Greeley City Council Agenda

Work Session

Tuesday, December 10, 2024 at 6:00 PM

City Council Chambers at City Center South, 1001 11th Avenue, Greeley, CO 80631
via Zoom at: https://greeleygov.zoom.us/j/82235659594

NOTICE:

City Council Meetings are held on the 2nd and 4th Tuesdays of each month in the City Council Chambers. Meetings are conducted in a hybrid format, with a Zoom webinar in addition to the in-person meeting in Council Chambers.

City Council members may participate in this meeting via electronic means pursuant to their adopted policies and protocol.

Members of the public are also invited to view Council work sessions in person or remotely. **Work Sessions do not include public input in any format. Public comment is only permitted at regular Council meetings on the 1st and 3rd Tuesdays of each month.**

Watch Meetings:

Meetings are open to the public and can be attended in person by anyone.
Meetings are livestreamed on the City's website, Greeleygov.com as Youtube.com/CityofGreeley as well as over Zoom webinar. Public participation in the Zoom webinar only allows viewing the meeting.

Meeting agendas, minutes, and archived videos are available on the City's meeting portal at https://greeleyco.portal.civicclerk.com/ For more information about this meeting or to request reasonable accommodations, contact the City Clerk's Office at 970-350-9740 or by email at cityclerk@greeleygov.com If you need the following documents in an alternative format for accessibility purposes, please contact the City Clerk's Office at cityclerks@greeleygov.com or 970-350-9740.

City Council
Work Session Agenda

Tuesday, December 10, 2024 at 6:00 PM

City Council Chambers at City Center South, 1001 11th Avenue, Greeley, CO 80631
via Zoom at: https://greeleygov.zoom.us/j/82235659594

1. Call to Order
2. Pledge of Allegiance
3. Roll Call
4. Reports from Mayor and Councilmembers
5. Xcel Energy Update
6. Alquist 3D Update
7. Scheduling of Meetings, Other Events
8. Adjournment

Work Session Agenda Summary

Title:

Reports from Mayor and Councilmembers

Background:

Board/Committee	Meeting Day/Time	Assignment
Airport Authority	3rd Thu, 3:30 p.m.	Payton/Gates
Board/Commission Interviews (Team of 2)	monthly as needed	Council Rotation
CML Executive Board Opportunity	as needed	Hall
CML Other Opportunities	as available/desired	
CML Policy Committee (Council or Staff)	as needed	Hall/Lee Gates alternate
Downtown Development Authority	3rd Thu, 7:30 a.m.	Butler/DeBoutez
Employee Health Board	as needed	DeBoutez
Highway 34 Coalition	as needed	Olson
Highway 85 Coalition	as needed	Gates
Historic Preservation Loan Committee	as needed	DeBoutez
Human Relations Commission	2nd Monday, 5 p.m.	DeBoutez
Interstate 25 Coalition	as needed	Olson
Island Grove Advisory Board	1st Thu, 3:30 p.m.	Butler
National League of Cities Transportation and Infrastructure Services Committee	as needed	Olson
Parks & Recreation Board	1st Friday, 7 a.m.	DeBoutez
Police Pension Board	quarterly	McDonald
Poudre River Trail	1st Thu, 7 a.m.	Hall
Regional Opioid Council	as needed	Gates
Transportation/Air Quality MPO	1st Thu, 6 p.m.	Olson/Payton
Upstate Colorado Economic Development	last Wed, 7 a.m.	Gates
Water & Sewer Board	3rd Wed, 2 p.m.	Gates
Weld Project Connect Committee (United Way)	as needed	Olson
Youth Commission Liaison	4th Mon, 6 p.m.	McDonald

Work Session Agenda Summary

December 10, 2024
Key Staff Contact: Paul Trombino, Public Works Director, Peter Perez, Director of Emergency Management

Title:
Xcel Energy Update

Background:
This informational presentation will provide the City Council with an update from Xcel Energy, one of the leading utility companies in Colorado. As part of their ongoing efforts to enhance service delivery, reduce risks, and meet the evolving needs of Coloradans, Xcel Energy has developed a series of improvements for the Northern Colorado area. This includes upgrades to infrastructure, expansion of renewable energy sources, and enhanced safety protocols. A key component of these improvements is their wildfire mitigation plan, which has been submitted to the Colorado Public Utilities Commission (CPUC). The commission is currently accepting comments on this plan.

As described by Xcel Energy, its key features of this wildfire mitigation plan are:

- Public Safety Power Shutoff (PSPS) program is a tool of last resort use to proactively de-energize power lines when weather conditions pose extremely high wildfire risks.
- Enhanced Powerline Safety Settings (EPSS) program is active during periods of high fire risk. These settings make powerlines more sensitive to quickly stop the flow of energy if an issue is detected by the system, like a tree branch or other object touching the power line.
- Expanded Situational Awareness with expanded expertise and new weather stations in higher risk locations and the deployment of AI cameras.
- Expanded and Refined Wildfire Vegetation Management with the goals of reducing the frequency and potential of vegetation-caused outages and ignitions and reducing the consequences of severe weather events.
- Infrastructure Inspections using drone technology for defect and maintenance inspections, a comprehensive asset registry in high-fire threat areas, and three-dimensional maps of the equipment, the surrounding terrain, and nearby vegetation.
- Expanded Stakeholder Engagement including outreach and communication efforts to customers, local offices of emergency management (OEM), public safety partners, governmental and non-governmental institutions, and community organizations.

Strategic Focus Area:
Business Growth
Infrastructure and Mobility
Quality of Life

Attachments:

1. Xcel 2025-2027 Wildfire Mitigation Plan
2. Xcel Enhanced Powerline Safety Settings Factsheet
3. Item 5 - Presentation

Xcel Energy®

2025-2027 WILDFIRE MITIGATION PLAN

Public Service Company of Colorado

June 27, 2024

CONTENTS

1. MESSAGE FROM EXECUTIVE LEADERSHIP

Chairman Eric Blank
Commissioner Megan Gilman
Commissioner Tom Plant
1560 Broadway, #250
Denver, Colorado 80202

Dear Chairman and Commissioners:

Delivering safe, reliable, affordable, and clean energy to the customers and communities we are privileged to serve is an obligation and commitment we do not take lightly. This Wildfire Mitigation Plan is a key component of how we will meet the commitment to keep our customers and communities safe.

As I mentioned during the May 6 Commissioners' Information Meeting, the nature and extent of wildfire threat continues to evolve, posing a public safety risk to our communities. Climate change is driving severe weather and drier conditions. This means wildfires are an ongoing threat in regions across Colorado. Xcel Energy is committed to public safety, and to reducing wildfire risk for our customers, communities, and way of life in Colorado. We have a clear goal: that no catastrophic wildfire in Colorado is started by our assets.

As the wildfire risk continues to evolve, the mitigations we implement are also evolving. Our 2025-2027 Wildfire Mitigation Plan builds on the over $500 million we have invested since 2020 in a variety of wildfire mitigation activities. The 2025-2027 plan integrates industry experience; incorporates evolving risk assessment methodologies; adds new technology; and expands the scope, pace, and scale of our work.

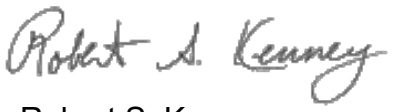
Our proposed investments and improvements are designed to reduce wildfire risk in a comprehensive and efficient manner. The plan takes into account not only the effectiveness of various mitigation activities, but also the associated costs, operational constraints, and customer impacts of those activities. Broadly, we propose to continue foundational system work, improve situational awareness and the resiliency of the system, and address emerging threats through operational mitigations, while longer-term mitigation initiatives are implemented.

We also know that engagement, education, and outreach are necessary components of our wildfire safety work. This plan recognizes that reality and includes new customer, public safety partner, and community outreach strategies. It also reflects our plan to continue engaging with key community partners across government and industry, as we all work to protect and strengthen our communities.

At Xcel Energy we are all committed to building the safe and reliable future Coloradans expect and deserve. We look forward to working with you and our communities as we

continue this important wildfire mitigation work. Thank you for your time and effort reviewing and evaluating this plan to protect our customers and communities.

Sincerely,



Robert S. Kenney
President, Public Service Company of Colorado
Xcel Energy

2. EXECUTIVE SUMMARY

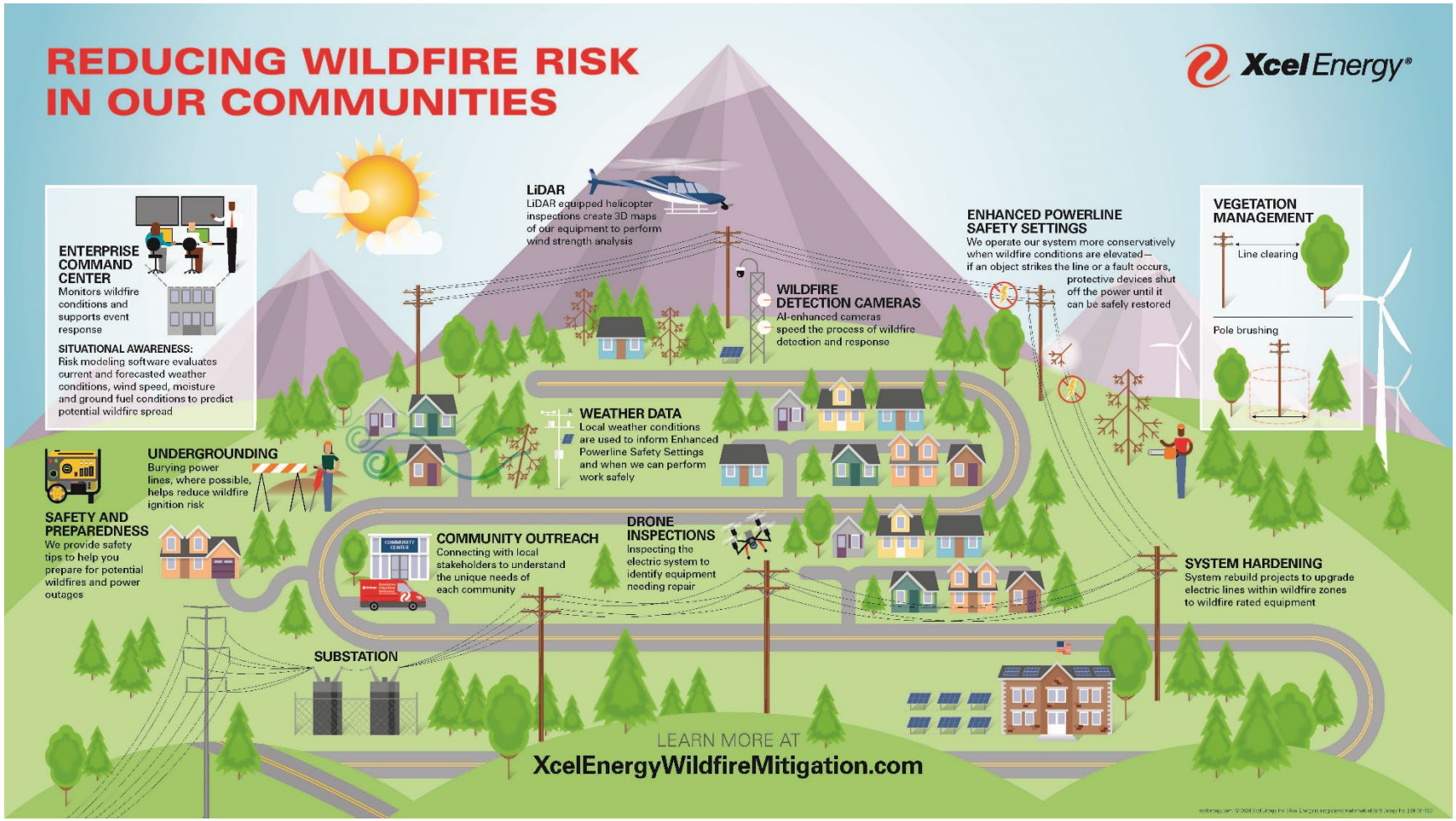
Public Service Company of Colorado ("Public Service" or the "Company") is committed to reducing the risk of wildfires to promote the safety and wellbeing of the State of Colorado and the customers and communities we serve. This commitment was demonstrated in our first Wildfire Mitigation Plan that we began implementing in 2020 (the "2020 WMP" or "Inaugural WMP"), where Public Service voluntarily and proactively initiated utility-specific wildfire risk reduction measures. The 2020 WMP was a natural progression of important Company objectives: community and employee safety, environmental stewardship, and stakeholder participation. The Company now presents our 2025-2027 Wildfire Mitigation Plan ("2025-2027 WMP" or "Updated WMP") to build on our existing efforts, integrate industry experience, incorporate new risk assessment methodologies, add new technology and expand the scope, pace and scale of the work we do. The Updated WMP reflects the Company's commitment and desire to continue to promote public safety through programs that construct, maintain, and operate the electric system in a manner that helps reduce the risk of a utility asset causing a wildfire.

Severe weather and drier conditions mean that wildfires are an ongoing threat in regions across Colorado, even areas that have not traditionally been wildfire prone. Our Updated WMP reflects the Company's continuing focus on protecting customers, enhancing the safety of Colorado's electric system and keeping the lights on while responding to a changing climate and more frequent severe weather events. As wildfire risks continue to evolve, so do the tools we are using to protect customers and communities.

The Updated WMP reflects the next step in the Company's Wildfire Risk Assessment and mitigation work, building heavily on the foundation we have previously established and implemented. Circumstances have evolved significantly since the Company's Inaugural WMP filing, and those changes have led to a step change to our mitigation efforts. In our Updated WMP, the Company is expanding existing mitigation programs, incorporating new mitigation approaches and programs consistent with utility practices, updating its approach to performing risk modeling, and focusing on the areas of its system to prioritize mitigation efforts.

A snapshot illustration of the Updated WMP and its comprehensive approaches to address wildfire risk is shown in the following Tab.

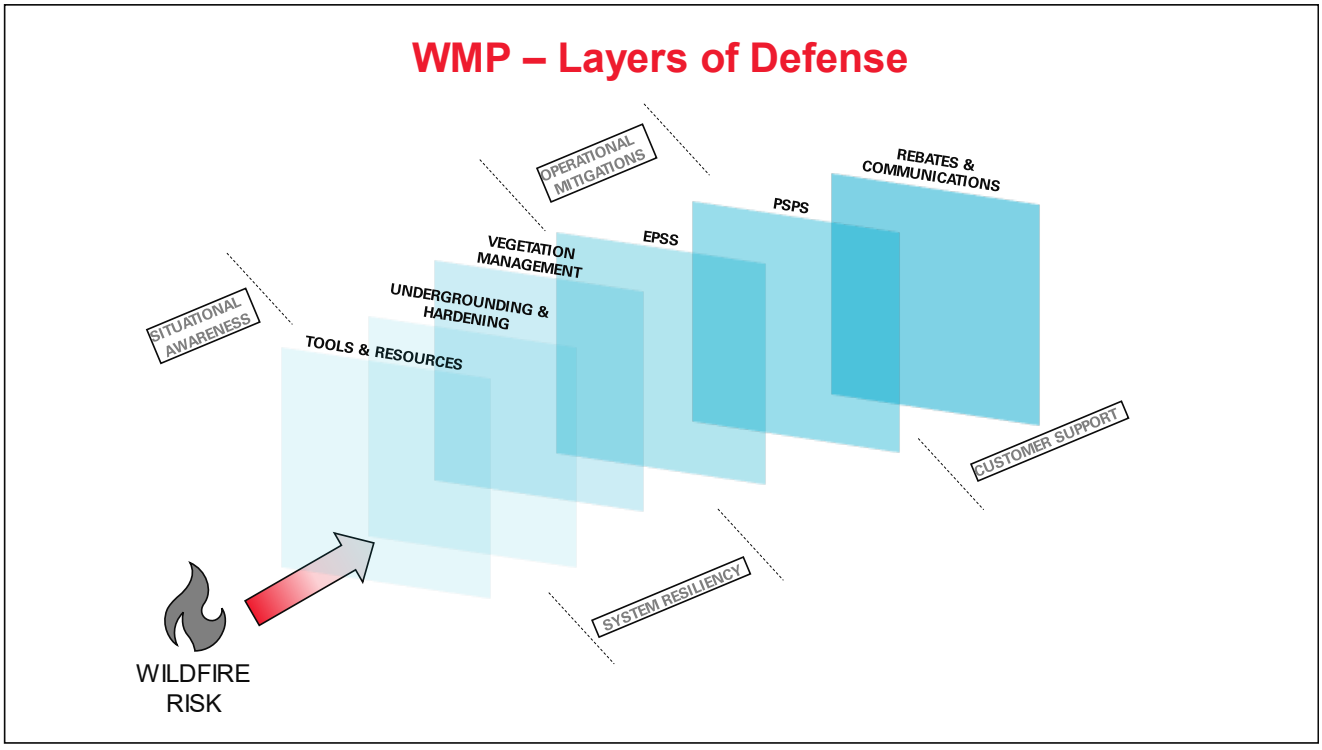
Figure D-1: 2025-2027 WMP Illustration



As promoted through an evolving risk-informed analysis, the Updated WMP will effectively reduce both the risk of the Company's facilities igniting a wildfire and the consequences of fires started throughout our service territory, regardless of their cause. The Company has developed an updated service-territory-wide Wildfire Risk Map, with assistance by EDM International ("EDM") and based on federally recognized landscape data sources. In addition, the Company has refined its approach to assess the risk reduction benefits of certain mitigation programs. The Company made those refinements through collaboration and consultation with Filsinger Energy Partners ("FEP"). Together, the updated Wildfire Risk Map and Wildfire Risk Assessment provide the Company with a data-driven approach to identifying where the highest risk areas are in our service territory, and informing the mitigation measures to employ and where the Company will prioritize work.

Public Service's mitigation measures in the Updated WMP are consistent with those that western utilities are implementing. As illustrated in the diagram below, the investments create a comprehensive, multi-layered approach to wildfire risk reduction though increased situational awareness, system resiliency, operational mitigations, and customer support activities designed to both prevent wildfire ignitions from utility infrastructure, limit the spread of fires regardless of their cause, and provide resources to our customers to mitigate the impacts of wildfires.

Figure D-2: WMP Layers of Defense



In this Updated WMP, the Company has quantified a benefit-cost ratio (referred to as "Risk Spend Efficiency" or "RSE") intended to model the cost-effectiveness of certain program elements on a specific wildfire risk-reduction basis. Not all of the Company's

mitigation activities were quantified with an RSE, as the activities were also informed from ongoing Company experience, along with support from industry learnings and practices. With the Company's comprehensive approach, we expect our suite of mitigations will help us achieve an overall risk reduction that is consistent with efforts being undertaken by other utilities, who have similarly comprehensive plans to address their own wildfire risks.

The following provides a summary of key mitigations and work activities the Company is proposing in this Updated WMP.

Greater Situational Awareness

- Adding hundreds of weather stations for granular data on temperature, humidity, wind speed and moisture levels near our power lines and equipment and monitoring during high-risk fire conditions.
- Tripling the number of Artificial Intelligence ("AI") cameras for rapid detection of fires.
- Expanding meteorology and fire science expertise to the wildfire mitigation team.

System Resiliency Investments

- Expanding the use of drone inspections and light detecting and ranging ("LiDAR") to create three-dimensional maps of equipment and terrain in high-fire threat areas.
- Updating the frequency of assessment of poles and other equipment in wildfire risk zones.
- Expanding our multi-year accelerated inspection programs to identify, analyze and repair or replace equipment that may be associated with higher wildfire risk.
- System hardening measures to help prevent contact with vegetation and animals, pole repair/replacement, equipment upgrades and major transmission line rebuilds.
- Targeted undergrounding of distribution power lines in high-risk areas.
- Accelerating and expanding vegetation management efforts in high-risk areas.

Improved Operational Mitigations

- Installing new sectionalizing protective equipment and new technology to facilitate Enhanced Powerline Safety Settings ("EPSS") and improve our facilities' capabilities to react to wildfire risk events.
- Establishing a Public Safety Power Shutoff ("PSPS") program as a wildfire mitigation tool for use in cases where risk is not adequately addressed by other methods.

Dedicated Customer Support

- Active work to educate, prepare and support customers for potential PSPS events, and to communicate and coordinate with offices of emergency management ("OEM") ahead of and during events. This includes targeted outreach to Qualifying Medical Customers, Critical Customers, income-qualified ("IQ") customers and customers in disproportionally impacted ("DI") Communities.

