemented at a much smaller scale. This funding will allow us to build more microgrids than currently available, 14 miles of undergrounding, 6,000 pole hardening projects, and the other project outcomes that would not be able to be implemented at all or at a much smaller and slower scale than without grant funding; as well at a lower cost to our rate payers. DOE funding will leverage Xcel Energy’s currently planned resiliency investments over the next five years, increasing the total investment in these activities from \$ (b) (4) to \$ (b) (4).

3 Workplan

3.A Project Objectives

The objective of the Wildfire Mitigation and Extreme Weather Resiliency for Xcel Energy is to accelerate and enhance ongoing resiliency programs to minimize grid impacts from wildfires, winter storms and other HILP environmental events.

Workstream	Objectives
Grid Resiliency	Increase resiliency on our current electric operations equipment, both distribution and transmission systems, through coating wood poles in areas with elevates wildfire risk, convert overhead distribution lines to underground, replacing distribution protective equipment with modern/non-expulsion devices, test to determine maximum wind and snow load for each pole in the system, and conduct vegetation management activities to remove hazards clear mainlines.
Monitoring Technology	Leverage enabling technologies such as drones and fire spread modeling software to develop and deploy semi-autonomous pole inspection workflow, fully automate restoration response operations for effect powerline segments, and establish industry-leading wildfire risk modeling software.
Community Resiliency	Partner with private companies, research entities, and communities to demonstrate community resiliency systems in disadvantaged communities (DAC) and BIPOC communities including electric vehicle driver wildfire alert structure, electric school buses as a resiliency asset, community microgrids that create resilience hubs, and a microgrid at a water treatment plant.

Buy America Requirements for Infrastructure Projects: This project will involve the construction, alteration, maintenance and/or repair of public infrastructure in the United States. While Buy America requirements may not apply to this project because Xcel Energy Services Inc. is a for-profit entity (per OMB M-22-11 and as explicitly stated in Appendix C of the Funding Opportunity Announcement DE-FOA-0002740), Xcel Energy is committed to meeting Buy America requirements to the extent applicable to the project. The Buy America Waiver can be found in the attached application.

3.B Technical Scope Summary

This project has five budget periods, spanning January 2024 – December 2028. Each period includes scope from each of the workstreams:

Budget Period	Workstream	Technical Scope Summary
BP1 Q1 2024 – Q4 2024	Grid Resiliency	Analyze and Identify project deployment locations. Complete design and workplan of implementation
	Monitoring Technology	Start design and training of artificial intelligence models; conduct planning and set-up activities for wildfire safety settings restoration response deployment. Final setup and configuration of key inputs needed for the Fire Spread Modeling software.
	Community Resiliency	resiliency center partner selection, project scoping and RFP; site selection for microgrids;
BP2 Q1-Q4 2025	Grid Resiliency	Initial project implementation.
	Monitoring Technology	Continued deployment of UAS & Software; updated plans and refinement based on previous year operations.

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Budget Period	Workstream	Technical Scope Summary
	Community Resiliency	Manage electric driver resiliency program participation and ESB demonstration; continue BIPOC microgrid project community outreach and workforce training/career pathway activities and build detailed design and execution installation; conclude construction of LaCrosse Water Treatment plant resiliency project and start execution of operation
BP3 Q1-Q4 2026	Grid Resiliency	Continue to execute project portfolio deployment. conclude execution of hazard tree clearing
	Monitoring Technology	Continue testing, evaluation, and reporting of projects. Utilize output from Fire Spread Modeling to assist with future work prioritization and risk-based selection of assets to harden.
	Community Resiliency	Continue to manage, operate, monitor, and report on partner programs and microgrid operations. Continue microgrid outreach and workforce development.
BP4 Q1-Q4 2027	Grid Resiliency	Continue to execute project portfolio deployment.
	Monitoring Technology	Conclude deployment of UAS inspection workplan and wildfire safety settings restoration response deployment. Utilize output from Fire Spread Modeling to continue to enhance risk-based decisions on asset hardening.
	Community Resiliency	Continue to manage, operate, monitor, and report on partner programs and microgrid operations. Continue microgrid outreach and workforce development.
BP5 Q1-Q4 2028	Grid Resiliency	Conclude deployment of remaining projects;
	Monitoring Technology	Continued updates and enhancements to the Fire Spread Modeling algorithms
	Community Resiliency	Complete management of electric driver resiliency program participation and provide ongoing reporting on success metrics; Continue microgrid projects operation and reporting.