- Enhanced interactive web maps reflecting outage areas.
- Adding a back-up power rebate program for IQ, medical exemption rate, and medical certification program customers in high fire-risk areas.

Wildfire risk mitigation remains an evolutionary process, where improving data analytics and successful mitigation implementation will enable deeper levels of risk mitigation. The Updated WMP demonstrates the progression of Public Service's wildfire risk mitigation program. It has been designed with complementary mitigation strategies that promote prioritization of risk reduction in an expedient, comprehensive, and reliable manner. The Updated WMP and its programs, standards, and goals are intended to protect customers, enhance the safety of Colorado's electric system, and keep the lights on while responding to a changing climate and more frequent severe weather events.

Public Service looks forward to continuing collaboration with state and federal policymakers; state, local, and tribal government officials; OEMs; community-based organizations; customers; and other stakeholders to help build a safer and more fire resilient Colorado.

3. BACKGROUND

Utility Wildfire Risk Assessment and mitigation is changing, with utilities across the United States implementing updates to their operational, management, and capital programs in response to global climate change, population growth, and expanding wildland urban interface ("WUI").[1] Climate change continues to impact vegetation composition and health across the landscape. Many ecosystems are no longer fire resilient. The changing conditions increase the frequency and intensity of extreme weather events, and lead to an expansion of high wildfire risk areas. The WUI also continues to expand, increasing the probability and exacerbating the costs of wildfire damage to people and property.

Wildfire risk mitigation is an evolutionary process, where improving data analytics, new and emerging technologies, and implementation of mitigation measures will deepen the next level of risk mitigation the Company can achieve. The Updated WMP represents the continuous refinement, expansion, and improvement in Public Service's wildfire mitigation efforts and builds heavily on the 2020 WMP. Many of the foundational initiatives contained in the 2020 WMP will continue, but the Updated WMP improves upon prior work by integrating practices and experiences of other utilities, new technologies, and new and evolving risk assessment methodologies.

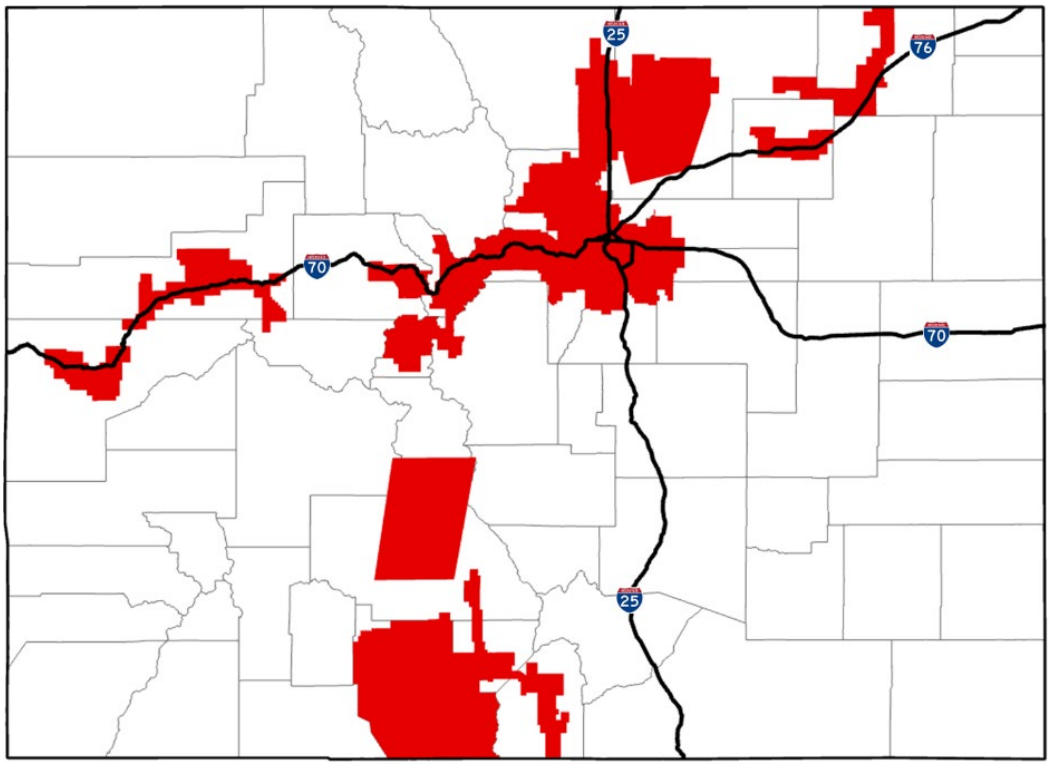
This document details the continued progression and maturity of Public Service's wildfire mitigation program, with the expanded and complementary mitigation strategies selected to promote risk reduction, in an expedient and reliable manner. The 2025-2027 WMP and its programs and goals are intended to enhance the safety, reliability, and resiliency of Colorado's electric system, respond to a changing climate, and prepare for more frequent and severe weather events. The Updated WMP reflects the Company's commitment to public safety through programs that construct, maintain, and operate the electric system in a manner that minimizes the risk of a utility asset being the ignition source for a wildfire.

A. Service Territory

Public Service is one of Xcel Energy's four operating companies and provides service to approximately 1.6 million electric customers and 1.5 million gas customers across its 8,200 square mile Colorado service area. The Company's electric service comprises more than 14,200 electric line miles, including both transmission and distribution overhead line miles. That mileage is roughly equivalent to traveling the coast-to-coast distance of the United States more than five times over. Our extensive system allows us to provide electric service to a diverse set of geographies and communities. Public Service's electric territory map is provided in the following figure.

[1] Colorado's WUI is comprised of "[an] area where structures and other human developments meet or intermingle with wildland vegetation." *Colorado's Wildland-Urban Interface,* Colo. State Forest Service, https://csfs.colostate.edu/wildfire-mitigation/colorados-wildland-urban-interface.

Figure D-3: Public Service Electric Service Territory



I. Introduction To Wildfire Risk

Investor-owned utilities in California were the first to implement comprehensive wildfire mitigation plans in response to changing climate conditions that led to a series of destructive fires within their service territories. Utilities in other jurisdictions, particularly across the Western United States, are now implementing their own wildfire mitigation programs.

Much knowledge has been gained and shared within the industry by the utilities in the Western United States; more knowledge and technological advancements have allowed for better planning and prioritization. The coordination supports how to import fire science knowledge, resources, capital, and new technology to areas deemed to have a higher probability of ignitions, and higher consequences of potential fire spread. This has resulted in mitigation plans that contain numerous layers of defense. Those mitigation strategies that are most fitting to the electrical systems and environmental conditions in the Company's service territory are described in detail within this Updated WMP.

II. Previous Wildfire Mitigation Efforts

In implementing its 2020 WMP, Public Service has made meaningful progress in identifying and reducing wildfire risk on the Company's electrical transmission and distribution systems. The Updated WMP builds upon the Company's accomplishments and represents the next step in wildfire risk assessment and mitigation. The table below highlights progress made achieving the 2020 WMP objectives and goals through 2023.

Table D-1: Summary of Public Service's 2020-2023 Wildfire Mitigation Milestones

Initiative	Wildfire Mitigation Milestones & Achievements in 2020-2023
Community Outreach	Engaged with local, county, and state entities to ensure Public Service customers, communities, and emergency responders are aware and informed of the Company's operations and the work being conducted. Educated stakeholders on the Company's wildfire mitigation practices, solicited feedback and concerns, and discussed potential new and expanded programming anticipated through this Updated WMP.
Conductor Replacement Program	Replaced 40 miles of bare secondary conductor, 159 miles of small conductor, and installed 22 miles of covered conductor. Aligned secondary and small wire replacement programs.
Equipment Design & Upgrades	Advanced the design and implementation of the following: Advanced Distribution Management System ("ADMS") control features, protection studies for feeders,[2] a sectionalizing device communications network, substation relay communication upgrades, and substation relay upgrades for Enhanced Powerline Safety Settings-enabled feeders.[3]
Equipment Inspections	Annually completed 2,832 visual inspection miles of transmission lines (primarily on foot). Collectively inspected 56,415 distribution poles via the Company's Unmanned Aircraft System ("UAS") asset inspection program, which obtains high-resolution imagery of distribution pole tops, crossarms, and equipment.
Expanded Vegetation Management ("VM") Program	Initiated the Mountain Hazard Tree activity, Defensible Space Around Poles ("DSAP" or "pole brushing") activity, established secondary voltage line clearance standards, and Right-of-Way ("ROW") vegetation type conversion in ROW (a fuel minimization initiative).

[2] As used herein, "feeders" means power lines from substations that distribute power to customers.

[3] For purposes of the Updated WMP, the Company has adopted the terms "Enhanced Powerline Safety Settings" and "EPSS" to describe an operational mitigation that modifies settings in relays and recloser controls on the distribution system (both within the substation and outside the substation on the feeder) to create a wildfire-specific operating mode. The Company also has referred to this operational mitigation as "Wildfire Safety Settings" or "WSS". The Company is using "Enhanced Powerline Safety Settings" and "EPSS", as those terms are becoming standard nomenclature throughout the industry.

Initiative	Wildfire Mitigation Milestones & Achievements in 2020-2023
Artificial Intelligence ("AI") Cameras	Completed a pilot program deploying AI Cameras in Boulder County as a tool to heighten situational awareness for early detection of wildfires. Contracted to procure AI Cameras for 42 additional sites, 21 of which were installed in 2023 with the remaining 21 sites to be installed in 2024.
Pole Distribution Loading and Clearance Modeling and Analysis Inspections	Implemented LiDAR - equipped helicopter inspections to model and analyze structural load parameters and line clearances. These inspections assist in informing the Company's pole replacement program. 11,975 poles were completed using this technology.
Preventative Wildfire Action Communication Protocol	Implemented changes to our operational protocols, including new processes for operational teams to increase wildfire and high-risk area awareness, along with providing work criteria for wildfire and high-risk areas.
Repair and Replace Program Improvements - Distribution	Replaced 159 miles of small wire conductor, 39 miles of open wire secondary conductor, 13,827 distribution poles, performed 24,767 equipment upgrades (replacement of fuses, cutouts, arresters, etc.), and installed 22 miles of covered conductor.
Repair and Replace Program Improvements - Transmission	Rebuilt 37 miles of transmission line and identified and corrected 1,065 priority transmission defects.
Satellite Vegetation Inspections Pilot	Initiated a pilot program to assess vegetation clearances along overhead circuits using high-resolution satellite imagery (a technology designed to identify the horizontal and vertical distances between power lines and trees, which can also estimate the growth rates of vegetation along those lines).
Utility Wildfire Mitigation Summit	Initiated, hosted and participated in multiple Colorado Wildfire Mitigation Summits to share practices and experience gained with other utilities, cooperatives, municipal power agencies, transmission agencies and companies, and other stakeholders.
EPSS Pilot	Enabled EPSS fast trip capability on eight higher risk distribution feeders. Initiated situational awareness monitoring for these feeders, which determines the daily device settings for each pilot feeder. The Company installed 56 distribution sectionalizing devices and 58 substation protective relays.

Initiative	Wildfire Mitigation Milestones & Achievements in 2020-2023
Wildfire Spread Modeling Risk Software	Implemented Technosylva wildfire spread modeling software (Wildfire Analyst Enterprise) to simulate wildfire spread scenarios under varying weather conditions and to improve situational awareness in the Company's service territory.
WMP Website	Deployed a special purpose website (www.xcelenergywildfiremitigation.com) to disseminate current wildfire mitigation program information in English and Spanish. The website has seen a steady increase in traffic since its inception.

4. ESCALATION OF WILDFIRE RISK

The United States has experienced an increase in both the frequency and intensity of wildfires in recent years. A 2016 comprehensive wildfire study concluded that each decade since the 1970s showed an "increased frequency of large wildfires at a regional scale compared with preceding decades. Area burned by wildfires has also increased through the decades, particularly through the increasing frequency of large wildfires (greater than 400 hectares or 988 acres)."[4] This is due to a combination of factors, such as climate change, increasing population, and drying and diseased forests. Fire risk has evolved as part of every community and ecosystem. Climate change, along with new and altered weather patterns have accelerated the fire return interval in most developed areas. Many utilities across the country have substantially increased their investments in wildfire-risk reduction activities, both in response to large fires in their service territories or as mandated by their utility commissions or legislatures.

A. Western United States

The Western United States faces unique and complex challenges with wildfire management and prevention. In recent years, these challenges have grown more pronounced, driven by a multitude of factors, such as rising temperatures, changes in vapor pressure deficit,[5] bark beetle impacts on tree mortality, and a growth of the WUI, where increased human-caused fires and expanded communities within forested environments are leading to increased risk of catastrophic fires at these locations.

B. Weather and Climate

Rising temperatures, decreasing atmospheric and fuel moisture, and shifting weather patterns have combined to elevate wildfire risk in the Western United States. The region has seen a notable increase in size and destructive impact of wildfires over the last decade. The National Oceanic and Atmospheric Administration ("NOAA") reported a tenfold increase in wildfire damage from 2017-2021 ($81.6 billion) compared to 2012-2016 ($8.6 billion).[6] A NOAA-supported study found that climate change has been the primary cause of the increase in fire weather in the Western United States, accounting

[4] *Increasing western US forest wildfire activity: sensitivity to changes in the timing of spring*, Anthony LeRoy Westerling (June 2016), https://royalsocietypublishing.org/doi/10.1098/rstb.2015.0178.

[5] The vapor pressure deficit is the difference between the amount of moisture in the air and the maximum amount of moisture the air can hold at a given temperature, indicating how dry or humid the air is. This metric indicates the rate at which fuels dry, or the "drying power" of the atmosphere, which makes it a good proxy for wildfire weather due to the relationship between drought and wildfire. *Multi-Decadal Change in Western US Nighttime Vapor Pressure Deficit,* Andrew M. Chiodi et al. (July 2021), https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2021GL092830; *Climate Science Special Report: Fourth National Climate Assessment, Volume 1, Chapter 8*, U.S. Global Change Research Program (2017), https://science2017.globalchange.gov/chapter/8/.

[6] *Wildfires,* Cybersecurity & Infrastructure Security Agency, https://www.cisa.gov/topics/critical-infrastructure-security-and-resilience/extreme-weather-and-climate-change/wildfires.

for two-thirds of the increase in vapor pressure deficit.[7] Additional NOAA studies have demonstrated that climate change-induced fuel aridity doubled the burn area of fires between 1984 and 2015,[8] while driving longer and off-cycle wildfire seasons.[9]

C. Colorado Weather and Climate

Colorado is experiencing climate change impacts, with NOAA studies indicating that Colorado's climate has warmed by 2°F over the past 30 years.[10]

In addition, recent bark beetle epidemics (caused by unhealthy forest conditions, long-term droughts, and higher temperatures according to the Colorado State Forest Service) have also made Colorado forests more vulnerable to wildfires.[11] Bark beetle damage causes an accumulation of dead fuel in the forests, which leads to increased wildfire frequency and intensity. Since bark beetle population growth is connected with temperature rises, this stands to further exacerbate wildfire risk in Colorado.[12]

D. Colorado Wildfire Risk Considerations

Colorado faces an increasing wildfire threat. The combination of rapidly growing population pushing farther into wildfire-prone areas, combined with rising temperatures, increasingly dry conditions, and poor forest conditions, have increased the risks for Colorado energy providers.

E. Recent Fire History

Lack of large, natural wildfire activity in recent Colorado history has led to a change in vegetation composition and flammability. These changes have resulted in a significant increase in wildfire growth. The top 10 largest fires in Colorado's history have taken place

[7] *Study Shows That Climate Change is the Main Driver of Increasing Fire Weather in the Western U.S.*, Rong Fu and UCLA (Nov. 9, 2021), https://www.drought.gov/news/study-shows-climate-change-main-driver-increasing-fire-weather-western-us.

[8] *Wildfire climate connection,* National Oceanic and Atmospheric Administration (last updated July 24, 2023), https://www.noaa.gov/noaa-wildfire/wildfire-climate-connection.

[9] *Climate Science Special Report: Fourth National Climate Assessment, Volume 1, Chapter 8*, U.S. Global Change Research Program (2017), https://science2017.globalchange.gov/chapter/8/.

[10] *Colorado Fire Season: In-Depth Guide*, Western Fire Chiefs Association (last updated Nov. 3, 2023), https://wfca.com/articles/colorado-fire-season/.

[11] *Colorado's Forests in a Changing Climate*, Colorado State Forest Service, https://csfs.colostate.edu/colorados-forests-changing-climate/.

[12] *Interactions among the Mountain Pine Beetle, Fires, and Fuels*, Michael J. Jenkins et al. (Aug. 2023), https://academic.oup.com/forestscience/article/60/3/489/4583745.

since 2002.[13] Additionally, three of the five largest fires in Colorado history occurred in the last five years, and Colorado endured two of the most destructive fires in that same time.

In 2020, the largest fire ever occurred in Colorado, the Cameron Peak Fire. It burned over 200,000 acres, including in the Arapaho and Roosevelt National forests and the Rocky Mountain National Park. In 2021, the Marshall Fire, a late December wildfire become the most destructive wildfire in Colorado history in terms of structures lost. This wildfire highlights the new reality that wildfires can occur any time of year, not just in the warmer seasons.

A list of more recent wildfires in Colorado include the following:

Table D-2: List of Recent Colorado Wildfires

Year	Wildfire Name	Acres Burned
2020	Pine Gulch Fire	139,007
2020	Grizzly Creek Fire	32,631
2020	Cameron Peak Fire	208,913
2020	Williams Fork Fire	14,833
2020	Middle Fork Fire	20,517
2020	Mullen Fire	176,878
2020	East Troublesome Fire	193,812
2021	Oil Springs Fire	12,613
2021	Morgan Creek Fire	7,586
2022	Marshall Fire	6,200
2023	403 Fire	1,215
2023	Gageby Creek Fire	4,600

[13] *Colorado Fire Season: In-Depth Guide*, Western Fire Chiefs Association (last updated Nov. 3, 2023), https://wfca.com/articles/colorado-fire-season/.

5. INTRODUCTION OF 2025-2027 WILDFIRE MITIGATION PLAN

The 2025-2027 WMP promotes public safety by mitigating the risk of Public Service's equipment being a potential ignition source for wildfires. This Updated WMP reflects an evolution of prior wildfire mitigation efforts, incorporating new risk modeling, expanded situational awareness, and a combination of new and expanded wildfire risk mitigation activities and programs.

A. Updated WMP Overview

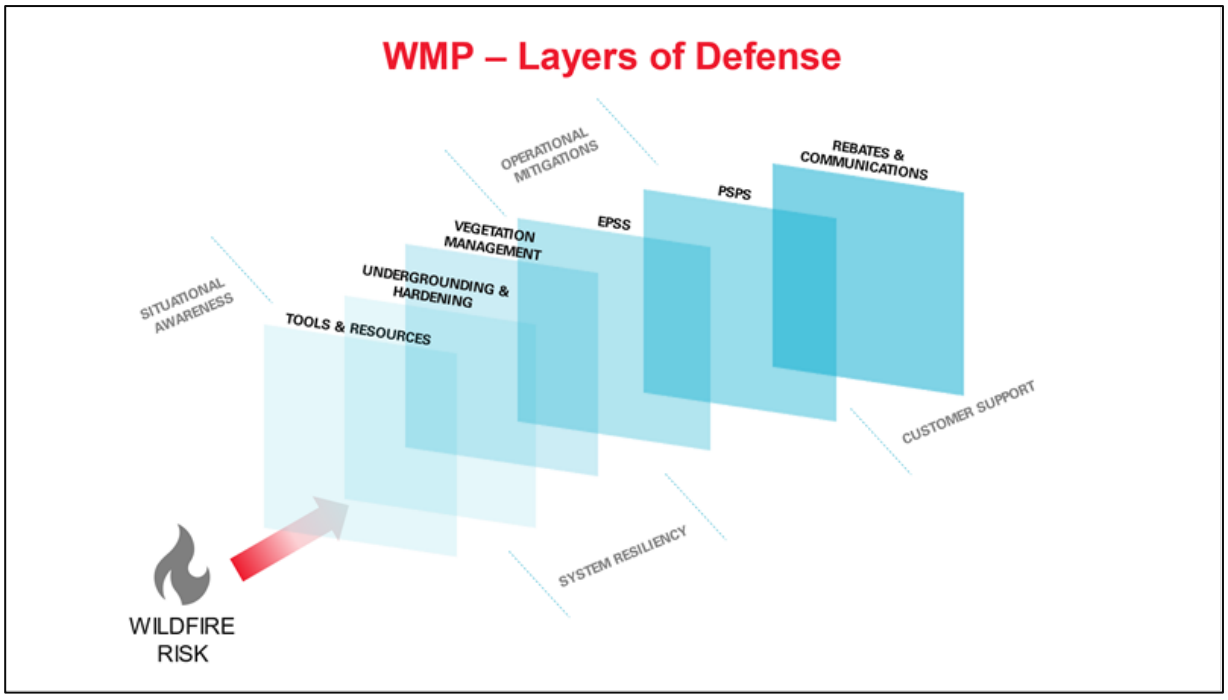
In developing this Updated WMP, the Company identified four guiding principles:

- **Do the Right Thing -** Remember what is at risk. The decisions we make in this space impact the health and safety of our customers, their lives, and their livelihoods.
- **Execute Confidently -** Do what we say we are going to do, in the time and at the cost that is appropriate.
- **All In -** All internal organizations must be brought into the execution of the proposed work through documented processes, validation, measurement, budgeting, and reporting.
- **Adaptability -** Our plan must be dynamic and flexible enough to address evolving risk.