3.C WBS and Task Description Summary

Milestones for each sub-task are captured in section 3.D.

<p>1. Overall Project Management and Planning - scope as required for the SOPO including Project Management Plan (PMP), National Environmental Policy Act (NEPA) compliance, and continuation briefing(s).</p> <p>1.1. Project Management Plan (PMP) - Within 30 days of award, Xcel Energy Services Inc. shall submit a Project Management Plan (PMP) to the designated Federal Project Officer (FPO). Xcel Energy Services Inc. shall not proceed beyond Task 1.0 until the PMP has been accepted by the FPO.</p> <p>1.2. National Environmental Policy Act (NEPA) Compliance - As required, Xcel Energy Services Inc. shall provide the documentation necessary for NEPA compliance.</p> <p>1.3. Continuation Briefing(s) - Xcel Energy Services Inc. will brief DOE on roughly an annual basis to explain the plans, progress and results of the technical effort. The briefing shall also describe performance relative to project success criteria, milestones, and the Go/No-Go Decision point that are documented in the Project Management Plan (PMP).</p>
<p>2. Grid Resiliency</p> <p>2.1. Wood Pole Fire Resistant Coating – Identify circuits and wood poles that are in the area of elevated wildfire risk (approximately 3,000 poles each in PSCo and SPS). Once the target poles have been identified, each pole will be evaluated to determine the appropriate fire-retardant product and installation method (spray-on coating or fiber-mesh wrap).</p>

<p>2.2. Undergrounding High-risk circuits on the distribution system - Risk of ignition and outage history will be reviewed to prioritize which circuits would benefit from undergrounding. Schedule of work, materials, and design will be executed.</p>
<p>2.3. Non-expulsion Fuses - Perform a comprehensive fuse coordination study on all identified wildfire feeders to ensure adequate system protection is maintained when performing a changeout of an expulsion type fuse with a non-expulsion type fuse. In conjunction with these replacements, locations for fault indicators (FIs) will be installed to ensure quick fault location identification occurs when line crews are working to restore power after a fault occurs.</p>
<p>2.4. Hazard Tree Clearing – Expand a current, bi-annual program to become annual for the identification of high-risk hazard trees on T&D circuit-based projects. This program is currently referred to as the Mountain Hazard Tree Program and includes identification of hazard trees (i.e., trees that have an unacceptable level of risk scene or predicted within a targeted timeframe). All projects within the Company’s WF risk zone would be patrolled annually for these trees, versus bi-annually today. Trees meeting the risk criteria would be mitigated through tree felling or reducing the tree’s height</p>
<p>2.5. Vegetation Management Mainline Reclamation in High Reliability Risk Circuits – perform more detailed tree inspections to identify failure risk, perform clearing to achieve 10-feet to 20-feet of clearance at time of maintenance through pruning and tree removals (compared to routine work which targets achievement of 6-feet minimum). Annually the program will be reviewed to assign overall budget and assess criteria used to determine highest priority circuits, i.e., those circuits and sections of circuits which have potential to have large contributions to SAIDI results and have trees present.</p>
<p>3. <u>Monitoring Technology</u></p>
<p>3.1. Unmanned Aerial System (UAS) pole Inspection for Distribution Assets – jointly define scope of work and deliverables schedule with software development partner Airtonomy, internal Data Science team AI model development timeline, procure drones and sensory equipment. Start deployment of drones and sensory equipment to field; test, train and deploy end-to-end solution.</p>
<p>3.2. WSS Restoration Response Program for Electric Transmission and Distribution Lines – development of the end-to-end workflow to support autonomous BVLOS UAS operations; AI models for identification, classification, and ranking of line and equipment defects requiring immediate restoration response action; integration of priority work orders into enterprise asset management system; procurement of FAA waivers to enable BVLOS, Operations Over People, and One-to-Many Operations; acquisition and deployment of local radar systems, ADSB receivers and transmitters, and Detect-and-Avoid technology system.</p>
<p>3.3. Fire Spread Modeling Software – purchasing the licensing for industry-leading wildfire spread modeling software that is commercially available and configuring it for the SPS service areas (Texas and New Mexico). In addition, the current advanced fire spread modeling software that has been implemented in Colorado will be expanded to cover additional square miles of the service territory for electric distribution and transmission assets located within the eastern plains of Colorado.</p>
<p>3.4. Wind Strength Testing – to inspect via LiDAR equipped helicopters the pole loading and strength of poles withing the wildfire zone. This inspection includes modeling of ice load and wind speed as well as an inspection of the integrity of the pole and the equipment on the pole.</p>
<p>3.5. Hazard Tree Identification Using Satellite Imagery Analysis – Analytics of vegetation risk relative to infrastructure proximity (i.e., trees with fall-in risk to powerlines) and the tree(s)’ health will be used to guide scheduling of projects and ordering of projects to be worked during each calendar year. Areas or projects with higher concentrations of hazard trees identified through the technology analytics will be prioritized sooner that projects with lower counts of identified hazard trees. The data and analytics deliverable coming from the technology partner, AiDash, will be reviewed regularly.</p>
<p>4. <u>Community Resiliency</u></p>

4.1.	Electric Vehicle Drivers for Efficient and Effective Public Safety Power Shutoff Solutions - defining eligible evacuation centers with proper access, identification of site critical loads relevant to evacuation activities, determination of system design, and project preparation activities. To provide resilience to the community, depleted ESB batteries must be recharged so they can be deployed again as needed. As the ESBs are typically stored and operated from depots with large parking lots, installation of renewable onsite power generation (typically solar canopies) and stationary battery energy storage systems (BESS) would allow ESBs to return to the depot, charge and be dispatched again to evacuation center. At the bus depot, numerous components will need to be installed and operational.
4.2.	Electric School Buses as a Resilience Asset - A collaboration with WRI aims to create a resilience center which can be provided with back-up power through a bi-directional electric school bus (EBS). The project has objectives to develop a process for dispatching ESBs to the resilience center in times of emergency and document the solution to create a blueprint to replicate these systems in other communities impacted by PSPS events.
4.3.	Microgrids Supporting Black, Indigenous, People of Colors (BIPOC) Community Resilience – Install four total microgrids (3 RMP sites plus one or more additional BIPOC community center sites) supporting community resilience in emergencies. Work with host communities to develop and deliver training program in microgrid technologies to form training and career launch services to cohorts.
4.4.	LaCrosse WI Water Treatment Plant Resiliency – The City of La Crosse is working with Xcel Energy to install a microgrid - including a battery energy storage system, advanced microgrid controls, and system enhancements - to leverage renewable digester gas-fueled combined heat and power and standby generation to support the wastewater treatment plant in the event of a utility outage. A future phase would support additional grid modifications and components to include other facilities, including the all-electric municipal bus charger.
5. <u>Community Benefits Plan</u>	
5.1.	Planning -includes detailed community Outreach Plan for area wide and specific location project deployment, benchmark initial J40 metrics and internal workforce gaps.
5.2.	Implement phase 2 of the Community Benefits Plan -integrating the outreach plan, educating communities on project benefits, finalizing J40 metrics through community input, and creating workforce capable of operating new resiliency project technologies.
5.3.	Implement Phase 3 of the Community Benefits Plan -Continuing outreach through project deployment and using initial outreach to further Justice40, DEIA, and community engagement and consideration.
5.4.	Implement Phase BP4 & BP5 of the Community Benefits Plan -Continuing outreach through final project installations and continued project operations.

3.D Milestone Summary

Budget Period, Schedule	WBS	Milestone	Means of Verification
BP1, (b) (4)	2.4.	Hazard Tree Clearing - Assign annual plan to contractors. Reviewed production and financial reports.	Design Plan
	3.3.	Fire Modeling Software - Setup and Configuration of software to New Mexico and Texas service areas complete	System
	4.4.	LaCrosse Microgrid – design and planning complete	Design Plan
BP1, (b) (4)	2.1.	Wood Poles – Finalized work plan for PSCo and SPS	Workplan
	2.4.	Hazard Tree Clearing - Reviewed monthly production and financial reports. Identified adjustments made in workplan.	Workplan