The Company is committed to these principles, and they are at the center of the Company's Updated WMP planning efforts and decision-making.

In incorporating these principles, the Updated WMP developed separate layers of defense to protect against the risk of wildfires. Recognizing that no single "layer" is going to be 100 percent effective, we have designed a plan that includes numerous, complementary layers designed to help reduce the risk of Public Service's equipment being a potential ignition source for wildfires. Figure D-4 illustrates the multiple layers of defense in the 2025-2027 WMP.

Figure D-4: WMP Layers of Defense

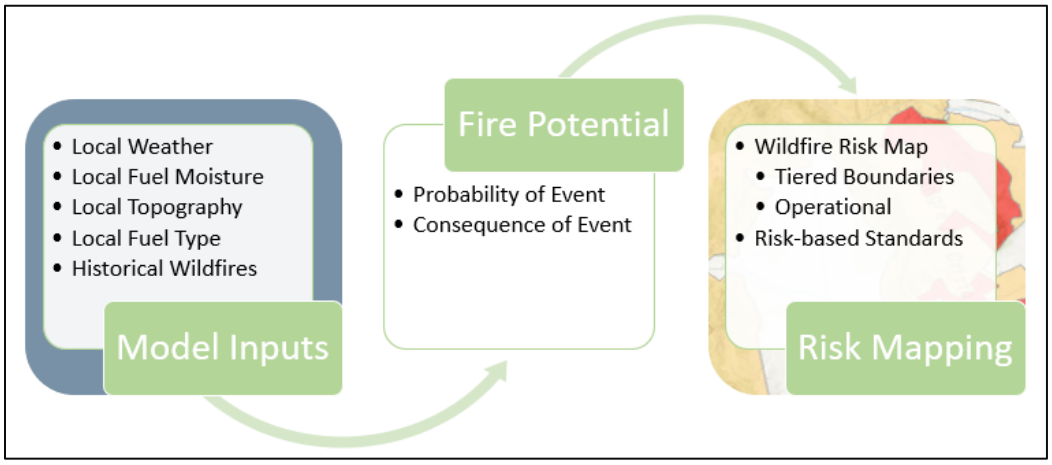


Building on this layering concept, the Company, with the assistance of FEP, developed the mitigation tools in the Updated WMP. The mitigations have been carefully tailored to the unique circumstances of Public Service's system and service territory.

I. Updated Wildfire Risk Map and Wildfire Risk Assessment

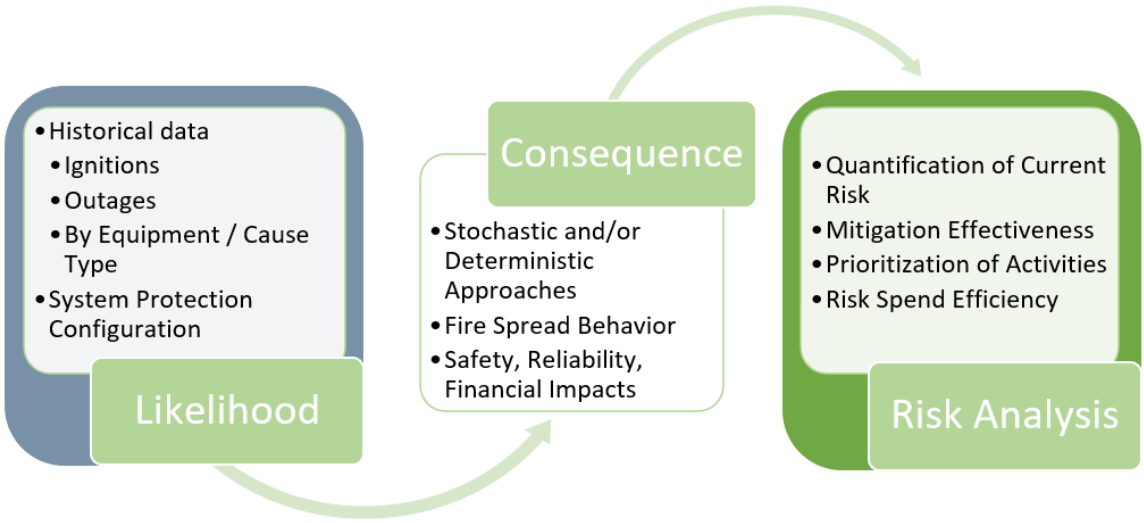
Updated and Expanded Wildfire Risk Map: Working with third-party consultant EDM, the Company commissioned an updated Wildfire Risk Map. The updated Wildfire Risk Map visualizes the level of risk within the Company's service territory, both in terms of probability and consequence of a wildfire event. The Wildfire Risk Map indicates where risk reduction may be the most effective and is used to influence the prioritization of activities. Notably, the Wildfire Risk Map evaluates risk across the Company's entire service territory, assigning one of three risk tiers to all areas within the Company's service territory based on nationally and industry-recognized data sources. While Section 6 provides more detail on this important tool, the figure below provides a graphic summary of how it was developed.

Figure D-5: Wildfire Risk Map Development



Wildfire Risk Assessment: In coordination with FEP, the Company developed an updated approach to consider the risk-reducing benefits of certain mitigation activities. Quantification of wildfire risk requires great efforts to effectively incorporate historical data, such as ignition and outage data based on system protection configurations. In addition to estimating the probability of ignitions by distribution feeder, our Distribution Feeder Model incorporates the consequence of fire spread behavior. The Distribution Feeder Model was used to quantify risk reduction for several programs of work, including: undergrounding, EPSS, covered conductor, and small wire replacement. The Distribution Feeder Model also analyzes the effectiveness of the mitigation efforts to calculate a Risk Spend Efficiency ("RSE") of the mitigation measure. Additionally, and again working with FEP, the Company developed an approach to consider the unique risk-reducing benefits of certain vegetation management work through a Vegetation Risk Analysis. Section 7 provides more detail on the approach to assess risk. In addition, the below figure provides a graphic summary of the overarching Wildfire Risk Assessment conducted to support the Updated WMP.

Figure D-6: Wildfire Risk Assessment Development



II. Layers of Defense

With the development of the Wildfire Risk Map, Wildfire Risk Assessment, experience from the 2020 WMP, and collaboration with and consideration of Western U.S. utilities and their practices, the Company developed and refined its wildfire mitigation activities. The Updated WMP includes four broad categories of activities: (1) situational awareness; (2) system resiliency; (3) operational mitigations; and (4) customer support. Descriptions of each of these broad categories is as follows:

- **Situational Awareness**: Situational awareness tools enhance the Company's ability to identify, assess, and respond to a physical, cyber, or environmental hazard, including wildfires.

- **System Resiliency**: System resiliency involves the Company making physical investments in its infrastructure to directly reduce the risk of a utility-caused wildfire.

- **Operational Mitigations**: Operational mitigations involve the Company adjusting something about how it operates the electric system in order to reduce the risk of a utility-caused wildfire.

- **Customer Support**: Customer support involves the Company directly informing customers regarding wildfire risk and mitigation activities and also provides direct customer assistance for customer resiliency.

Within each category, there are a variety of programs, each of which are part of the multi-layered strategy to reduce the wildfire-related risk of providing electric utility service. The table below provides a high-level organization of the Updated WMP within these four categories.

Table D-3: Summary of Updated WMP Activities

Category	Updated WMP Activities
Situational Awareness	• AI Cameras • Technosylva • Weather Stations • Emergency Management Resources • Weather and Fire Science Modeling • Area Risk Mapping • Wildfire Command Center • Software
System Resiliency	• Targeted Undergrounding • Line Rebuilds • Asset Assessment and Remediations • Pole Replacements • Non-Expulsion Upgrades • Vegetation Management
Operational Mitigations	• Enhanced Powerline Safety Settings • Public Safety Power Shutoff (“PSPS")
Customer Support	• Public Dashboard • PSPS Resiliency Rebates • Communications and Engagement

The Company’s situational awareness resources allow for the monitoring of environmental conditions that could contribute to wildfire in order to maximize the effectiveness of each layer of defense. In Section 8, the Company addresses the situational awareness tools, including utility-owned weather stations, third-party weather and fire risk data, high-definition cameras equipped with artificial intelligence, the monitoring of fuel conditions, field reports, and fire analysis.

Our system resiliency efforts support the hardening of our system in the face of evolving wildfire risks. The work begins with proper installation, maintenance, repair, and inspection of utility assets to maintain equipment health and reduce ignitions stemming from equipment failure. It then involves the replacement of existing facilities with more resilient infrastructure, as undertaken through line rebuilds, distribution undergrounding, pole replacements, wire upgrades, and removal of ignition prone components from our system. The Company simultaneously complements these efforts through enhanced vegetation management activities, removing and clearing vegetation growth around our facilities that could pose a risk of ignition. The vegetation management defensive layer includes managing vegetation to prescribed clearances (distance from the wires and associated components) through inspection and pruning, along with the identification and removal of hazard trees that have the potential to fall into energized lines. Details on the Company's system resiliency work are provided in Section 8.

Operational mitigations facilitate dynamic Company operations to proactively address forecasted weather conditions that post a threat to public safety. There are two such mitigations in the Updated WMP. First, is the deployment of EPSS, adding capabilities to powerline protective equipment to allow for more sensitive ground settings and faster trip settings during periods of elevated wildfire risk. During periods of higher wildfire risk, more sensitive settings are used such that feeders will trip at lower levels and faster if a significant issue is detected, resulting in de-energization of the feeder until the root cause can be determined and the line is restored to service. Further details on the Company's EPSS proposal are addressed in Section 8. Second, is the use of a PSPS program, which can act as a mitigation tool for use in cases where risk is not adequately addressed by other methods. It will allow the Company to proactively shut off power to feeders and circuits during elevated fire risk conditions. The equipment and techniques used for EPSS will aid in focusing and limiting portions of our system that are de-energized. The Company's PSPS approach exists in a standalone plan outside of this document, but is also briefly addressed in Section 8.

Customer support is necessary and appropriate to ensure our customers have the information, tools, and resources appropriate to address the risks of wildfires, including from outages that the Company proactively planned or those caused by severe weather. Such support is facilitated through new communications and engagement efforts that include both mass customer communication efforts, education and preparedness campaigns, as well as engagement and support for customers adversely impacted in a wildfire-related event. The Company will enhance its customer support and engagement through new online tools, including a wildfire mitigation hub and new outage maps to inform of our customers on areas impacted by PSPS outages. Additionally, the Company is introducing new rebate offerings to support appropriate residential customers with back-up power equipment to assist their own resiliency to withstand the impacts associated with power outages.

The Company's layers of defense in the Updated WMP are well designed with cohesive mitigation activities to support our customers, our communities, our system, and the State

of Colorado. In the sections that follow, we address our risk mapping updates, our revised risk analysis approach, and then the four categories of our mitigation efforts to lower the risk of wildfires.

6. UPDATED WILDFIRE RISK MAP

The Wildfire Risk Map is an essential tool to visualize the level of risk within the Company's service territory. The Wildfire Risk Map indicates where risk (the potential of ignition times the potential consequence of ignition) is the highest, and therefore where risk reduction may be the most effective. The Wildfire Risk Map is used to guide operational activities and system resiliency work like vegetation management, asset inspection programs, and strategic undergrounding.

The 2020 WMP included a single-risk tier, asset-based map. The area of heightened wildfire risk was referred to as the Wildfire Risk Zone.[14] Company personnel identified the Wildfire Risk Zone using Company data and state data available through the Colorado Wildfire Risk Assessment Portal ("CO-WRAP").[15]

The Updated WMP includes a new Wildfire Risk Map, developed by EDM in partnership with the Company's Risk Management department. The updated Wildfire Risk Map introduces three geographic tiers of wildfire risk: Tier 1 (lower risk), Tier 2 (moderate risk), and Tier 3 (high risk). The new tiered system assists the prioritization of risk mitigation resources and program rollout for the whole service territory. The Company's mitigation efforts under the Updated WMP will largely focus on Tier 2 and Tier 3 areas.

A. Background on Wildfire Risk Map Development

Wildfire risk varies across the Company's service territory and is specific to the fuels, terrain, fire behavior patterns, prevalent weather patterns, proximity of developed areas (e.g., WUI), and other key criteria. As such, the Wildfire Risk Map provides a geospatial look of the entire service territory, allowing the Company to better visualize fire risk on the landscape and prioritize and operationalize its mitigation efforts.

The following summarizes the purpose, features, and background data utilized in developing geospatial categorizations of wildfire hazards in the Company's service territory.[16] Those categorizations include Hazardous Fire Areas ("HFAs"), which served as the foundation of the three operationalized tiers created by the Company. HFAs provide granular insight into the relative hazards across the landscape, whereas tiers meld the information into generally larger polygons appropriate for prioritizing and operationalizing mitigation strategies. The risk categorization was ultimately incorporated into the Wildfire Risk Map that forms foundation to the Updated WMP.

[14] Approximately 2,100 miles of overhead distribution feeder (out of 9,500 miles total on the system) and 2,900 miles of transmission lines (of nearly 5,000 total) were included in the initial Wildfire Risk Zone.

[15] The Colorado State Forest Service (CSFS) (https://csfs.colostate.edu) created CO-WRAP as an online mapping tool that will help decision makers, community leaders, professional planners and interested citizens determine wildfire risk and where forest management actions can achieve the greatest impact to reduce that risk. The WRZ was specific to Company owned assets and included a 1,000-foot buffer.

[16] Mapping process and data sources excerpted from: *PSCO Wildfire Map Tiers & Hazardous Fire Areas*, EDM International Inc. (July 2023).

B. Purpose of Risk Categorization

The purpose of the risk categorization within the Wildfire Risk Map is to rank areas in the Company's service territory by wildfire risk. The Wildfire Risk Map ranks areas based on those that are susceptible to high intensity, severe wildfire behavior should a wildfire originate or burn in the vicinity, and areas with greater potential damages receiving a higher risk ranking. The HFAs and tiers are significant references that support multiple activities and functional areas and can provide guidance and insight when developing measures for reducing risk of utility-related ignitions and improving system resilience to outside wildfire threat.

C. Baseline Data

The raw datasets used to develop the Wildfire Risk Map tiers and HFAs are available from wildfirerisk.org ("WRO").[17] The data was created by the United States Forest Service ("USFS") at the direction of Congress for the purpose of providing guidance and informing mitigation prioritization.

WRO is built from nationally consistent data, including vegetation cover and fire-behavior fuel models, topography, recent weather patterns, and long-term simulations of large wildfire behavior. It is based on techniques developed by the Missoula Fire Sciences Laboratory of the Rocky Mountain Research Station. Baseline data informing the model include, but are not limited to:

- Vegetation cover and fire-behavior fuel models from the interagency LANDFIRE program, which leverages the Scott and Burgan 40 Fire Behavior Fuel Models.
- Topographic data from the United States Geological Survey ("USGS").
- Historical weather patterns from the National Weather Service ("NWS").
- Long-term simulations of large wildfire behavior from the USFS.
- Community data from the United States Census Bureau and Department of Energy ("DOE").

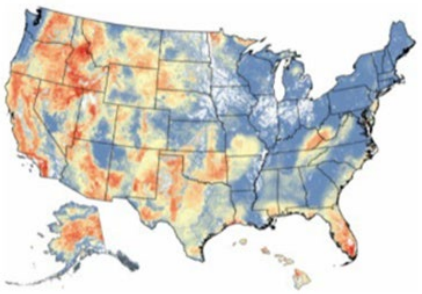
The following data layers were used in developing the HFAs and Wildfire Risk Map tiers:

Figure D-7: Wildfire Hazard Potential (WHP)

Wildfire Hazard Potential (WHP): An index that quantifies the relative potential for wildfire that may be difficult to control, used as a measure to help prioritize where fuel treatments may be needed.

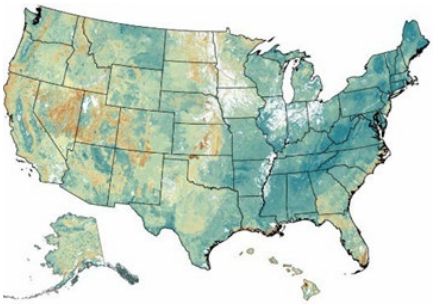
[17] *Wildfire Risk to Communities,* U.S. Department of Agriculture and U.S. Forest Service, https://wildfirerisk.org.

Figure D-8: Burn Probability (BP)



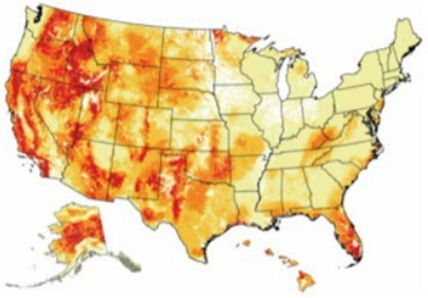
Burn Probability (BP) (or Wildfire Likelihood): The annual probability of wildfire burning in a specific location.

Figure D-9: Conditional Flame Length (CFL)



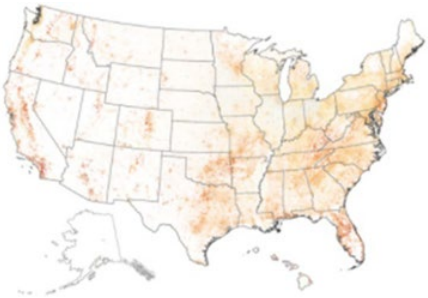
Conditional Flame Length (CFL): Most likely flame length expected at a given location if a fire occurs, based on all simulated fires; an average measure of wildfire intensity.

Figure D-10: Risk to Potential Structures (RPS)



Risk to Potential Structures (RPS) (or Risk to Homes): A measure that integrates wildfire likelihood and intensity with generalized consequences to a home on every pixel. For every place on the landscape, it poses the hypothetical question, “What would be the relative risk to a house if one existed here?”

Figure D-11: Housing Unit Risk (HU Risk)

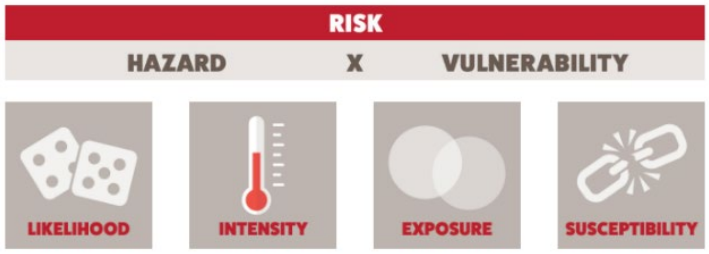


Housing Unit Risk (HU Risk): An index that integrates all four primary elements of wildfire risk, i.e., likelihood, intensity, susceptibility, and exposure, on pixels where housing unit density is greater than zero. It is conceptually similar to Risk to Potential Structures, but also incorporates housing unit count.

I. WRO Risk Evaluation

WRO (wildfirerisk.org) evaluates four risk factors – wildfire likelihood, wildfire intensity, exposure, and susceptibility as depicted and defined below.[18]

Figure D-12: WRO Risk Factors



Wildfire Likelihood is a probability that any specific location (pixel) may experience wildfire in any given year. It is based on thousands of fire behavior modeling simulations. In each simulation, factors contributing to the probability of a fire occurring, including weather, topography, and ignitions are varied based on observations from recent decades.

Wildfire Intensity is a measure of the energy expected from a wildfire. Intensity is largely a condition of the physical landscape (topography) and vegetative fuel available to burn. For example, a crown fire on a forested hillside can produce a greater wildfire intensity than grasses on flat ground.

Exposure is the spatial coincidence of wildfire likelihood and intensity with communities. Any community that is located where wildfire likelihood is greater than zero (i.e., where there is a chance wildfire could occur) is exposed to wildfire. For example, a home in a flammable forest is exposed to wildfire. Communities can be directly exposed to wildfire from adjacent wildland vegetation, or indirectly exposed to wildfire from embers and home-to-home ignition.

Susceptibility is the propensity of a home or community to be damaged if a wildfire occurs. WRO uses a generalized concept of susceptibility for all homes. In other words, WRO assumes all homes that encounter wildfire will be damaged, and the degree of damage is directly related to wildfire intensity.

D. Wildfire Risk Map Hazardous Fire Areas

The HFAs are a foundational dataset that enables the Company to visualize wildfire risk more granularly within tiers. The WRO baseline data is first used to produce the more granular HFAs. The HFAs are weighted and scored locally for where population and utility infrastructure are located. A weighted natural breaks process is utilized to develop

[18]Wildfire Risk to Communities, U.S. Department of Agriculture and U.S. Forest Service, https://wildfirerisk.org/understand-risk/.

the HFA scores, which consist of six adjective classes (i.e., normalized descriptors of the various factors affecting wildfire initiation, spread, and difficulty of control on an area):

1. Zero (0)
2. Very Low
3. Low
4. Moderate
5. High
6. Very High

The weighted scores determining specific HFA classifications are shown in the following sample map. It is intended to demonstrate the granularity of hazardous fire areas.

Figure D-13: Hazardous Fire Area Classifications

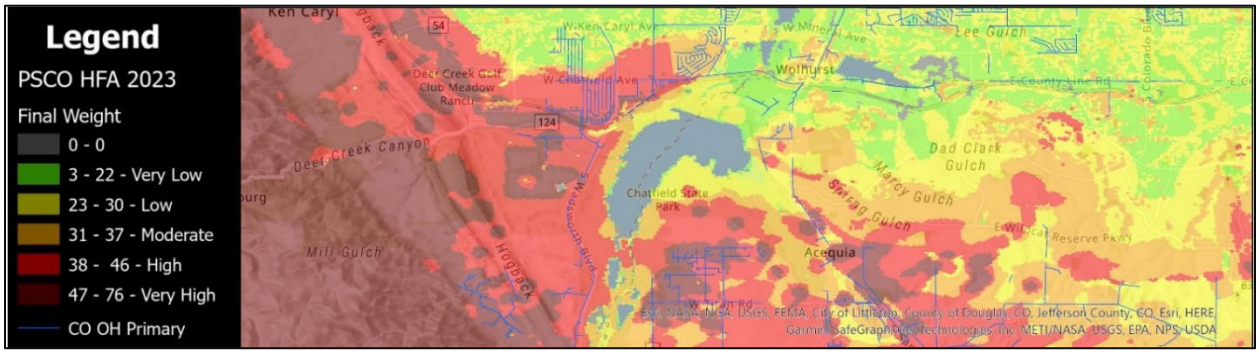
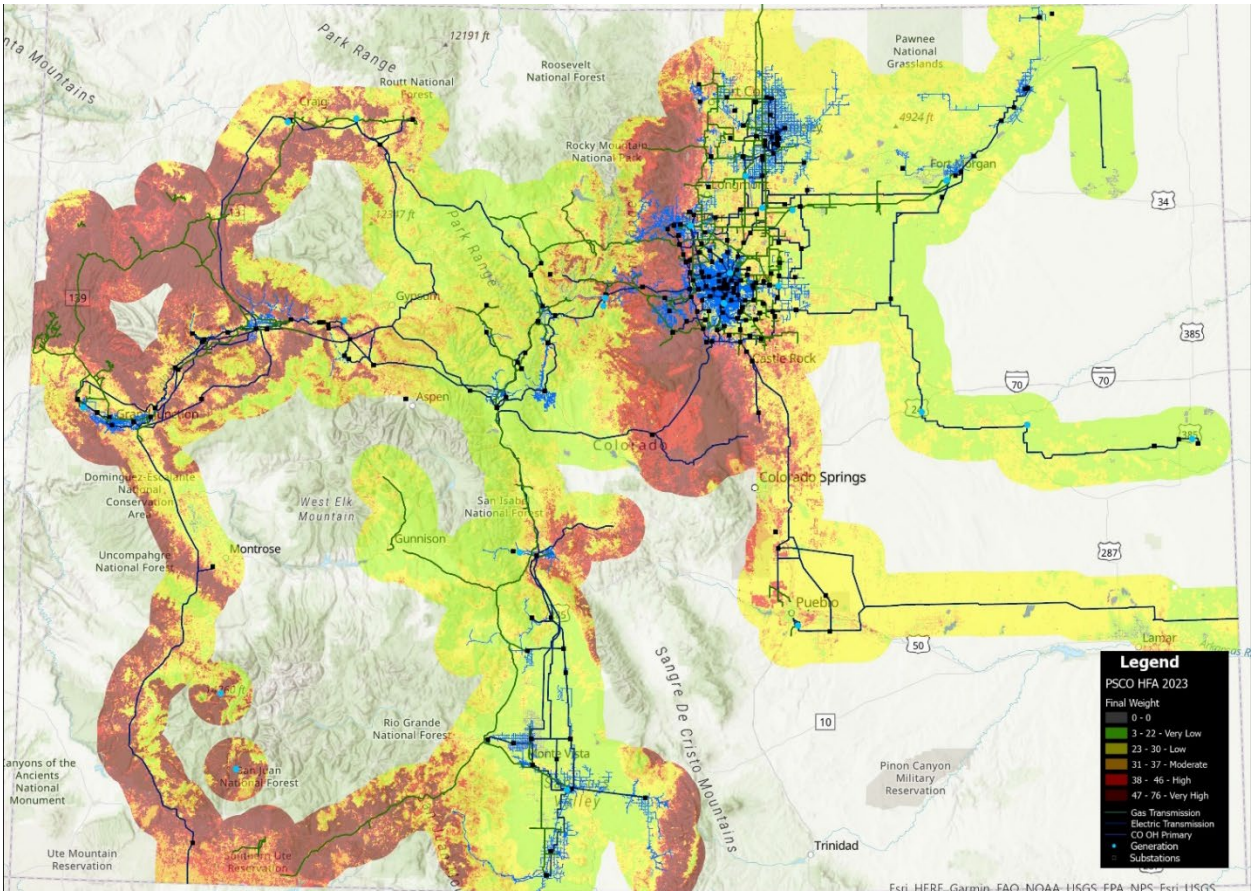


Figure D-14 depicts the HFAs relative to the Company's service territory and assets using a facilities centerline and 20-mile buffer.

Figure D-14: HFAs and Company Assets



E. Updated Wildfire Risk Tiers

The three Risk Tiers were created to turn the more granular geospatial HFAs into contiguous polygons useful for a variety of business functions.

Risk Tiers are aggregated from HFAs using broader wildfire risk value ranges to develop a geospatial wildfire risk visualization variant. A quantile evaluation of the HFA data is used to aggregate the six HFAs into three tier levels or adjective classes described below.

Tier 1 includes Fire Resistant and Low HFAs. Fire Resistant incorporates areas with significant human development and/or surfaces resistant to fire. Examples of fire-resistant areas include bodies of water and waterways (e.g., lakes, rivers, etc.) and dense urban areas covered by buildings and surfaces covered in asphalt/concrete (e.g., parking lots, surface streets, freeways, etc.). Low covers areas of human development and disturbance that reduce the likelihood of a large, destructive wildfire. In general, urban, and semi-urban areas can be classified as Low as well as barren ground, gravel pits, plowed / irrigated fields, feed lots, golf courses, and railroad yards. A catastrophic wildfire is still possible in areas designated as “Low” depending on conditions severity and fire suppression resource availability.

Tier 2 Incorporates Moderate HFAs, where wildfire may cause significant damage to human infrastructure due to fuel continuity and/or terrain. The resulting wildfire may be less likely to develop substantial momentum depending on severity of conditions and fire suppression resources availability.

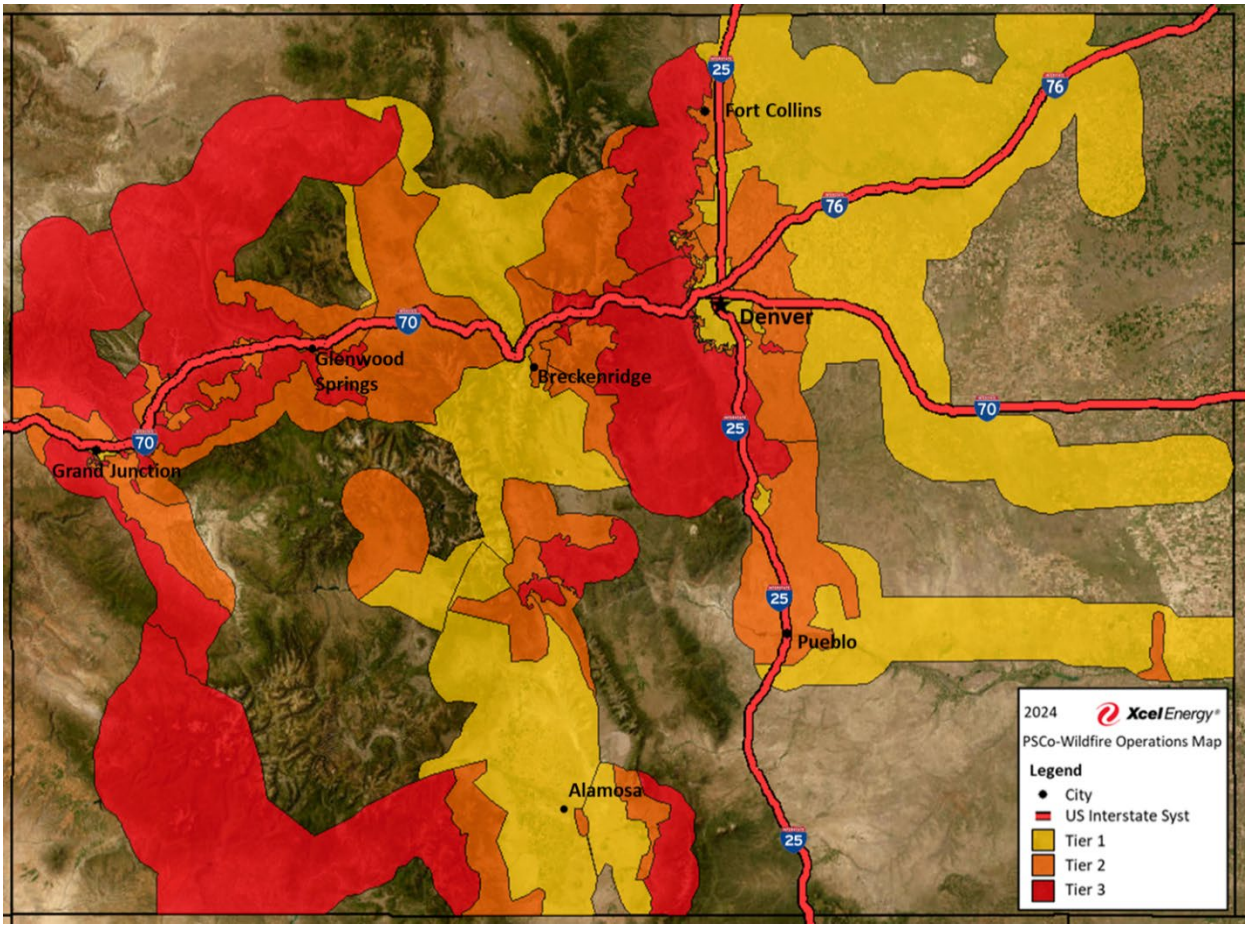
Tier 3 Contains High HFAs with fuel continuity and population density such that a wildfire is likely to rapidly become a large destructive or catastrophic event.

F. Operationalizing the Wildfire Risk Map

The nature of the data forming the tier-based map can result in areas where multiple risk categories are located in close proximity to one another. In some cases, an individual polygon may be completely surrounded by a different risk category. Such maps can be operationally challenging and confusing to utility field personnel due to frequent and abrupt changes in risk categories over short distances in which differing inspection standards and programs may apply.

To enhance the effectiveness of the Wildfire Risk Map, the Company refined the final weighted HFA-based map to operationalize it, to avoid tier boundaries from beginning or ending in the middle of a line. This includes homogeneous areas of risk categorization designed to enhance operational efficiency and streamline the implementation of programs and technologies across the Company's system. For example, if a distribution feeder is located in an area predominately categorized as "High" with small amounts of "Moderate" and "Low", the entire risk area surrounding the distribution feeder was adjusted to "High". From an operational perspective, any activity undertaken by Company personnel in that area would be treated as if it were "High" risk, regardless of the designation of each individual hexagon in the original HFA-based map. Figure D-15 below depicts the three-tiers of wildfire risk across the Company's service territory.

Figure D-15: Wildfire Operations Map



This three-tier geographic risk system provides for a more focused and efficient utilization and implementation of risk-reducing strategies. The risk rankings also facilitate an organized rollout of programs to emphasize the highest risk areas in the Company's service territory.

7. WILDFIRE RISK ASSESSMENT

The Updated WMP is informed by a quantitative Wildfire Risk Assessment of wildfire risk and effectiveness of various mitigations that can be reasonably modeled. The Company's Wildfire Risk Assessment estimates the current wildfire risk and identifies the effectiveness of certain mitigations to reduce that risk. The Wildfire Risk Assessment is comprised of four distinct, but interrelated components: (1) a Quantitative Risk Framework, (2) the systemwide Estimated Total (average) Wildfire Risk ("ETWR") Analysis, (3) a Distribution Feeder Model, and (4) a Vegetation Risk Analysis. This section discusses how the components of the Wildfire Risk Assessment were developed and used.

Risk assessments have been used in various industries and settings for a long period of time, but those that focus on wildfire risk at electric utilities are relatively new. Risk assessments typically use a combination of actual data, estimated data, and assumptions provided by subject matter experts ("SMEs"), though they depend on the quality of data. The Wildfire Risk Assessment for this WMP should be interpreted as an informative estimate, rather than a precise forecast; while the overall Wildfire Risk Assessment provides useful data to inform the Company's mitigation approach, determining how the findings should be applied to decision-making is based on human judgment and many assumptions. In addition to the general imprecision and limitations of the Wildfire Risk Assessment, many other factors, such as feasibility, strategic alignment, and resource availability need to be considered in determining the appropriate scope of wildfire mitigation work.

Below, we discuss each of the four elements of the Wildfire Risk Assessment in turn.

A. Quantitative Risk Framework

I. Overview

The Company, in consultation with FEP, developed a risk valuation method called a "Quantitative Risk Framework," which is foundational to the Wildfire Risk Assessment. The Quantitative Risk Framework considers various impacts from a wildfire and develops a way to quantify those impacts in a manner that allows for comparison across four attributes. The table below displays the four attributes and associated assumptions incorporated into the Quantitative Risk Framework. The "Score" listed in the table is equivalent to a monetary value of $10,000 per unit (e.g. $10,000 per acre, $1 million per structure).

Table D-4: Quantitative Risk Framework

Attribute	Unit	Score
Acres Burned	Acre	1
Structures Destroyed	Structure	100
Electric Reliability	1 SAIDI[19]	228
Financial	$1 million	100

This Quantitative Risk Framework is the Company's first iteration of such, and it will likely undergo changes in future years as more information is gathered and stakeholder input is received. As such, the four attributes currently reflected in the table above do not represent all quantifiable risks from wildfire. As the Company gathers further experience and data it is likely that additional attributes will be considered for future inclusion in the Quantitative Risk Framework.

It is important to note that the attributes used in the Quantitative Risk Framework are meant to capture the broader societal impact from wildfires, as opposed to solely impacts to Company assets and personnel. For example, "Structures Destroyed" refers to structures (or buildings) within the general community, not specifically Company-owned structures.

II. Using the Quantitative Risk Framework

The Quantitative Risk Framework assigns values to each of the attributes; these values are then used to measure the consequence of a wildfire, were one to occur. A hypothetical example of this quantification is shown below, using two separate fires with different impacts for each attribute:

Table D-5: Illustrative Examples of Hypothetical Wildfire Damage

Attribute	Fire 1 Impacts	Fire 2 Impacts
Acres Burned	250 acres	10,000 acres
Structures Destroyed	30 structures	5 structures
Electric Reliability	3 SAIDI minutes	10 SAIDI minutes
Financial	$0	$0

[19] System Average Interruption Duration Index ("SAIDI") represents the total minutes of interruption experienced by the average customer.

Using the Quantitative Risk Framework, the fires in this table would have consequence scores of:

Fire 1 consequence score = 250 x 1 + 30 x 100 + 3 x 228 = 3,934 risk units ($39.34M)

Fire 2 consequence score = 10000 x 1 + 5 x 100 + 10 x 228 = 12,728 risk units ($127.28M)

The other factors shown in these calculations represent the estimated per-unit impact associated with each attribute, as discussed later in this section. Computing consequence scores is a key element to the Wildfire Risk Assessment, which uses these consequence scores in combination with likelihoods of events to create a risk score. This process is also explained in detail further below in this section.

Each "Score" value in the Quantitative Risk Framework acts as a form of weighting to indicate the relative importance of each attribute relative to the other attributes. Although this method of placing values on multiple attributes is common in decision science, its application to wildfire risk is relatively new. The Company crafted the Quantitative Risk Framework based on available information that is relevant to its service territory.

Below is a discussion of each of the impact attributes.

III. Acres Burned Attribute

This attribute estimates the impact to society for each acre burned. The value of "1 per acre" was selected based on reviewing historical impacts from medium to large fires in recent years in the Western United States. The consequences included in that review were ecological impact, fire suppression costs, lost revenue, and air pollution. Importantly, this attribute does not capture the cost of structures located in the acre, which is estimated through the Structures Destroyed attribute.

While different acres of land would ultimately have different values of impact, depending on many factors, for purposes of this analysis, all acres are given the same valuation. The Quantitative Risk Framework value of "1 per acre" has a financial equivalent of $10,000 (without structures); this can be computed by understanding that 100 acres of impact has the same value in the Quantitative Risk Framework as the financial value of $1 million. Therefore, one acre is valued as the same as $1,000,000/100 = $10,000.

For the Distribution Feeder Model (addressed further below), the number of acres burned for each feeder were obtained by using analysis that combined data from Technosylva and proxy factors applied to normalize for the worst-case conditions. Technosylva is a wildfire technology that specializes in operationalizing fire science. The Company received daily model runs from Technosylva that estimate the size of a fire were it to start at specified locations. Daily data that had been received from Technosylva was used to perform risk analysis at each feeder.

IV. Structures Destroyed Attribute

This attribute estimates the impact to society from a hypothetical average structure burning. The value of "100 per structure" was selected based on current real estate

values. This value is applied equally per structure, regardless of other factors; the value used is intended to be an average value of single-family homes across all of the Company's service territory and does not differentiate by commercial versus residential structures, nor does it consider the size of the structure or the specific property values of any region within the Company's service territory.

The Quantitative Risk Framework value of "100 per structure" has a financial equivalent to $1,000,000. This can be computed by understanding that one structure burned has the same value in the Quantitative Risk Framework as the financial value of $1 million.

As with the acres burned attribute, Technosylva also is also the basis for the source for data for the structures burned attribute.

V. Electric Reliability Attribute

This attribute estimates the impact to society from the loss of electrical service. Impacts are due to lost commercial revenue, impacts to quality of life, and spoilage of food, for example. Like the other attributes mentioned above, the value used represents an average across the Company's service territory and does not differentiate between commercial and residential customers, or other factors such as time of day of the outage. It is common for electric utilities to place a value on electric reliability for the purposes of identifying which electric reliability improvement programs have the most merit.

The Quantitative Risk Framework value of "228 per SAIDI minute" has a financial equivalent of $2,280,000, which can be computed by understanding that the value for one SAIDI minute is 2.28 times higher (i.e., 228 vs 100) than the financial value of $1 million. The foundation of this valuation is in the monetization of a customer minute outage derived from the Interruption Cost Estimate ("ICE") Calculator, which Berkeley Lab developed in 2016, known as the ICE calculator.[20] The ICE calculator provides estimates for the cost of an interruption event for residential, commercial, and industrial customers. Blending this estimate across the customer types and escalating the cost with inflation derives a value for a customer minute out of $1.58; multiplying this value times the number of customers calculates the estimated value of a SAIDI minute of $2,280,000.