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Budget Period, Schedule	WBS	Milestone	Means of Verification
	3.1.	UAS - Requirements complete for fleet and mission management, AI model, end-to-end inspection workflow, and work notifications.	Report
	3.3.	Fire Modeling Software - Final testing and validation of fire spread model output (TX and NM) complete	Report
BP1, (b)(4)	2.1.	Wood Poles – execution schedules developed	Schedule file
	3.5.	Hazard Tree Identification – Developed pilot program work plan and finalized field analytics validated results. Completed pilot program.	Report
	2.4.	Hazard Tree Clearing - Reviewed monthly production and financial reports. Identified adjustments made in workplan.	Report
	3.2.	WSS - BVLOS waiver application submitted for XE Operations in PSCO Regions with initial low-risk criteria	Copy of waiver submission
	4.1	WeaveGrid – Enrollment or authorization pathway to migrate existing EV program participants into this project’s passive and active managed charging service levels launched.	Functioning enrollment platform
	4.2.	ESBs as Resilience Asset - Project scoping and design/stakeholder input complete	Workplan
	4.3.	BIPOC Microgrids - Preliminary microgrid design completed; critical loads identified.	Site drawings and/or one-lines
	5.0	Community Benefits - Complete Detailed Community Benefit Plan, including phase 2 outreach plan, Supplier Diversity Analysis, initial labor gap analysis, and initial benchmarking of J40 metrics	Report
BP1, (b)(4)	2.2.	Undergrounding - Design, materials and planning complete	Report
	2.3.	Non-Expulsion Fuses - 10% of feeders complete	Report
	3.4.	Wind Strength Testing - 20% of feeders complete	Report
	3.5.	Hazard Tree Identification - Following year’s program schedule build complete	Schedule file
	2.4.	Hazard Tree Clearing - Documented year-end results. Following year’s annual plan built.	Report
	2.5	Mainline Reclamation - Identified workplan adjustments complete. Documented year-end results. Following year’s annual plan build complete.	Design Plan and Report
	3.1.	UAS - 20% of Distribution System Inspection for Wildfire Risk Zone completed via UAS	Report
	3.1.	UAS - Delivery of initial AI imagery inspection model and ML pipeline from UNITI	System
	3.1.	UAS -Delivery of work notification app configurations to support automated work notifications for wildfire pole inspection scenarios	System
	4.3.	BIPOC Microgrids - EPC contractor selected	Contract signed
BP2, (b)(4)	4.4	LaCrosse Microgrid – Construction Completed, initial operations started	Functioning BESS and control system
BP2, (b)(4)	3.2.	BVLOS waiver application submitted for XE Operations in PSCO Regions with revised (more expansive) criteria	Copy of waiver submission
BP2, (b)(4)	4.2	ESBs as Resilience Asset - RFP results within budget and timeframe	Contract Signed
BP2, (b)(4)	2.2.	Undergrounding - 4 miles complete	Report
	2.3.	Non-Expulsion Fuses - 30% of feeders complete	Report
	3.4.	Wind Strength Testing - 40% of feeders complete	Report
	3.5.	Hazard Tree Identification – Year’s workplan execution complete. Following year’s program schedule build complete.	Report