VI. Financial Attribute

This attribute measures the potential financial impact of a risk event, distinct from the impacts mentioned above. This attribute is included to assist in "monetizing" the other Quantitative Risk Framework attributes. With the inclusion of the financial attribute, it is possible to derive a financial value for the other attributes, by assigning a per unit financial value.

[20] The ICE calculator is available at: icecalculator.com.

B. Estimated Total Average Wildfire Risk

I. Introduction and Overview

Modeling undertaken for the Updated WMP results in an average annual risk from wildfire of approximately $95 million. Although using the average value is useful for certain analytic purposes, there is more to wildfire risk than just the average annual value. Wildfire risks to the Company have a wide range of potential annual consequences, including both "tail risks" and the results of the annual Estimated Total (average) Wildfire Risk ("ETWR"). This section addresses both concepts.

Current estimated wildfire risk level is used as the starting point to determine the degree that potential mitigation measures can reduce risk and associated consequences. For quantification purposes, the risk level is discussed in the context of the "expected value" of risk in a single year. Different mitigant measures have different useful lives, as demonstrated later in this section; therefore, risk and risk reduction are considered on an annualized basis.

For the purposes of calculating an RSE, the Company calculated an annualized risk from wildfire of $95 million. This value is an average and is not intended to suggest that there will be any particular level of wildfire risk in a given year. This value represents the modeled wildfire risk associated to the Company from all causes, including Transmission and Distribution assets.

II. Probability Distributions and Tail Risks

What follows is a brief discussion on risk distributions using three examples: rolling a single die, rolling multiple dice, and a Poisson distribution.

Using the example of a dice roll, the expected value of a single roll is 3.5 – due to the fact that a single roll of a die is equally likely to be a 1 through 6. The math is:

$$\text{Expected Value of dice roll} = \frac{1}{6}(1) + \frac{1}{6}(2) + \frac{1}{6}(3) + \frac{1}{6}(4) + \frac{1}{6}(5) + \frac{1}{6}(6) =$$

$$\frac{1}{6}(1 + 2 + 3 + 4 + 5 + 6) = \frac{1}{6}(21) = 3.5$$

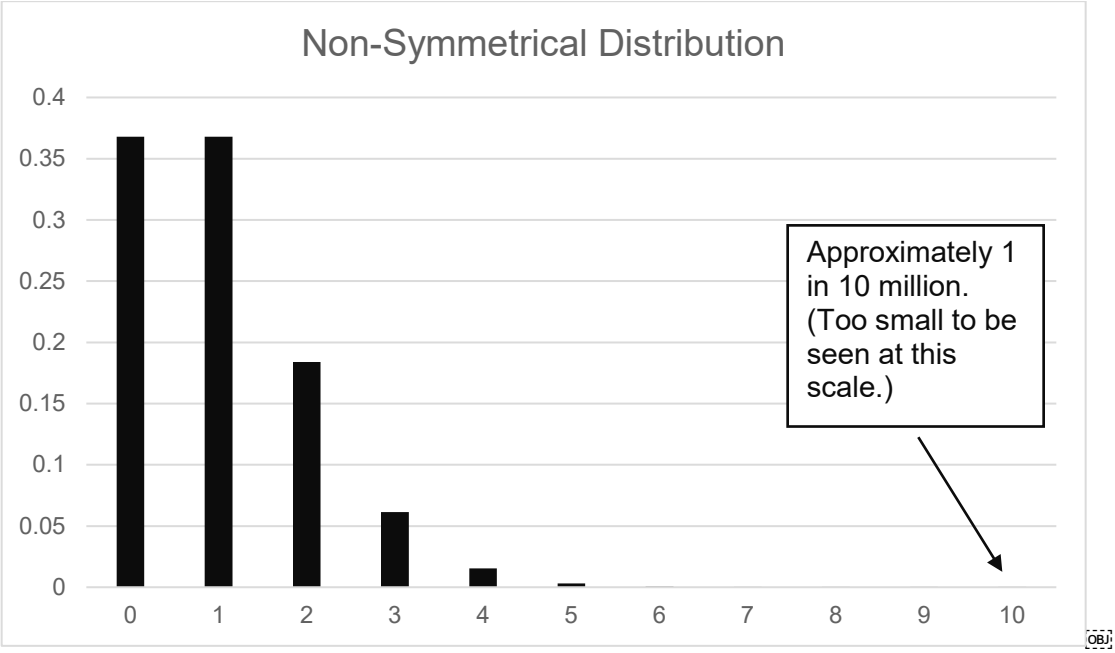
In the above example, a dice roll has a range of possible outcomes from 1 to 6, but the expected average is 3.5. From this simple example, one can see that there is uncertainty involving the dice roll, as opposed to the dice roll resulting in a value of 3.5 on each roll.

Some events have ranges of consequences that are symmetrical, like the rolling of two dice shown in the figure below. The likelihood of each outcome of rolling two dice are not all the same, like that of the rolling of a single die, but the results are still symmetrical.

Figure D-16: Likelihood of Achieving Particular Sum with Two Dice

Other events have a non-symmetrical range of outcomes. When using the Poisson distribution, such as in the figure below, there are no values less than 0; in fact, the range of possible outcomes lies between 0 and infinity.

Figure D-17: Poisson Distribution with Parameter = 1



The range of outcomes associated with a Poisson distribution is illustrative of the notion of how a “tail risk” has a small chance of occurring, but the outcome can be significant if they do occur. In the figure immediately above, the outcome of 10 is very rare, but could represent an outcome that is extreme. A “tail risk” thus refers to risk distributions whose

most frequent outcomes are not remarkable, but rare events can be significantly negative. Examples of tail risks are earthquakes, hurricanes, and financial crises – all low probability but high consequence events. There are many earthquakes every day across the planet, and the average impact of earthquakes is exceedingly small. However, as is well known, large earthquakes – while rare – can have significant damage to widespread areas, and are appropriate to plan for, even if the average annual value of the risk is relatively low.

Wildfires also fall in the category of tail risks because there are many ignitions in wildlands that cause very little damage, but there are rare large fires that are highly destructive. Research has shown that the worst one percent of wildfires destroyed over 80 percent of the acres burned from all fires.[21]

III. Output From the ETWR Analysis

The ETWR is a single value, representing the annual average of a wide array of potential annual consequences. In the ETWR analysis, while most simulated years have no consequence at all, the worst five percent of years simulated have an average consequence of just over $1.5 billion. The following table highlights some of the data from the ETWR analysis:

Table D-6: Specific Data Points from ETWR Analysis

Expected Value	$95M
Likelihood of no significant consequences in a given year	84%
Likelihood of risk exceeding $10M in a given year	14%
Likelihood of risk exceeding $100M in a given year	11%
Likelihood of risk exceeding $1B in a given year	3%
95th Percentile annual consequence	$656M
99th Percentile annual consequence	$2.27B
Average of 90 - 100 percentile annual consequence	$933M
Average of 95 - 100 percentile annual consequence	$1.5B

The method of determining the “Expected Value” is discussed below. The estimation of wildfire risk involves many unknowns, and the conclusions shown here represent estimates using available data and reasonable assumptions. Because large wildfires are rare, and large wildfires caused by utility equipment in Colorado are even rarer, it is not straightforward to estimate these risks with a high degree of precision.

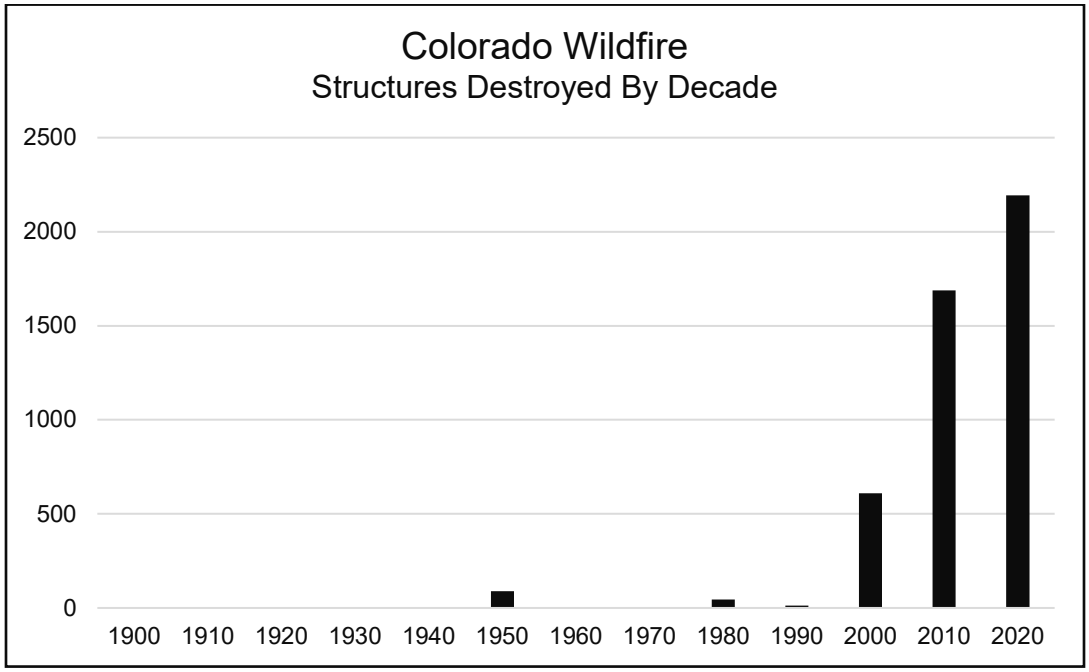
[21] *Do One Percent of Forest Fires Cause Ninety-Nine Percent of the Damage?* Forest Science, Strauss, Bednar, Mess, https://www.fs.usda.gov/psw/publications/strauss/psw_1989_strauss001.pdf

IV. ETWR Methodology

To estimate total wildfire risk, the Company reviewed available data regarding wildfires that have occurred in Colorado, including fires from as early as 1924, and then turned its focus to fires that destroyed structures. After reviewing that large data set, the scope of data used to inform the model was limited to the last 10 years (2013-2023) to include fires that were representative of the frequency and magnitude that is seen today. Attempts were made to gather information on cause of fire, structures destroyed, and size of burn area measured in acres.

Figure D-18 demonstrates the number of structures destroyed by decade. Data for the cause of each fire and structures destroyed have little standardization; data quality is therefore imperfect, though it has improved over time. The definition of a structure can also vary by source, where some sources focus on residences and larger commercial properties, while others include smaller structures such as barns and sheds. The data found in Figure D-18 was built from a composite from dozens of sources of data including national wildfire records, but also heavily from news articles and various state and local fire agency reports.

Figure D-18: Structures Destroyed by Decade from Colorado Wildfire



As the figure reflects, the number of structures destroyed from wildfires has increased over time and decade, and it can be concluded it is unlikely that this increase is due to a lack of data prior to the year 2000. The increase can likely be attributed to other causes, such as the environmental and geographic factors discussed earlier.

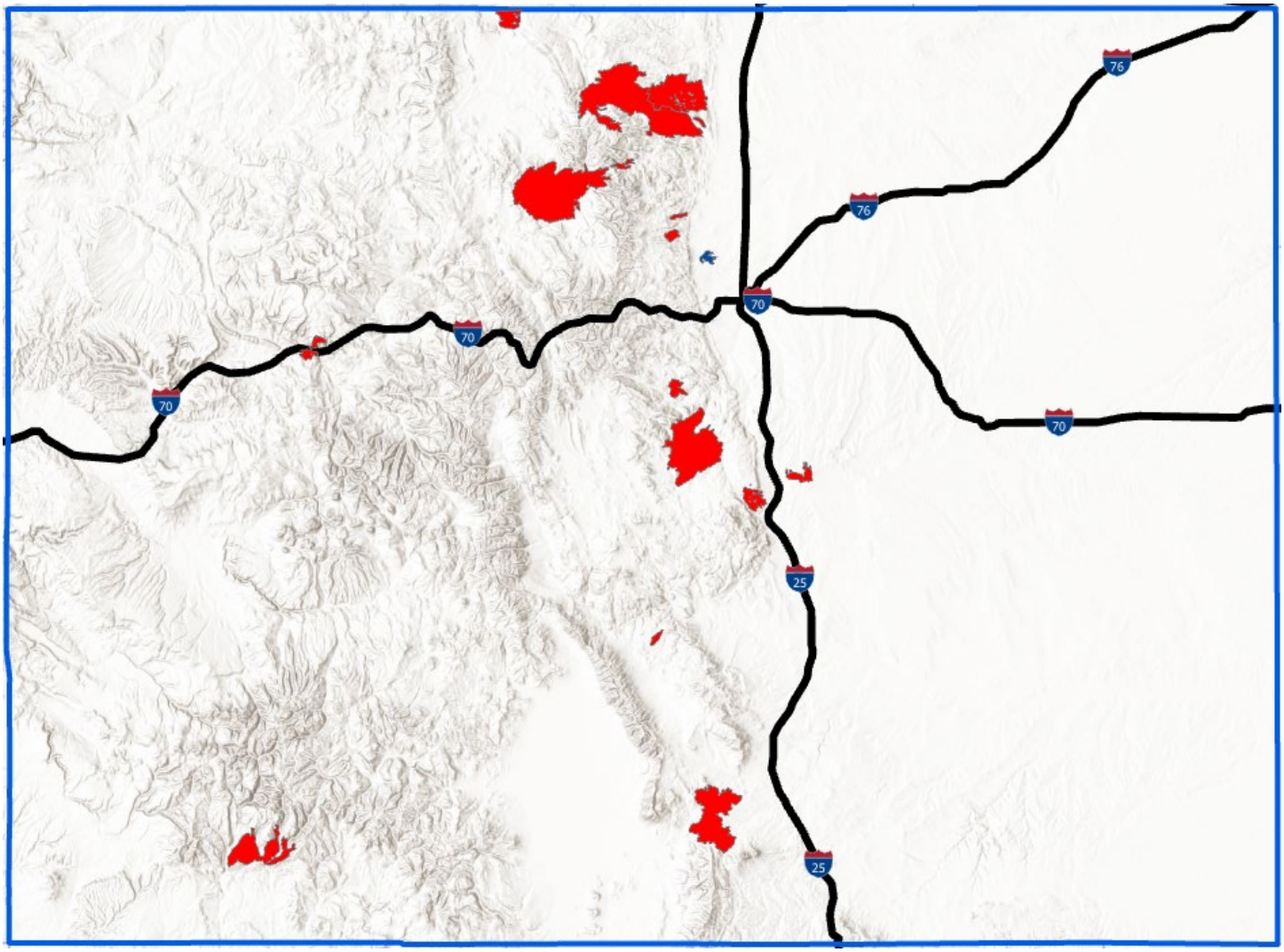
Categorize Wildfires into Two Separate Geographic Groupings

Using the Wildfire Risk Map discussed in Section 6, the Company reviewed general historical wildfire behavior, specifically with wildfires that caused damage to 30 structures or more. The Company reviewed the location, fire spread, vegetation involved, and where possible, the weather conditions present at the time of each fire. After this review, the Company concluded that – for the purposes of analysis – damaging wildfires can be grouped into two separate categories; Type 1 and Type 2 fires. These groupings are not meant to be an exhaustive taxonomy of wildfires in Colorado, but help the risk analysis by adding some level of granularity to a broad subject. Fire Type 1 fires represent all fires except for those in Fire Type 2; Fire Type 2 fires are fires that originate on the Eastern slope of the Front Range in the grassy foothills during extreme windy events.[22]

Figure D-19 below is a map showing all wildfires since 1924 that destroyed 30 structures or more. The red fires are the Fire Type 1, and the blue fire is Fire Type 2. As can be seen from the map above, all wildfires in Colorado history since 1924 that destroyed 30 structures were Fire Type 1, except for the Marshall Fire of 2021.

[22] Note that the Black Forest fire of 2013 occurred east of the Front Range in a forested area northeast of Colorado Springs.

Figure D-19: Wildfires Destroying 30 Structures or More Since 1924



There are many different vegetation types associated with Fire Type 1, but the significant and damaging fires in those areas are primarily in forested areas, and the impacted areas tend to be lower density populations. These fires can be very difficult to suppress, with the East Troublesome Fire of 2020 continuing for six weeks before it was considered extinguished. The duration of these fires prolongs their risks. The majority of structures that burned in the East Troublesome Fire occurred in the second week of the fire burn.

The above discussion of Fire Type 1 is contrasted by the intensity and impact of the Marshall Fire that was driven by extreme downslope winds, which subsided relatively quickly. During that time, however, the fire impacted the landscape immediately. The Marshall Fire progressed mostly through grassy vegetation, rather than a forested ecosystem. The zone for Fire Type 2 is concentrated along the Front Range primarily west of I-25 and can be thought of as primarily WUI fires.

While performing the ETWR analysis, it was understood that Fire Type 1 fires were more frequent, but of relatively lower impact on average, than Fire Type 2 fires. Although the Marshall Fire has different characteristics than other wildfires in Colorado, it is believed that fires similar to it are possible and even likely in the future, especially as the WUI encroaches farther west into prime down-slope Chinook wind areas.

The drivers that lead to fires of Type 1, on the other hand, are quite common and align frequently in the summer in Colorado's forests. These drivers include preponderance of dead or dry fuel, mountainous terrain (slopes aid in fire spread), and breezy to windy conditions.

V. Stochastic Modeling (Monte Carlo)

Probabilistic modeling was used to estimate wildfire risks. Because wildfire inputs and assumptions have uncertainties, probabilistic models allow the analysis to consider scenarios that span across a variety of possible outcomes. Both fire types discussed above have their own uncertainties and ranges associated with the destructiveness of fires, the likelihood of these fires, and the likelihood of electric infrastructure being associated with ignition. The ranges for destruction and likelihood are described using probability distributions. A Monte Carlo simulation performs risk analysis by building models of possible results by substituting a range of values – a probability distribution – for any factor that has inherent uncertainty. It then calculates results over and over, each time using a different set of random values from the probability functions.

The general steps of Monte Carlo modeling are summarized below.

- **Step 1:** Run 100,000 simulations of the following steps. Consider each simulation to be a single year of results, repeated over and over.
- **Step 2**: For Type 1 fires, choose the number of years to look backward for trend.
- **Step 2a:** Perform data search of number of fires that burned 30 structures within the number of years selected.
- **Step 2b:** Calculate annual probability of fire, given the results of the data search.
- **Step 2c:** Randomly determine if, for the simulation year, a wildfire will occur. This is done by choosing a random number between 0 and 1, and determining if that number is smaller than the probability established in Step 2b.
- **Step 2d:** If a wildfire occurred for the simulation year, randomly determine whether utility equipment is associated with its ignition. Currently, the model assumes that likelihood to be 20 percent or 0.20. As above, a random number between 0 and 1 is selected, and if it is less than 0.20, the wildfire is considered to be associated with the Company.
- **Step 2e:** If a fire associated with the Company occurred during the simulation year, randomly choose the consequences of that fire from the probability distribution selected for Type 1 fires. Record the consequence that has been identified.
- **Step 3:** Identical to Step 2, except use probability distribution selected for Type 2 fires.

- **Step 4:** With all runs completed, utilize recorded consequence data. For example, to determine the annual average risk (or expected value), divide the total consequence from all simulations by the number of simulations.

With the average annual risk estimated, that value can then be used for further analysis, notably as part of the Distribution Feeder Model discussed in Section 7(D) below.

Estimate Annual Likelihood of Wildfire for Each Geographic Grouping

Destructive wildfires are relatively rare, and those associated with electric infrastructure are even rarer. The low frequency of these events complicates the ability to accurately forecast certain aspects of wildfire risk. The likelihood of a wildfire occurring in a given year, before the year has begun, is inherently unknown and hard to predict. Historical data and subject matter expertise can nonetheless be used to try to make reasonable predictions.

The Estimated Total (average) Wildfire Risk analysis attempts to account for this uncertainty by employing stochastic modeling that uses ranges of probabilities. Specifically, to help estimate the likelihood of a wildfire occurring, stochastic modeling was used to randomly select what length of wildfire history should be used.

It is clear that wildfire risk is increasing; the general analysis is to determine how many fires there have been over a certain number of years, and then use that number divided by the years reviewed as the likelihood. For example, if four fires had occurred in the past 10 years, the probability would be 0.4 fires in a given year. But because of the clear trend upward in recent years, it is not obvious how far back one should look to acquire the probability for a future year. Going back one year is the equivalent of suggesting that every year in the future will look like last year, and going back 100 years may underestimate the probabilities due to the lack of large fires in the past.

The ETWR analysis therefore uses a stochastic approach by ranging the years of review from one to 10, distributed evenly. In other words, some simulations look back seven years, and others look back three years. This approach was taken for both Fire Type 1 and Fire Type 2.

Create Probability Distributions of Consequences for Each Geographic Grouping Using Recent Wildfires

In addition to determining the probability of an event occurring, it is also important to evaluate how consequential a wildfire may be. The relatively small number of wildfires in Colorado makes the act of understanding their consequences difficult. However, to determine consequence, the ETWR analysis relies on the PowerLaw distribution, which offers a reasonable proxy for the true probabilistic distribution of wildfire consequences.

The PowerLaw distribution used for Fire Type 1 was set by assuming the East Troublesome of 2020 is a P80 fire. Meaning, that it is larger than 80 percent of the group of wildfires being studied – namely, those wildfires in Fire Type 1 that have destroyed 30 structures or more. The PowerLaw distribution used for Fire Type 2 was set by assuming that the Marshall fire of 2021 is a P80 fire. Meaning, that it is larger than 80 percent of

the group of wildfires being studied – namely, those wildfires in Fire Type 2 that have destroyed 30 structures or more.

With the probability distributions created, the Monte Carlo steps 2e and 3 are performed by randomly sampling from these distributions.

VI. Estimated Total (average) Wildfire Risk Summary

Based on the ETWR analysis, for the purposes of calculating an RSE, it is estimated that the annual average consequence from ignitions caused by Company equipment is approximately $95 million. This value is the average annual consequence prior to including the impact of any mitigations. This dollar value is calculated using the output from the Monte Carlo steps discussed above.

Section 7(E) discusses how the ETWR is then used for mitigation assessment.

C. Risk Spend Efficiency

After establishing annual risk values, it is then possible to estimate the risk reduction of a given mitigation measure or measures and then compare the risk reduction to the cost of the mitigation. For purposes of the Updated WMP, this cost-benefit analysis is referred to as the Risk Spend Efficiency ("RSE"), which is stated as a ratio of how much risk is reduced compared to the cost of the mitigation measure(s).

An RSE is calculated using the following formula:

$$\boldsymbol{RSE = \frac{(Annual\ Risk\ Reduction)\ x\ (Project\ Life)}{Cost\ of\ Project}}$$

"Annual Risk Reduction" is the estimated amount of wildfire risk, as computed using the Quantitative Risk Framework and the ETWR values.

> **Example**: Suppose a mitigation is intended to reduce ignitions on certain equipment by 20 percent, and that the equipment has a useful life of 20 years. Further, the cost of the mitigation is estimated to be $10 million. For this example, assume that the equipment is estimated to currently cause $6.7 million of average annual wildfire risk, as computed by the Risk Framework.
>
> The RSE for this example mitigation would be:
>
> $$RSE = \frac{(\$1.34M)\ x\ (20)}{\$10M} = 2.68$$

Note the $1.34 million is the amount of risk reduction from a 20 percent reduction of a $6.7 million annual risk (i.e., $6.7 million x 20 percent = $1.34 million)

An RSE of 2.68 indicates that more monetized risk is reduced than the cost of the project. Namely, 2.68 times more risk is reduced than the cost of the project. This analysis, therefore, would support including the mitigation in a wildfire plan.

While RSEs can be a helpful metric to inform various programs of work, an RSE alone is not necessarily the best or only metric to decide if a particular mitigation measure should be implemented, as a mitigation measure could have other benefits that are not included in the Quantitative Risk Framework.

Some mitigation measures (e.g., vegetation management) were assessed at the wildfire tier level, while others (e.g., EPSS) were analyzed at the distribution feeder level, though more detailed engineering and design work is also required before implementing mitigations at the feeder level. Different programs lend themselves to more detailed analysis than others. For example, when considering the risk reduction from undergrounding an existing overhead distribution line, it is possible to use specific information on that distribution feeder to assess the benefits and costs.

Table D-7 is a table of different mitigation measures that were evaluated for risk assessment, what level of analysis was undertaken, and the key metric used to assess each mitigation. The calculated RSEs are reflected in the Distribution Feeder Model.

Table D-7: Mitigation Measures Considered for Wildfire Risk Assessment

Mitigation	Level of Analysis	Metric
Vegetation Management – Clearances	Tier	RSE
EPSS	Feeder	RSE
Undergrounding (Distribution)	Feeder	RSE
Covered Conductor	Feeder	RSE
Small Conductor Replacement	Feeder	RSE

D. Distribution Feeder Model

Overview

Four mitigation measures were analyzed for risk reduction at the feeder level. Feeder-level analysis offers a practical approach because much of what happens on a feeder affects other parts of the same feeder. For example, if an outage occurs at that feeder's circuit breaker, the entire distribution circuit will experience the outage.

There are 247 feeders included in the Distribution Feeder Model, most of which are either in Tier 3 or Tier 2 risk areas. These feeders were selected as part of the Company's partnership with Technosylva. As part of the partnership between the Company and Technosylva, the Company requested that Technosylva design and construct daily updated high-resolution weather forecast data and to archive this weather forecast data into a 20-year dataset, which will act as a component of the fire potential index that is correlated to actual fire occurrence in Colorado. The Technosylva platform performs hundreds of millions of fire simulations daily to generate risk forecasts calculated every 1-3 hours. New forecasts are derived daily to provide timely analysis of possible wildfire events. This provides insights into current and future weather and fire danger scenarios to inform daily operations.

Described immediately below, the Distribution Feeder Model quantifies wildfire risk allocated across the 247 feeders in an amount of approximately $76 million.

Distribution Feeder Model Methodology

To perform risk assessment at the feeder level, the first step was to determine the amount of annual average risk on each feeder. This determination was made in several steps. First, the Company assumed that 80 percent of the total annual risk was located on the 247 feeders. This value was estimated by estimating how much risk was from the transmission system, and how much risk was present on the distribution feeders other than the 247 discussed above.

Second, based on the allocation method discussed below, the Distribution Feeder Model assumes 80 percent of total wildfire risk – approximately $76 million, or 80 percent of approximately $95 million of total system risk, is allocated across the 247 feeders.

Third, each feeder had certain historical information collected regarding its characteristics, such as customer counts, length in miles, number of average annual outages, number of average annual ignitions, data from Technosylva, and the geographic location of the feeder. An estimate was made of how many ignitions had historically occurred on each feeder. This estimate was based on actual ignitions and actual outages recorded on overhead Company equipment.

Fourth, for each feeder, Technosylva data was used to estimate the consequence of wildfires occurring on the particular feeder. The Technosylva data was then used to identify the maximum number of acres burned and maximum number of structures destroyed for each feeder. The Quantitative Risk Framework was used in this step to convert acres burned and structures destroyed to a single monetized value.

The final step was to multiply the ignition rate by the maximum consequence for each feeder. Although this value is not a practical value by itself as an estimate of average annual risk (*i.e.*, it is too large of a value because it assumes that every fire that occurs on that feeder will inflict maximum consequences), the value is then used to apportion the total wildfire risk. In other words, the annual average wildfire risk of approximately $76 million discussed above is allocated to the 247 feeders using the relative magnitude of

the calculations discussed in this section. In the end, each of the 247 feeders have their own annual feeder risk amount, which sums to approximately $76 million.

Distribution Feeder Model Summary

The Distribution Feeder Model can be described as top-down analysis with a component allocation. The top-down analysis estimates the total wildfire risk. With that total identified, it is then allocated to its constituent parts using an assessment that gauges the relative risk among those parts.

With an estimated risk at the feeder level computed, it is then possible to analyze how specific mitigations reduce that risk at the feeder level.

Additionally, with the feeder level risk estimated, certain programs can use those values to help prioritize where work should be carried out. For example, if it becomes known that two identical pieces of equipment need repair, the feeder risk levels can help prioritize whether one repair should occur before the other.

E. Mitigation Assessment

The Distribution Feeder Model provides RSE scores for the four wildfire risk mitigations, plus vegetation management clearances were evaluated in the Vegetation Risk Analysis. Performing these analyses not only illustrates the mitigations to generalize prioritize over others, also illuminate opportunities to improve processes and data integration going forward.

I. Modeling Summary by Mitigation Measure

As mentioned above, RSEs are only a part of the decision-making process. Nevertheless, some mitigation measures – at the tier level or the feeder level – appear to provide a larger benefit than their cost (*i.e.*, have an RSE >1). Other mitigations did not appear to provide as much benefit as their cost would warrant, but yet may still be justified based on considerations other than RSEs.

Below is a summary of mitigation measures analyzed, the Distribution Feeder Model output associated with the mitigation measure, and the operational take-away.

Table D-8: Summary of Mitigation Measures and Distribution Feeder Model Output

Mitigation Measure	Feeder Model Output (RSE Score)	Operational Take-Away
EPSS	> 1 for most feeders (more than two thirds of all feeders)	Implementation is warranted.
Undergrounding	> 1 for a select number of feeders	Targeted deployment, understanding that actual use will be based on detailed engineering and design.
Covered Conductor	>1 for a select number of feeders.	The Company should consider covered conductor as an option for replacing small wire.
Small Conductor Replacements	<1 for most feeders.	Local knowledge of risk associated with small wire issues support some attention, despite RSE results.
Vegetation Management Clearances	Mixed for larger clearances.	Focus on Tier 2 and Tier 3 for clearances as also informed by utility practice.

II. Enhanced Powerline Safety Settings

EPSS is the most sophisticated form of Wildfire Safety Operations ("WSO"). EPSS reduces wildfire risk by decreasing the amount of time a fault persists, which reduces the time where a spark could be present and therefore lowering the chance of an ignition.

The Distribution Feeder Model cost-benefit RSE calculation assumes EPSS mitigates 40 percent of wildfire risk. This is a lower number than other utilities that currently operate similar programs. As deployment expands, the Company will gain information to track risk reduction, including knowing when EPSS settings are turned on and off for each feeder, tracking outages and ignitions on that feeder, and documenting causation of outages/ignitions.

The Distribution Feeder Model incorporates higher-level cost assumptions for the following equipment:

Table D-9: EPSS Cost Assumptions for RSE

Cost Element	Cost	Units
Protection Study	$25,000	$/Study
Substation Relay	$500,000	$/Relay
Substation Communications[23]	$60,000	$/Device
Recloser	$90,000	$/Recloser

The Company's Updated WMP budget for EPSS uses more granular cost assumptions, though actual costs will depend on the fully developed scope of each EPSS feeder project as determined through detailed engineering and design.

EPSS has a relatively high RSE compared to other mitigations: of the 247 feeders analyzed, more than half of feeders have an EPSS RSE of at least 2.0 (meaning estimated risk reduction benefits are at least double associated costs) and seventy percent of them have an RSE greater than 1.0 (meaning estimated risk reduction benefits are at least equal to associated costs).

III. Targeted Undergrounding

"Undergrounding" involves reconfiguring all or a portion of an electrical distribution feeder that was built above ground (or overhead) to an underground construction.[24] While it is possible for underground electric lines to cause sparks and small fires, the chance of one of these sparks leading to a destructive wildfire is low. This results in targeted undergrounding mitigating substantial wildfire risk.

Undergrounding also increases reliability due to less of the feeder being exposed to external elements, thereby reducing, or avoiding entirely, the causes of many outages (*e.g.*, animal, plant, or vehicle contacts, or wind, lightning, or icing). The Distribution Feeder Model calculates a cost-benefit RSE that considers reliability benefits, though the Company's scope of targeted undergrounding is informed by RSE that considers only wildfire risk reduction benefits.

[23] The $60,000 for Substation Communications was calculated by assuming one out of every five feeders would require such work. The assumed cost for substation communications upgrades is $300,000 which divided by five equals $60,000.

[24] The Company is not proposing to underground transmission assets as part of the Updated WMP due to the significantly greater cost and complexity. Additional discussion of the difference between undergrounding distribution and transmission assets is provided in the Company's Direct Testimony accompanying the Updated WMP.

The Distribution Feeder Model cost-benefit RSE calculation assumes targeted undergrounding mitigates 95 percent of wildfire risk. This is consistent with the mitigation benefits used by Southern California Edison to calculate cost-benefit in its 2023-2025 Wildfire Mitigation Plan.[25]

The Distribution Feeder Model cost-benefit RSE calculation utilizes a per mile cost of targeted undergrounding, with two different values used depending on the location of the feeder. Different values are used because feeders located east of the Front Range are less expensive to underground, based on geological factors (*e.g.*, less granite and flatter terrain).

Table D-10: Targeted Undergrounding Cost Assumptions for RSE

Cost Element	Cost	Units
Metro + Foothills	$4.0	$ Millions /Mile
Mountains	$6.6	$ Millions /Mile

There are six feeders in the Distribution Feeder Model with an RSE (excluding reliability benefits) greater than 1.0. These results will help inform selection of feeders for targeted undergrounding activity under the Updated WMP.

IV. Covered Conductor

Unlike bare conductor (which has no insulating cover), covered conductor has an outside coating of cross-linked polyethylene that is ultraviolet resistant, non-tracking, fully voltage rated, and erosion resistant. Covered conductor is heavier than standard bare conductor of the same gauge and type and has a higher wind loading profile. Covered conductor is less susceptible than bare conductor to ignition events associated with vegetation contact. It therefore is a useful mitigation, particularly in heavily forested areas.

The Distribution Feeder Model cost-benefit RSE calculation assesses replacing all conductor on each feeder with covered conductor. For purposes of calculating an RSE, the Distribution Feeder Model assumes covered conductor mitigates 60 percent of wildfire risk. This assumption is based on information from utilities in the California Joint IOU Covered Conductor Working Group.

The Distribution Feeder Model cost-benefit RSE calculation utilizes a $761,333 per mile cost of replacing conductor with covered conductor. The cost of the covered conductor is a combination of the cost of the conductor and needed upgrades to poles.

[25] *See* Southern California Edison, *2023-2025 Wildfire Mitigation Plan* at 742 (Mar. 27, 2023), https://www.sce.com/sites/default/files/AEM/Wildfire%20Mitigation%20Plan/2023-2025/2023-03-27_SCE_2023_WMP_R0.pdf.

V. Small Conductor Replacement

Small conductor replacement involves replacing small diameter (*i.e.*, #4 American Wire Gauge[26] ("AWG") or smaller) conductor with stronger, more durable conductors. Larger, more durable conductor being installed through the small conductor replacement program is physically more robust than small conductor, making it better able to withstand tree contact, other mechanical damage, and extreme weather and therefore less likely to end up broken and on the ground.[27] Ultimately, the stronger, more durable conductor is less likely to result in ignition events.

The Distribution Feeder Model cost-benefit RSE calculation assesses replacement of the estimated amounts of small wire on each feeder with a larger, bare wire alternative. The Distribution Feeder Model cost-benefit RSE calculation also assumes replacing small conductor with larger, bare conductor reduces potential wire down events by approximately 50 percent. This 50 percent reduction in wire down events translates to a very small reduction in wildfire risk in the Distribution Feeder Model. Given the limitations of available data, the Distribution Feeder Model likely underestimates mitigation benefits of this resiliency work.

The Distribution Feeder Model cost-benefit RSE calculation utilizes a $603,000 per mile cost of replacing small conductor with larger, bare conductor.

VI. Vegetation Management Clearances & Vegetation Risk Analysis

The Company, with FEP's assistance, additionally performed a Vegetation Risk Analysis to help determine the appropriate clearances. Vegetation Management is an ongoing mitigation and is discussed in detail in Section 8(D). Based on the Company's data, the tree clearance aspect of Vegetation Management reduces wildfire risk as well as generally reduces outages. Outages and ignitions are tracked based on cause – whether from live tree contact, broken branches, or full tree failure. With this data set, it is possible to estimate what fraction of the overall risk from wildfire and reliability are due to tree contacts.

The Vegetation Management clearance mitigation was analyzed at the tier level by using outage data to ascertain the proportion of tree contacts in each tier. The Vegetation Risk Analysis considers the degree to which outages will be reduced by implementing the mitigation, allocating that reduction through the overall risk amount specifically from Vegetation Management, then allocating that from the total Company risk. As discussed above, these values are then converted to risk scores that estimate the annual risk reduction. For Vegetation Management, the assessed mitigation involves pruning trees to be no closer than 10 feet from the electrical lines, rather than six feet.

The cost of the proposed Vegetation Management program is estimated by looking at historical costs per mile of Vegetation Management, then extrapolating to a larger amount

[26] American Wire Gauge is the standard measure for the diameter of electrical conductors in the United States.

[27] There may also be instances where small conductor is physically degraded or damaged due to age.

based upon the new mitigation. The annual cost of the Vegetation Management clearance mitigation activity differs by the Company's per year cost proposal.

Vegetation Management Mitigation $RSE = \frac{(\$19.3M)\ x\ (1\ year)}{[\$Annual\ Cost]}$

VII. Updated WMP Mitigation Selection

This Updated WMP reflects the Company's commitment and desire to promote public safety through programs that construct, maintain, and operate the electric system in a manner that helps reduce the risk of a utility asset being the ignition source of a wildfire. The overall mix of programs builds on the work conducted over the prior years and considers evolving risks, operational considerations, utility practices, and cost. The following broadly describes how the Company identified the wildfire mitigation technologies and procedures included in the Updated WMP.

The Updated WMP incorporates multiple categories of mitigation activities to be implemented in the years 2025, 2026 and 2027. Those mitigation categories were identified by the Company and its external experts and are directed at the specific wildfire risks in the wildfire risk area. The Company's proposed allocation of resources across those categories balances three factors: (1) risk reduction; (2) operational constraints; and (3) customer impacts. Each factor is discussed below.

Risk Reduction

The mitigation activities under the Updated WMP are informed, where possible, by the Company's quantitative Wildfire Risk Assessment. The Wildfire Risk Assessment incorporates the updated Wildfire Risk Map and wildfire spread modelling to identify and quantify wildfire risks within the Company's service territory. The Wildfire Risk Assessment also produces several risk reduction cost curves that identify activities and locations where mitigations will maximize risk reduction per dollar spent (*i.e.*, RSE). Given operational and financial constraints, the RSE scores help the Company allocate resources across activities and prioritize projects within each mitigation category, with the overall goal of reducing wildfire risk in an economically and operationally efficient manner.

Operational Constraints

The growth in wildfire risk has resulted in there being more potential risk mitigation activity than can be accomplished during the Updated WMP's plan period. As a result, the Company's proposed scope of work and allocation of resources reflects its assessment of the number of hours reasonably available to execute work based on current and proposed staffing levels, as well as the volume and type of work considered. The Company also considered seasonal variables, permitting and access/land use considerations, preexisting work and lead times, anticipated contractor availability, while recognizing there are some known and unknown variables that will inevitably impact our ability to carry out work.

Ultimately, these practical factors also influenced the scope of mitigation activities the Company believes it can reasonably execute during the plan period.

Customer Impact

The Company is obligated to provide safe and reliable service to its customers. Wildfire risk mitigation is a core component of that obligation, but so too are other activities. For example, the Company is significantly expending the use of renewable resources to serve customers with clean and low carbon energy and is modernizing its distribution system to accommodate new use cases (*i.e.*, building and transportation electrification) and accommodating customer-sited generation. These are all important activities that increase the value of the Company's service to customers, but they also require resources (both financial and operational). The scope of mitigation activities within the Updated WMP reflect the Company's attempt to balance financial demands and remain focused on providing safe, and reliable service.

The Distribution Feeder Model, which is part of the overall Wildfire Risk Assessment, allows for the calculation of RSE scores for certain mitigation strategies, incorporating items such as the duration of risk reducing benefit of the mitigation, its projected effectiveness at reducing ignitions, as well as its overall risk reduction per unit of cost. This was used by the Company to inform the development of a balanced portfolio of mitigation initiatives. Ultimately, the overall mix of mitigations is designed to improve situational awareness, reduce risk by improving the resiliency of the system, and address emerging threats through operational mitigations, while supporting customers with new programs and enhanced communication and engagement efforts.

By using this approach, the Company is better able to evaluate its investments across multiple programs. In addition to evaluating these types of outputs, the Company has considered other factors, such as programs that address multiple risk drivers, local and geographic considerations, resource and other constraints, regulatory commitments, interactions among various programs, operational constraints, and time to implement a given mitigation measure.