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Budget Period, Schedule	WBS	Milestone	Means of Verification
	2.4.	Hazard Tree Clearing - Reviewed monthly production and financial reports. Identified adjustments made in workplan. Documented yearend results. Following year's annual plan built.	Report
	2.5	Mainline Reclamation - Identified workplan adjustments complete. Documented year-end results. Following year's annual plan build complete.	Design Plan and Report
	3.1.	UAS - 40% of Distribution System Inspection for Wildfire Risk Zone completed via UAS	Report
	3.1.	UAS - Delivery of subsequent AI imagery inspection model(s)	System
	3.2.	WSS - Delivery of initial AI imagery inspection model and ML pipeline from UNITI supporting restoration response	System
	4.1	WeaveGrid – Reach 1,000 participant target for electric driver resiliency project	Count of active participants
	4.3.	BIPOC Microgrids - microgrid permitting, site preparation, and construction complete.	Report
	5.0	Community Benefits - Complete BP2 Report including reporting on completed outreach, finalized list of J40 metrics with initial J40 report, and workforce development report	Report
	3.2.	WSS - Delivery of work notification app configurations to support automated work order creation for WSS restoration response scenarios	System
	4.2	ESBs as Resilience Asset – Complete ESB resiliency installations	Visual Review
BP3, (b)(4)	2.2.	Undergrounding – 7 miles complete	Report
	2.3.	Non-Expulsion Fuses - 50% of feeders complete	Report
	3.4.	Wind Strength Testing - 60% of feeders complete	Report
	3.5.	Hazard Tree Identification – Year's workplan execution complete. Following year's program schedule build complete.	Report
	2.4.	Hazard Tree Clearing - Reviewed monthly production and financial reports. Identified adjustments made in workplan. Documented year-end results. Following year's annual plan built.	Report
	2.5	Mainline Reclamation - Identified workplan adjustments complete. Documented year-end results. Following year's annual plan build complete.	Design Plan and Report
	3.1.	UAS - Delivery of subsequent AI imagery inspection model(s)	System
	3.2.	WSS - Delivery of subsequent AI imagery inspection model(s)	System
	4.3.	BIPOC Microgrid - microgrid operational (demonstrated by successful island mode operation in actual or simulated outages); first cohort of workforce training program graduates	Report
	5.0	Community Benefits - Complete BP3 Report including completed outreach and BP3 J40 report	Report
BP4, (b)(4)	2.1.	Wood Poles –Final report	Report
	2.2.	Undergrounding – 10 miles complete	Report
	2.3.	Non-Expulsion Fuses - 80% of feeders complete	Report
	3.4.	Wind Strength Testing - 80% of feeders complete	Report
BP5, (b)(4)	4.2	ESBs as Resilience Asset – Disseminate project results nationally	Report
	2.2.	Undergrounding – 14 miles complete	Report
	2.3.	Non-Expulsion Fuses - 100% of feeders complete	Report
	3.4.	Wind Strength Testing - 100% of feeders complete	Report

Budget Period, Schedule	WBS	Milestone	Means of Verification
	4.1	WeaveGrid - Complete report on jointly defined success metrics for driver engagement and managed charging in response to wildfire and safety events	Report
	5.0	Complete BP4 & 5 report including completed outreach and J40 outcomes	Report

3.E Go/No-Go Decision Points

Budget Period	Workstream	Go/No-Go Decision Point
BP1	Grid Resiliency	Right-of-way access plan and applicable permits obtained. Analysis and Design of projects completed
	Monitoring Technology	Delivery of initial AI models and work notification app configuration
	Community Resiliency	Executed RFPs and Vendors/Contractors selected
BP2	Grid Resiliency	30% of feeders, 10 miles of undergrounding, and identified workplan adjustments complete.
	Monitoring Technology	Delivery of initial WSS and subsequent UAS AI imagery inspection models
	Community Resiliency	microgrid permitting, site preparation, and construction complete.
BP3	Grid Resiliency	BP3 project schedules completed for projects
	Monitoring Technology	Delivery of subsequent WSS & UAS AI imagery inspection models
	Community Resiliency	Microgrid has achieved commercial operations
BP4	Grid Resiliency	80% of feeders, 50 miles of undergrounding, and wood poles complete
	Monitoring Technology	Delivery of subsequent WSS & UAS AI imagery inspection models
	Community Resiliency	Microgrid has achieved continued commercial operations

3.F End of Project Goal

WBS Subtask (Project)	End of Project Goal(s)
2.1 Wood Pole Fire Resistant Coating	Install fire protection on approximately 6000 wood poles in high wildfire risk areas by end of BP4.
2.2 Undergrounding High Risk Circuits on the Distribution System	14 miles of overhead Distribution high risk circuits across Xcel Energy Services have been converted to underground by end of project.
2.3 Non-Expulsion Fuses	Replace all fuses in wildfire risk areas with non-expulsion fuses by end of project.
2.4 Hazard Tree Clearing Program	Have zero controllable wildfire ignitions due to hazard tree failures striking our utility infrastructure by BP5.
2.5 Vegetation Management Mainline Reclamation	Achieve a reduction in SAIDI results compared to year beginning forecasts by end of project.
3.1 Unmanned Aerial System (UAS) Pole Inspection for Distribution Assets	Deploy UAS with final AI imagery inspection model to expand capability for inspection, monitoring, and response action for defects in high-wildfire threat areas by 40% than with methods today.
3.2 Wildfire Safety Settings (WSS) Restoration Response Program	Complete WSS programs with enabling technology to reduce outage duration impacts by end of BP5.
3.3 Fire Spread Modeling Software	Integrate fire spread modeling software in each service area and validation testing report by BP5
3.4 Wind Strength Testing	All feeders within the wildfire zone will have wind strength testing and analysis completed by BP5.
3.5 Hazard Tree Identification Using Satellite Imagery Analysis	Target hazard tree mitigation where the greatest operational or risk benefit will be gained overuse of traditional means.
4.1 WeaveGrid: EV Drivers	1000 customers enrolled in PSPS EV charging project by end of project

WBS Subtask (Project)	End of Project Goal(s)
4.2 WRI: Community Center Power	Operational PSPS ESB Community projects by BP5
4.3 Microgrids Supporting Black, Indigenous, People of Color (BIPOC) Community Resilience	Fully operational microgrid(s) by end of BP3; demonstrates successful island-mode operation in event of an outage (or simulated outage in absence of actual outage during project term). BIPOC hosts self-report that the project is meeting their community needs. At least one cohort has graduated from workforce training program and is on track to secure family-wage jobs in the energy industry.
4.4 LaCrosse Water Treatment Plant Resiliency	Install fully operational microgrid at city wastewater treatment plant by BP2, with continued operation by end of project

3.G Project Schedule

The Wildfire Mitigation and Extreme Weather Resilience projects will be executed over a five-year period from early 2024 through 2028. DOE support, combined with the fact that many of these projects involve enhancements to and acceleration of existing programs, will ensure these projects are rapidly deployed.

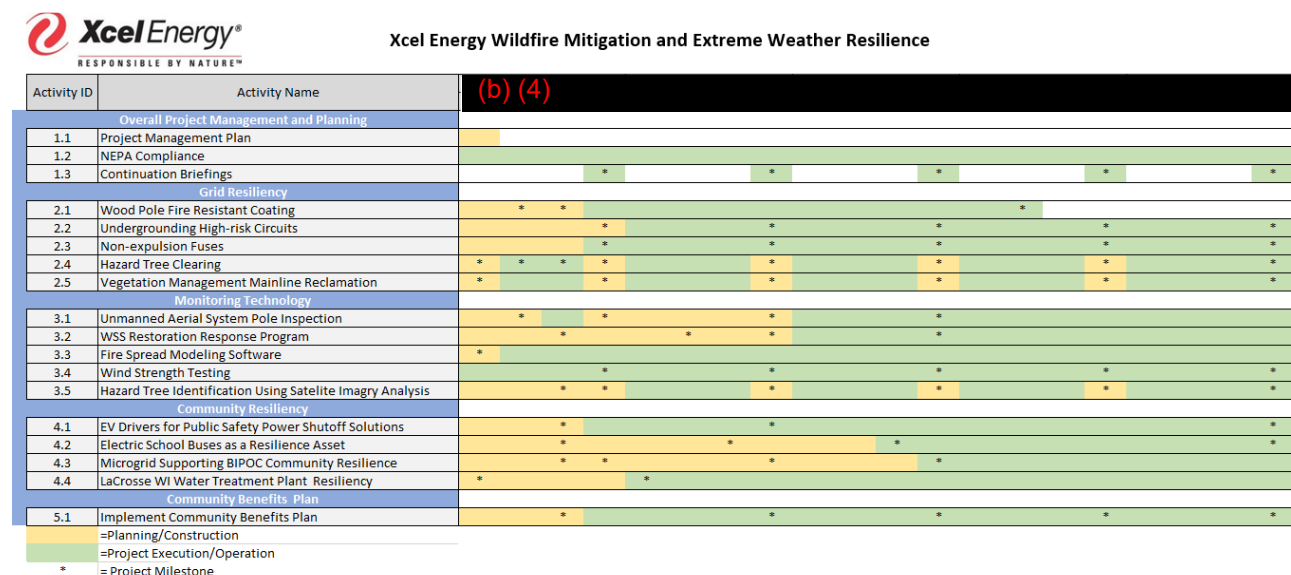


Figure 3 – Project Schedule

3.H Project Management

Each project in this application will have a specified project manager, which can be seen in 4.D. These managers will work with their specific project teams to execute on projects and deliverables and work with Jason Mauch, the overall principal investigator (PI) to complete all deliverables to the DOE, whose resume is included in this application. Jason has over 20 years of experience in risk and resiliency management and has been the program manager for \$ (b)(4) resiliency project portfolios for the company in the past. Fletcher Johnson, Director of Vegetation Management & Pole Integrity with 30 years of experience in the industry, will oversee the planning and execution management of vegetation management activities including the Hazard Tree Clearing program in PSCo, Hazard Tree Identification using Satellite Imagery in all operating companies, and vegetation management Mainline Reclamation in High Reliability Risk circuits

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project scopes in all operating companies. Tom Stegge, Senior Program Manager, Unmanned Aircraft Systems (UAS), will manage the project scope related to drone use.

Xcel Energy will leverage established lines of communication with the DOE and others to keep them apprised of project success, lessons learned, and other efforts associated with the projects. Day to day project activities will be overseen by the PI who will work with the project leads to ensure that timelines and critical path are maintained, and progress as prescribed in the plan. The PI, with the support of the project team, will submit deliverables to the DOE as required and to provide status updates, guidance, and approvals.

Project Risk Mitigation. Xcel Energy has established an initial risk register which identifies, prioritizes, and develops strategies to deal with risks associated with implementation of the Wildfire Mitigation and Sever Weather Resiliency project. A summary of the primary risks and related mitigation factors are noted below. The project risk register will be updated during project initiation and as needed during subsequent phases.

Risk Category	Mitigation Factors