VIII. Continuous Improvement

Risk identification and analysis is a continuous process, and the Company will be re-evaluating its risks continuously and assessing the most effective ways to address them.

In selecting and optimizing the portfolio that is included in this Updated WMP, the Company has analyzed and balanced multiple factors such as risk reduction values, fire history, ingress/egress, geographic considerations, types and density of local vegetation, feasibility constraints, available resources, regulatory requirements, customer impacts, and other commitments.

The Company will continue to update and refine its Wildfire Risk Assessment approach for the Updated WMP as it is implemented, ensuring that its lessons learned, additional data streams, and program developments are considered to prioritize work scopes and annual activities.

8. 2025-2027 WILDFIRE MITIGATION PLAN

This section provides a more detailed description of the various mitigation measures and mitigation tools that Public Service plans to deploy over the 2025-2027 WMP period horizon. As noted above, the Updated WMP mitigation measures and tools span four broad categories:

- **Situational Awareness**: Situational awareness tools enhance the Company's ability to identify, assess, and respond to a physical, cyber, or environmental hazard, including wildfires.
- **System Resiliency**: System resiliency involves the Company making physical investments in its infrastructure to directly reduce the risk of a utility-caused wildfire.
- **Operational Mitigations**: Operational mitigations involve the Company adjusting something about how it operates the electric system in order to reduce the risk of a utility-caused wildfire.
- **Customer Support:** Customer support involves the Company directly informing customers regarding wildfire risk and mitigation activities and also provides direct customer assistance for customer resiliency.

The Updated WMP builds upon the 2020 WMP, and is part of an evolutionary process to steadily enhance the ability to identify and mitigate wildfire risk on the Company's system.

In this section, each mitigation is detailed, organized by the four above-listed categories. Additionally, it also outlines the growth of expertise and organizational support needed to aid the Company's wildfire mitigation activities and the 2025-2027 WMP.

A. Situational Awareness

Situational awareness is the ability to monitor environmental conditions to make critical operational decisions in an effective and timely manner. It covers a broad range of systems and tools that inform operational and/or response actions for both the transmission and distribution systems. Currently, the Company uses various public information sources (such as the National Weather Service, Rocky Mountain Geographic Area Coordination Center Predictive Services) and third-party services (such as Indji Watch)[28] to provide pertinent data, including Red Flag Warnings[29] and Fire Weather Watch and High Wind Warning/High Wind Watch/Wind Advisories. Situational awareness resources also include internal personnel (crews/technicians), as well as external resources (first responders) that can assist in the gathering of environment condition data and provide condition reports on active wildfire situations.

[28] Indji Watch is a third-party data service that provides information on environmental threats like active fires that the Company monitors for proximity to Company assets. More information is available at https://www.indjiwatch.com/.

[29] A Red Flag Warning is a weather warning issued by the National Weather Service when temperatures, humidity, fuel moisture, and winds increase the risk for wildland fire.

In addition to gathering information on current environmental conditions, situational awareness also extends to understanding which parts of the service territory may be exposed to higher consequential wildfires. The Company began piloting Technosylva wildfire spread modeling software in as part of the 2020 WMP, which generates millions of simulations to estimate wildfire spread scenarios under varying fire weather conditions, to further refine and identify areas where to focus wildfire mitigation efforts. This risk modeling software also improves situational awareness through the integration of various external wildfire notifications such as IRWIN[30] and FireGuard.[31]

The Company will implement PSPS for severe wildfire risk events (detailed in Section 8(E)) and expand its EPSS program as part of the Updated WMP. Both programs require more detailed and location-specific assessments of fire potential, including enhanced meteorological forecasting, along with the gathering of localized environmental conditions such as temperature, wind speed/direction, humidity, and fuel moisture.

The following are situational awareness capabilities, tools, and upgrades the Company proposes in this Updated WMP:

I. Enhanced Meteorology Capabilities

Historically, Company meteorology staff have supported various functional areas. Given the increased wildfire risk in the Company's service area, the Company has begun hiring meteorological staff to focus solely on wildfire mitigation. The Company plans to expand its meteorological and fire science staff over the 2025-2027 WMP period to support the continued evolution of situational awareness and predicting.

Responsibilities of the wildfire mitigation meteorology team include monitoring, forecasting, and tracking of weather conditions. The team will produce real-time forecasts and help develop long term analysis and trends that are informative about the spread of wildfire. This will include coordination and interpretation of data from public sources, Company-owned weather stations, high-definition cameras, and third-party services. The meteorology team is responsible for providing advance notice to Company personnel regarding Red Flag Warnings, Fire Weather Watches, and High Wind Warnings/High Wind Watch/Wind Advisories and will be responsible for determining when conditions

[30] Integrated Reporting of Wildland Fire Information ("IRWIN") is a Wildland Fire Information and Technology affiliated investment intended to provide an "end-to-end" fire reporting capability. IRWIN is tasked with providing data exchange capabilities between existing applications used to manage data related to wildland fire incidents. *Data Management & WFIT - Integrated Reporting of Wildfire Information (IRWIN)*, U.S. Department of Agriculture and U.S. Department of the Interior, https://www.wildfire.gov/application/irwin-integrated-reporting-wildfire-information.

[31] FireGuard uses military satellites with the National Interagency Fire Center, U.S. Forest Service and the National Geospatial-Intelligence Agency's Firefly capability to detect wildfires, notify authorities, and create products to disseminate to firefighting networks nationwide. *FireGuard Program Enhances National Guard Wildfire-fighting*, National Guard Bureau (Nov. 18, 2022), https://www.nationalguard.mil/News/Article/3223104/fireguard-program-enhances-national-guard-wildfire-fighting/.

may exist for PSPS. The Wildfire Risk Mitigation team has made progress in building out this team and hired a Senior Meteorologist in December 2023.

The following are the anticipated steps that the Company plans to undertake for the development and refinement of its meteorological and fire science group:

- Develop Situational Awareness tools, such as a Fire Potential Index, that can inform current and near-term wildfire risk across the Company's service territory. Provide daily updates of this data to all relevant Company personnel.
- Collect and analyze fire weather data to further support the relationship between wind speeds and undesired events such as outages and ignitions.
- Determine appropriate weather data sources, ranging from existing public sources to the addition of Company-owned weather stations.
- Build relationships throughout the Company and relevant outside stakeholders, such as local fire suppression agencies, various emergency organizations, local academia, and fire weather research centers.
- Collect ignition data with enough granularity to allow for analysis. Create a standard for the definition of an ignition and use trained personnel to collect data within a short time of the event occurring. This data will be collected such that it can be easily linked to other Company data such as locations of assets and outage events.
- Assist in building standards regarding when and where operational wildfire mitigation measures should be deployed, such as PSPS.
- Continue to hire meteorology staff as the need grows.

II. Weather Station Deployment Strategy

Weather stations gather real time weather data to inform weather forecasts and weather model validation. These automated weather stations can be deployed in remote regions and installed directly onto utility poles to gather weather data on a more granular and site-specific basis than may be obtained through other government or third-party weather monitoring networks. These weather stations collect the following information: (1) air temperature, (2) barometric pressure, (3) relative humidity, (4) sustained wind speed/direction, (5) wind gust speed/direction, and (6) fuel moisture. Most weather stations are capable of recording and communicating between six and 120 observations per hour.

As part of the Company's expansion of its EPSS program and its PSPS program, each circuit in these programs will eventually be equipped with a minimum of one Company-owned weather station, and possibly more if the circuit extends into different environmental/weather areas. The Company is beginning to install weather stations in 2024 and will expand this weather station network in 2025-2027. The weather station data will be used to monitor weather conditions for EPSS and PSPS events and validate hourly forecast weather models. The weather stations will be installed on high priority circuits and substations. The Company's strategy to estimate the number of weather stations to install and the total number needed overall is based on a 1:175 mile install ratio per linear mile of both transmission and distribution lines.

III. Camera Deployment

AI-equipped cameras assist with early wildfire detection. Early detection can trigger more rapid deployment of fire suppression resources thereby helping reduce the consequences of an ignition – whether related to utility equipment or from other human or environmental causes.

Public Service has begun to build out its own network of these cameras.[32] These high-definition camera systems use AI to scan the skies for signs of smoke or fire and give the Company accurate 360-degree fire detection triangulation capability across remote and/or higher risk parts of its service territory.[33] Once smoke is detected, an alert is sent to the Company and its public safety partners who are onboarded with the system.

The Company ran a pilot with Boulder County with three AI cameras beginning in late 2022 that informed its decision to expand the use of AI cameras in 2023 and 2024. The Company installed 21 units in 2023, with nine of these cameras in the eastern part, and 12 in the western part of its service territory. The Company plans to install an additional 21 sites in 2024, with seven already installed. In addition to using cameras for monitoring and detection, the Company will continue to explore additional applications for wildfire mitigation and network expansion going forward. The Updated WMP calls for an additional 93 cameras, bringing the total to 135. With 135 cameras, 100% of Tiers 3 and 2 will have coverage.

The Company's AI camera systems are part of a larger situational awareness strategy coordinated with federal, state, and local fire agencies and officers.

IV. Technosylva/Weather and Fire Science Modeling

Technosylva software is a combination of observation, model, and asset information that provides current and forecast weather conditions. Technosylva software is used during PSPS events and if there are active wildfires to simulate possible wildfire behavior and spread scenarios if a wildfire occurs within the Company's service territory.

For this Updated WMP, the Company requested Technosylva design and construct daily updated high-resolution weather forecast data and to archive this weather forecast data into a 20-year dataset which will act as a backbone to the fire potential index, correlated to actual fire occurrence in Colorado. Additionally, Technosylva will be used for developing numeric weather predictions for Colorado by running software that will monitor critical wind speed, dryness, and temperature for initiating EPSS and PSPS events.

[32] More information is available at https://www.pano.ai/.

[33] Although the platform's machine learning algorithms have seen significant improvements in their abilities to detect wildfires on a 24-hour basis, most systems still operate with a 'human in the loop', to validate a wildfire prior to sending notifications to stakeholders.

The use of Technosylva and the associated data produced by the model runs will allow the Company to elevate the situational awareness which may help limit the impact of the PSPS program on customers.

V.Emergency Management Resources and Wildfire Command Center

The Company is integrating its situational awareness with other emergency management resources to inform those emergency management and response efforts. Specifically, the Company is developing a Wildfire Command Center that will serve as the Company's 24/7 hub for monitoring wildfire risks and processing weather, remote sensing, and other data from the Company's situational awareness programs. The Wildfire Command Center will be equipped with the necessary infrastructure for monitoring and processing data from the existing and planned situational awareness programs. The Wildfire Command Center will also serve as a centralized location for wildfire coordination, response, and recovery efforts.

VI.Area Risk Mapping

The Company's Wildfire Risk Map serves as a foundational tool providing guidance in work procedures, mitigation programs, and situational awareness. The updated Wildfire Risk Map serves as a statewide snapshot of the Company's updated risk categorization across its service territory and asset locations. The Wildfire Risk Map provides guidance for work and directs various programs within the wildfire risk tiers. Additionally, the Wildfire Risk Map provides valuable data which drives our EPSS and PSPS programming and scope of work.

VII.Software

The objective of the software updates that support risk assessments and modeling is to improve both near term and long-term predictive risk model capabilities as the Company's situational awareness and wildfire mitigation strategies mature. Specifically, these upgrades aim to refine the accuracy of data and data processes and seek to improve the quality of model outputs. In tandem with the improvement of model outputs, the Company will be able to better plan for and mitigate wildfire risk.

B. System Resiliency

System resiliency involves the Company making physical investments in its infrastructure to directly reduce the risk of a utility-caused wildfire. As discussed in more detail below, this work is performed on both the distribution and transmission systems. It also includes vegetation management, which protects physical investments and helps reduce the chance assets cause a wildfire.

The Company's system resiliency work builds upon the 2020 WMP, in which the Company initiated critical risk-reducing repair and replace programs. These programs will continue to be a significant part of the Updated WMP. As the Company's strategies have matured, however, we now group all physical investments that help reduce the risk of a utility-caused wildfire into the broader system resiliency category.

An effective system resiliency program often includes a systematic, risk-informed approach to the evaluation of available options that can make the electric system more resilient to outages and ignitions that can lead to wildfires. This approach includes detailed analyses and prioritization of the needed work on distribution feeders and transmission lines. The Wildfire Risk Assessment (described in Section 7) is used to estimate the existing risk compared to mitigation alternatives in terms of risk reduction per unit of cost (i.e., the RSE).

System resiliency improvements using wildfire-resistant construction standards, implementing ignition-reducing equipment enhancements, and upgrading electric equipment to be stronger in severe weather will all help reduce the risk of Company equipment igniting a fire. Our Updated WMP system resilience work is focused on Tier 3 and Tier 2 Wildfire Risk Areas.

In addressing these resiliency investments and activities, the Company's proposals for the estimated scope of work undertaken for each may reasonably differ based on factors such as situations encountered in the field, supply chain issues, labor constrains, and inflation. These types of factors may change the scope of the Company's wildfire activities and related costs.

The Company's system resiliency investments and activities are composed of those that address distribution and transmission needs, as well as vegetation management.

I. Distribution System Resiliency

The below section of this Updated WMP addresses the distribution activities the Company will undertake, including: (1) targeted undergrounding; (2) small conductor replacement; (3) non-expulsion upgrades; (4) pole replacement; and (5) overhead assessments and remediations.

Targeted Undergrounding

As discussed above, undergrounding involves reconfiguring all or a portion of an electrical distribution feeder that was built above ground (or overhead) to an underground construction. Undergrounding significantly mitigates wildfire risk, but it also is engineering, design, and construction intensive. For example, in some instances, the feeder will need to be reconfigured from radial taps to a normally open looped system. The Company must identify and obtain locations for switch cabinets and pad-mount transformers and associated land rights. Undergrounding also can involve more onerous permitting requirements from various agencies (Bureau of Land Management, U.S. Forest Service, National Parks Service, State and local government, etc.).

The Updated WMP targeted undergrounding reflects a balancing of several factors, including practical considerations of geology, the Company's experience with undergrounding portions of its distribution system and cost.

Undergrounding is more difficult in areas of greater elevation (or elevation change) and areas with rocky geology, like Colorado's Front Range, which is part of the Company's

service territory. Much of the Company's service territory has rocky geology, particularly in areas with higher wildfire risk. Undergrounding in such geologic conditions is far more challenging and costly than flatter, less rocky terrain. As a result, the Company will not attempt to underground feeders in areas that are predominately bedrock as part of the Updated WMP.

The Company has experience undergrounding shorter segments of the distribution system, particularly in flat, less rocky terrain. The Company has less experience undergrounding large portions of its distribution system (*i.e.* multiple miles). These practical considerations, along with others like more substantial permitting and land rights requirements (as the physical construction footprint is larger due to the need to stage equipment and disturb more ground) and more complicated logistics (*e.g.*, utility conflicts and geology) all contribute to the Company developing a proposed scope of work that reflects the Company's assessment of an ambitious, but achievable scope to be completed in the 2025-2027 timeframe.

The Company's targeted undergrounding proposal also considers cost. Undergrounding, while significantly mitigating wildfire risk, is relatively expensive due to the intensity of necessary work. Therefore, the targeted undergrounding scope of work also is informed by the Distribution Feeder Model RSE cost-benefit analysis.[34] That analysis identified six feeders with an RSE above 1.0. These feeders will be candidates for the targeted undergrounding program, with actual undergrounding being dependent on detailed engineering and study.

The proposed amount of targeted undergrounding included in the Updated WMP is shown in the table below.

Table D-11: Targeted Undergrounding

	2025 (Forecast)	**2026** (Forecast)	**2027** (Forecast)	**2025-2027 Cumulative** (Forecast)
Miles	5	20	25	50

Small Conductor Replacement

The small conductor replacement program involves replacing small diameter conductor with stronger, more durable conductor.[35] It also includes replacing existing bare, open wire secondary conductor spans with insulated aerial cable lashed to a bare neutral

[34] Undergrounding also increases reliability due to less of the feeder being exposed to external elements, thereby reducing or avoiding entirely causes of many outages (e.g., animal, plant, or vehicle contacts, or wind, lightning, or icing). The Distribution Feeder Model does calculate an RSE that considers reliability benefits, though the Company's scope of targeted undergrounding is informed by RSE that considers only wildfire risk reduction benefits.

[35] Small conductor replacement also requires pole replacement. The number of poles to be replaced due to small conductor replacement (as well as associated costs) are part of the pole replacement program discussed below.

conductor.[36] The Company has combined small conductor replacement with bare, open wire secondary conductor replacement ("open wire secondary replacement") to accomplish both in a more cost-effective manner. This combination does not mean all open wire secondary replacement will be on the same poles as small conductor replacement, but rather that both open wire secondary replacement and small conductor replacement will be performed on the same distribution feeders or in the same geographic areas.

Small conductors are used on some of the oldest lines in the Company's service territory and are smaller relative to what is now used for standard construction. Further, based on available 2022 data, small wires had almost twice the number of wires down events (weighted by feet of wire installed). Replacing open wire with insulated conductor provides protection against contact with tree limbs. It also allows the bare neutral conductor that the insulated conductor is lashed to provide a ground path so upstream protection can operate more quickly in the event the insulation becomes compromised.

The Company plans to replace 165 miles of small conductor and 33 miles of open wire as part of the Updated WMP. This is incremental to the 300 miles of small conductor the Company committed to replace by the end of 2025 in the 2020 WMP, of which the Company is still re-evaluating the completion of the remaining 120 miles of. It is possible that detailed studies, resource constraints, or other factors could cause actual deployment to differ from the amounts shown below. Further, progress made on the 2020 WMP work could materially impact the schedule for the next phase of small conductor and open wire replacement undertaken as part of the Updated WMP.

Table D-12: Small Conductor Replacement Program
(Miles)

	2025 (Forecast)	**2026** (Forecast)	**2027** (Forecast)	**2025-2027 Cumulative** (Forecast)
Small Conductor Replacement	50	55	60	165
Open Wire/Bare Secondary Conductor Replacement	10	11	12	33

The Company will be making other equipment upgrades in conjunction with small conductor replacement, which are detailed in the non-expulsion upgrades section below. The combination of these activities (small conductor replacement and associated pole replacement and equipment upgrades) is sometimes referred to as "line rebuilds."

[36] These spans can pose ignition risk due to vegetation contact, or due to failure initiated by pitting and/or wear of these smaller conductors.

The Company will perform a study of each feeder to determine whether bare conductor, covered conductor, or other solutions are appropriate for a particular feeder.

Non-Expulsion Upgrades

When a distribution feeder experiences a fault and an overcurrent occurs, fuses on the feeder are designed to open and isolate the fault, limiting further damage to other equipment. An expulsion fuse is designed to quench the arc, with material being expelled out of the fuse tube. The material being expelled can be hot and therefore presents an ignition risk when expelled in proximity to vegetation.

Lightning arresters are devices installed to ground lightning surges. They direct the excess energy from a lightning strike to ground, protecting pole top equipment such as transformers. Arresters can fail when lightning surge energy exceeds their capacity, or due to repeated operations. The end of life for an arrester is to fault to ground. When the fault happens, a built-in isolator fires and takes the arrester off-line by removing its connection to ground. This operation can expel hot material from the arrester, which can potentially ignite flammable matter or vegetation near the pole.

Non-expulsion upgrades are a form of system resiliency that involves replacing expulsion fuses, associated fuse cutouts, and lightening arresters on distribution poles with newer technology that does not emit hot material when operating. By avoiding the release of hot material during normal operations or at end of life, this newer technology directly reduces ignition risk. The new lightning arresters and non-expulsion fuses the Company has selected meet Cal Fire standards.

The Company will perform non-expulsion upgrades in connection with small conductor replacement. Based on non-expulsion upgrades in connection with small conductor replacement performed in 2023 as part of the 2020 WMP, the Company estimates approximately 167 devices will be upgraded per mile of small conductor line rebuild.

The Company plans to replace install 27,510 non-expulsion devices as part of the Updated WMP. Actual deployment will depend on the total miles of small conductor replacement as well as the actual number of devices that need to be replaced in connection with each small conductor line rebuild.

Table D-13: Non-Expulsion Upgrade Program
(Devices)

	2025 (Forecast)	**2026** (Forecast)	**2027** (Forecast)	**2025-2027 Cumulative** (Forecast)
Number of Devices	8,340	9,170	10,000	27,510

Pole Replacement

Decayed and weakened poles can fail, increasing the chance that energized conductors could come into contact with other objects or surfaces, possibly resulting in an ignition.