Labor Constraints – potential labor shortages may impact the pace and scale of the proposed activities, particularly related to the construction activities.	Xcel will leverage an existing robust network of contractors with extensive Xcel project experience to secure labor commitments and long-term agreements well in advance of installation activities.
Financial – substantial investment will be required to satisfy cost-share requirements and execute the various project activities.	Xcel’s size, credit standing, and available liquidity will enable Xcel to conduct the project on balance sheet with no obligation to obtain external financing.
Supply Chain – ongoing global supply chain constraints could lead to delays in project execution. Portions of the project schedule will be driven by long-lead material procurement. With existing supply chain constraints, lead times have been greatly increased for many electric distribution components.	Xcel has implemented enhanced procurement programs mitigating supply chain constraints. Xcel will enter agreements with the project technology vendors pre-award to obtain priority access to inventory.
Permitting/Interconnection – many project activities will require Federal, State and County level permits, including NEPA reviews, all of which will impact schedule.	Xcel has a wealth of experience securing environmental and land permits including state and federal jurisdictions.
Stakeholder Acceptance – policy makers, labor organizations and communities may not be adequately informed about planned Xcel project activities.	Combined with the engagement activities described in our Community Benefits Plan, Xcel will provide clear and concise messaging to state/local governments as well as community/labor leaders to ensure stakeholders are informed of activities and progress.
Technology and Innovation – proposed technology innovations may not perform as anticipated.	Xcel is collaborating closely with the project technology vendors to ensure seamless integration with Xcel’s planned projects. The proposed technology solutions have previously been successfully deployed at commercial scale.

4 Technical Qualifications and Resources

4.A Team Qualifications and Expertise

Xcel Energy, based in Minneapolis, Minnesota, operates in eight states and provides a comprehensive portfolio of energy related products and services to 3.7 million electricity customers and 2.1 million natural gas customers. Xcel Energy operates over 300,000 miles of electric transmission and distribution lines and over 40,000 miles of natural gas transmission and distribution lines. It operates 20,000MW of generating capacity and has total assets valued at \$57.9 billion.

WeaveGrid is a software company that helps utilities increase the adoption of electric vehicles through EV-specific rate support, managed charging programs, and distribution-level optimization. WeaveGrid's technology leverages embedded vehicle telematics—data, controls, and communication systems—as well as networked charging equipment to deliver robust and scalable programs. Their approach enables broad participation in utility programs with high levels of customer satisfaction while helping reduce the overall costs to serve EV loads. WeaveGrid's team includes alumni from leading automotive, energy, and technology companies including Tesla, General Motors, National Grid, Alphabet (Google), Pacific Gas & Electric, Salesforce, Meta (Facebook), ChargePoint, Enel X, and Itron. The WeaveGrid team brings deep knowledge and expertise of utility systems and customer-facing processes and programs, enabling WeaveGrid to successfully deliver sophisticated programs.

The World Resources Institute (WRI) Through their [Electric School Bus Initiative \(ESBI\)](#), WRI is working with national partners, such as the Electric Power Research Institute (EPRI), on implementation of vehicle-to-everything (V2X) applications with electric school buses. WRI and partners have developed a Mutual Aid Agreement for implementing bi-directional ESBs as mobile power units for emergency response. This project will take the lessons from recent work and implement them in a real-world deployment. The lessons learned from this project can be disseminated nationally to school districts, relevant state and local agencies, and other key stakeholders. This project can be replicated and create a blueprint of how to successfully deploy ESBs as resilience assets.

4.B Equipment and Facilities

Xcel Energy will leverage existing team assets to rapidly deploy the Wildfire Mitigation and Severe Weather Resiliency projects. All proposed work will address company-owned assets and will be executed on company property and within existing ROW enabling rapid deployment of DOE-supported projects. Many of the proposed activities are accelerations and extensions of existing programs and partnerships to prevent outages and modernize the grid. Prior Work and Demonstrated Innovations

Prior Experience with Similar Tasks, Risks, and Complexity. Xcel Energy has extensive experience with planning, designing, permitting, construction and operation of multi-year, multi-billion-dollar projects. This experience covers the distribution, transmission, generation, and nuclear sectors of its business. Its current five-year budget has \$ (b) (4) of investment. Xcel Energy is currently working on a Joint Development Agreement with Airtonomy to develop a UAS/remote

sensing data management and analytics platform. One of very few on the market Airtonomy's UNITI product enables data to be contextualized automatically and deliver the business rapid insight from 1,000's of photos every day. This project has spanned all aspects of the company's operations, and continues to be an on-going development effort, ensuring that the data we collect is valuable for years to come.

Prior Collaborations between Teaming Partners. Xcel Energy is currently working in partnership with the DOE on several projects including contract DE-NE00009038 to complete a demonstration of integrating a high temperature steam electrolysis (HTSE) system with a nuclear power plant. Xcel Energy also collaborates with the National Labs, including the National Renewable Energy Laboratory, on research and development of resilient and clean energy systems. Further Xcel Energy is working with WeaveGrid on customer transportation electrification programs as part of the company's approved Transportation Electrification Plans. World Resources Institute is a stakeholder and NGO partner that Xcel Energy has collaborated with for years. Xcel Energy has prior exemplary work experience with the FAA and other partners to develop and operationalized advanced utilization of UAS. FAA was the first to receive a nationwide BVLOS waiver to operate UAS for Transmission Line inspections.

4.C Time Commitment of Key Team Members

Summary Table of Key Team Members by project task

Project	Project Lead(s)	Time Commitment
Principle Investigator, Fire Spread Modeling Software	Jason Mauch	(b) (4)
Wood Pole Fire Resistant Coating	Jae Lee (PSCo), Corby White (SPS)	each
Unmanned Aerial System (UAS) Pole Inspection for Distribution Assets, Wildfire Safety Settings (WSS) Restoration Response Program	Tom Stegge	
Hazard Tree Clearing Program, Vegetation Management Mainline Reclamation in High Reliability Risk Circuits	Fletcher Johnson	
Undergrounding for Storm Resilience on the Distribution System, Non-Expulsion Fuses, Wind Strength Testing	Craig Holt	
Electric Vehicle Drivers (WeaveGrid collaboration)	André Gouin, Amelia Longo	
ESB as a Resiliency Service (WRI collaboration)	Gregg Kresge, Lori Bird	
Microgrids Supporting Black, Indigenous, People of Color (BIPOC) Community Resilience	Nick Martin, Jessica Lau	
LaCrosse, Wisconsin Water Treatment Plant Resiliency project	Ethan Trepp	
Community Benefits Plan	Kelly Flenniken (PSCo), Trisha Duncan (NSP), Brad Baldrige (SPS)	