The Updated WMP pole replacement program reflects two work streams to identify such poles: (1) ground-based assessments of Tier 3 and Tier 2 poles that have yet to undergo ground-based assessment as part of the 2020 WMP; and (2) pole replacement occurring in connection with small conductor replacement.[37]

Ground-based assessments involve above- and below-grade assessment of distribution pole strength.[38] This is accomplished by partially excavating around distribution poles and drilling into the poles (both above and below ground level) to identify internal decay and estimate the pole's remaining strength. The drilled holes help the Company identify poles that are weakened through decay, weathering, or other physical damage, and/or that do not meet National Electric Safety Code ("NESC") remaining strength requirements, as well apply wood preservatives to reduce risk of future decay.

The Company performed ground-based assessments on wood poles within the 2020 WMP Wildfire Risk Zone ("2020 WMP WRZ") as part of the 2020 WMP. Consistent with that work, the Updated WMP provides for ground-based pole assessment of Tier 3 and Tier 2 poles that have yet to undergo ground-based assessment as part of the 2020 WMP.

Based on the Company's experience of replacing small conductor as part of the 2020 WMP, the Company assumes that it will need to replace 25 poles for every mile of small conductor replacement. As such, the Updated WMP includes 4,125 pole replacements associated with small conductor replacements. The Company also plans to replace 6,240 Tier 3 and Tier 2 poles as part of accelerated ground-based assessments. The Company also continues to explore if there are alternatives to wood poles that make sense in certain areas of the system.

Table D-14: Pole Replacement

	2025 (Forecast)	**2026** (Forecast)	**2027** (Forecast)	**2025-2027 Cumulative** (Forecast)
Accelerated Tier 3 and Tier 2	2,080	2,080	2,080	6,240
Small Conductor	1,250	1,375	1,500	4,125
Total	**3,330**	**3,455**	**3,580**	**10,365**

[37] Pole replacement also may occur as part of remediations identified through overhead assessments, discussed below. Costs for pole replacements stemming from overhead assessments are not part of the pole replacement program budget.

[38] These assessments were referred to as the "Groundline Inspections Program" or the "Groundline Intrusive Pole Assessment Program" under the 2020 WMP. It has also been referred to as Invasive Pole Assessment and Treatment ("IPAT").

Overhead Assessments and Remediations

Asset assessments are part of the Company's overall asset maintenance program. Assets are assessed to identify defects that have the potential to lead to equipment failure. This proactive approach to asset management aids in reducing ignition risk and sustains and/or improves system reliability by identifying where work is needed to preserve the integrity and functionality of the system components.

The Company's distribution assessments historically have fallen into one of four categories: (1) Overhead Pole Assessment ("OPA") using Unmanned Aerial Systems ("UAS"); (2) Intrusive Pole Assessment and Treatment ("IPAT"); (3) Infrared Assessment; and (4) Pole Loading and Clearance ("PLC") using UAS or helicopters. Only OPA and PLC assessments are included in the Updated WMP.[39] Further, the Updated WMP includes estimated work to correct defects identified through these assessments.

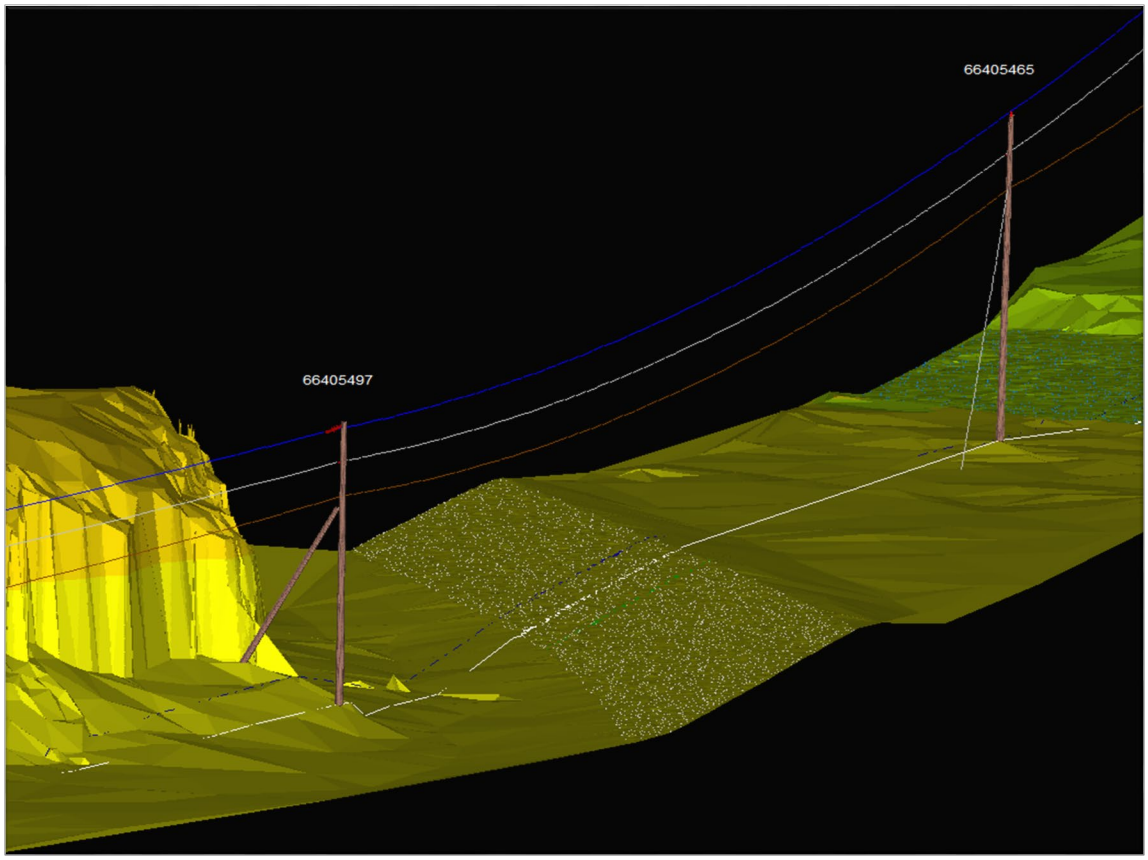
OPA assessments are the primary method of performing above ground visual assessments for distribution assets. OPA assessments involve the use of unmanned aerial drones, flown by licensed UAS pilots using a consistent procedure, to capture images of distribution structures and attachments from multiple angles. The imagery is then analyzed by Qualified Electrical Workers ("QEW") or other individuals with significant electrical experience against a standardized defect matrix to identify and classify deficiencies that can impact public safety and/or reliability.[40] Identified defects are categorized or ranked based on safety risk, risk to reliability, and ignition risk, and then addressed according to that prioritization. OPA assessments therefore are directly related to reducing wildfire risk.

PLC assessments identify the physical strength of distribution structures and vertical clearance of supported overhead conductors to increase the Company's ability to identify and correct potential structural weaknesses before failure. As part of the 2020 WMP, the Company started using light detection and ranging technology ("LiDAR")-equipped helicopters to assess lines in higher-risk areas. In 2024, the Company began using LiDAR-equipped UAS to conduct the assessments as well. The assessments were fed into Power Line System Computer-Aided Drafting and Design ("PLS-CADD") software to build models of asset strength in as-built conditions. Those models in turn help identify structures with insufficient strength to withstand extreme wind criteria.

[39] The Company still performs IPAT assessments on a standard 12-year cycle. Under the 2020 WMP, the Company accelerated IPAT assessments for poles located in the Wildfire Risk Zone. As discussed above, the Updated WMP provides for accelerated ground-based assessment of Tier 3 and Tier 2 poles that did not undergo ground-based assessment as part of the 2020 WMP. These accelerated assessments are not included in the Updated WMP overhead assessments and remediation program, though associated pole replacements are part of the pole replacement program.

[40] The Company will have a team of QEW resources reviewing samples of the OPA assessments to verify contractors' identification and classification of defects against the standardized defect matrix.

Figure D-20: Example of PLS-CADD Software



OPA assessments will occur according to a tier-based assessment schedule. By 2027 (the end of the Updated WMP time horizon), distribution poles within Tier 3 will be assessed every other year; Tier 2 distribution poles will be assessed every five years.

The Company is proposing to increase OPA and PLC assessments throughout the 2025-2027 period, as shown below.

Table D-15: Updated WMP Distribution Assessments

Assessment Type	Location	2025 (Forecast)	2026 (Forecast)	2027 (Forecast)	2025-2027 Cumulative (Forecast)
OPA					
	Tier 3	44,000	44,000	44,000	132,000
	Tier 2	0	0	27,000	27,000
	Total	**44,000**	**44,000**	**71,000**	**159,000**
PLC					
	Tier 3	5,400	8,100	12,000	25,500
	Total	**5,400**	**8,100**	**12,000**	**25,500**

These assessments identify defects requiring remediation. For OPA, various equipment on a distribution pole, including but not limited to arms, arresters, or the pole itself, could be found to be defective and requiring replacement. PLC assessments, on the other hand, are strictly focused on identifying poles that are not able to withstand extreme wind conditions or do not meet standard clearances. Based on historical defect rates, the Company estimates the Updated WMP OPA assessments will require 79,500 defect remediations,[41] while the Updated WMP PLC assessments will result in 2,550 pole replacements.

Table D-16: Overhead Assessment Remediations

	2025 (Forecast)	2026 (Forecast)	2027 (Forecast)	2025-2027 Cumulative (Forecast)
OPA	22,000	22,000	35,500	79,500
PLC	540	810	1,200	2,550
Total	**22,540**	**22,810**	**36,700**	**82,050**

The remediations above are based on historical defect rates; it is possible that the Company could identify fewer defects than it has in the past. It also is possible that as the Company's programs mature and more equipment is replaced, fewer defects will be identified.

Finally, the Company will be using the UAS images taken as part of or along with the OPA assessments to gather detailed information regarding assets located in the field. The information gathered will include a detailed, GPS coordinate for each pole, details regarding the conductor at the pole (e.g., bare wire versus covered conductor, whether

[41] The Company will be reviewing samples of the OPA remediation work to verify outside contractors' timely completion of corrective work and adherence to established standards.

the primary conductor is copper or aluminum, if secondary conductor is lashed cable or open-wire), and types of fuses and lightning arresters on the poles. This will result in the Company having more granular information (including more accurate location information) regarding field assets, thereby improving our ability to operate and maintain the distribution system and determine where to implement wildfire mitigations.

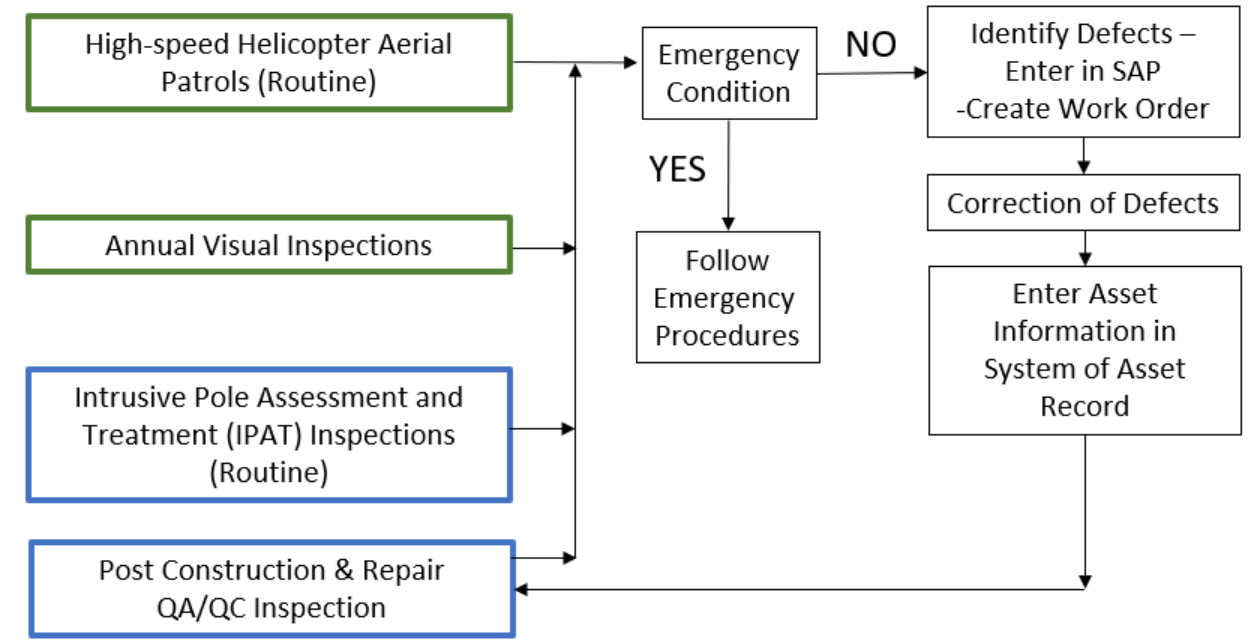
II. Transmission System Resiliency

The below section of this Updated WMP addresses the transmission activities the Company will undertake, including: (1) transmission asset inspections; and (2) transmission infrastructure improvement. The Company's transmission asset inspection work includes two routine inspection programs (high-speed helicopter aerial inspections, and Intrusive Pole Assessment and Treatment (IPAT) inspections) and one wildfire-based program (the Annual Visual Inspection program). The Annual Visual Inspection program is an important wildfire mitigation strategy that involves detailed ground-visual inspections of all transmission assets in high wildfire risk areas—Tier 3 and Tier 2—on an annual basis. The Company's transmission infrastructure improvement work—formerly called "Repair and Replace" work—includes the continuation of two programs: Major Line Rebuilds, and High-Priority Defects corrections. Additional details on the programs under transmission asset inspection and infrastructure improvement are provided below. First, this section summarizes what is involved in each of the three inspection programs and provides a schedule for asset inspection. Next, this section outlines prioritization for infrastructure improvement work based on what the Company has identified through inspections, and details the infrastructure improvement programs.

Transmission Asset Inspection Programs

As shown in Figure D-21, transmission asset inspections are conducted via the following programs: Annual Visual Inspections, High-speed helicopter aerial patrols, and IPAT. The workflow of each is provided below.

Figure D-21: Transmission Inspections & Repair Workflow



Annual Visual Inspections: This wildfire-based program primarily uses ground patrols to conduct detailed visual inspections on transmission lines and poles. The program is conducted annually, primarily in Tier 2 and Tier 3 wildfire areas. These inspections involve a QEW equipped with high-power binoculars and other tools who inspect transmission assets from a close distance by driving or walking up to each structure. While the Company's routine high-speed helicopter aerial patrols allow for rapid transmission line and structure inspections, they can lack the granularity and detail required to identify certain smaller component defects. Therefore, there is a need to conduct detailed visual inspections more frequently in higher-risk wildfire areas. While the primary method of inspection in this program will be ground patrols, the Company may incorporate additional inspection techniques, such as high-resolution imagery assessments and detailed helicopter-aided aerial inspections, in instances where ground inspection may be difficult to perform due to challenging access or to enable more comprehensive evaluation of asset condition. Techniques such as Infrared (IR) camera may also be used to supplement these more detailed inspections. The defects identified through the Annual Visual Inspection program are addressed through the transmission Infrastructure Improvement programs (formerly, the Repair and Replace programs), which include High Priority Defects and Major Line Rebuilds.

High-Speed Helicopter Aerial Patrols: This routine program involves rapid aerial inspection of transmission lines and structure with an on-board QEW. These inspections are conducted annually on the entire transmission system. These inspections provide an aerial perspective and help to locate larger defects or issues ahead of more detailed patrols.

IPAT: This routine inspection program is applied to transmission poles that are made of wood, using the procedures that were previously described in the distribution IPAT section. This program is currently on a 12-year-cycle plan generally in accordance with the United States Department of Agriculture ("USDA") Rural Utilities Service ("RUS") Bulletin 1730B-121 (Wood Pole Inspection and Maintenance). The Company does not anticipate accelerating this inspection frequency at this time because Colorado is located in the least severe decay zone defined by the USDA Rural Utilities Service. However, the Company will continue to review the Intrusive Pole Inspection results and evaluate the appropriate cycle length to determine if any adjustment of frequency is required in the future.

Transmission Asset Inspection Schedule

Similar to the distribution inspections, the Company plans to perform the majority of its transmission asset inspections on a risk-informed basis, where assets in the higher wildfire risk tiers are inspected on an accelerated basis. For Tiers 2, 3, and select Tier 1 areas, the Annual Visual Inspection program will provide annual detailed inspections. This is in addition to the annual route High-Speed Helicopter Aerial Patrols and 12-year cycle IPAT inspections.

Transmission Post-Inspection Repair/Replace Prioritization

Transmission defects identified *via* inspections are assigned priority. The priority ratings, which are based on condition, and the expected maintenance actions are included in the figure below.

Figure D-22: Transmission Defect Priority Definitions for the Tier 2 and Tier 3 Risk Areas

Maintenance Priority	Condition Priority Rating	Task Severity and Asset Management Action
Emergency	1	**Immediate Action Required** Failed component or failure imminent – component damaged or no longer suitable for intended use.
High	2	**Action Required** Asset Renewal Required Significant wear, corrosion, or damage to warrant action plans.
Medium	3	**Action Recommended** Asset Renewal Recommended – moderate to minimal wear, corrosion, or damage to warrant action plans.
Low	4	**No Action Required** Minimal Maintenance - Minor wear, corrosion, etc. Structure is still in functional condition for the intended purpose. Observe during next inspection for further deterioration
Monitor	5	**No Action Required** Initial stage of normal wear. Asset is Functional. Observe during next inspection for further deterioration

The defect definitions and maintenance actions stated above will apply to the assets located within the wildfire risk areas. For defects that require an immediate response, the inspector will notify the Transmission Control Center and Transmission Field Operations for immediate correction. Other defect notifications are evaluated by Transmission System Performance and Transmission Field Operations for work plan creation, then handed off to the Project Management Office. Project Management Operations then engages various groups including Engineering, Project Controls, and Siting and Land Rights organizations to create the work package for Transmission Field Operations to execute. Efforts will be targeted primarily to higher risk zones such as Tier 2 and Tier 3,

but defects identified within Tier 1 that are classified as a high priority will also be addressed.

Transmission Infrastructure Improvement

Major Line Rebuilds: Aging transmission lines that are beginning to encounter maintenance and reliability issues and approaching their expected useful life must be rebuilt to operate safely and reliably. These rebuilds will have a significant impact on system reliability and potentially reduce ignition risk by preventing a transmission line failure. Continuation of this program ensures that the Company is maintaining its infrastructure, thus reducing risk, and improving system reliability.

As part of the 2020 WMP, Public Service initiated a Major Transmission Line Rebuild Program. The program is directed at asset renewal and is driven by both the inspection program and the Wind Strength Review performed in 2019. Where the Company determined that the amount of required corrective action identified *via* inspection programs is too large to be effectively mitigated through a few structure or component replacements or if most of the assets on a transmission line are nearing the end of their useful life, a full or partial rebuild of the line is the most effective method to improve resilience and mitigate ignition risk. Additionally, the Wind Strength Review results determined that line rebuild was the preferred alternative for eight 69 kV transmission lines based on physical condition and potential vulnerability to high-speed wind events. A total of 37 miles of transmission lines was rebuilt from 2020-2023 and approximately 30 more miles are planned to be completed in 2024. Under the Updated WMP, approximately 125 miles of the remaining 69 kV transmission lines that were part of the original WMP will be rebuilt or refurbished between 2025-2027. In addition, newly identified rebuild projects could begin construction as early as 2027.

High-Priority Defect Corrections: The inspection programs discussed above identify defective transmission line components located within elevated wildfire risk areas. Timely correction of these defects is key to an effective asset maintenance program. This program addresses high-priority defects identified in the Tier 2 and Tier 3 wildfire risk areas by replacing or repairing defective structures and other components such as poles, cross-arms, insulators, braces, and wires. This also includes Priority 2 (High) defects within Tier 1. In addition, the Company will replace the defective wood structures in the Tier 2 and Tier 3 wildfire risk areas with steel or composite structures to provide more resiliency against fire (if not feasible, apply fire-resistant wrap around the replacement wood pole). Once a defect is identified, assignment of the appropriate defect priority is utilized to schedule repair or replacement work.

III. Wildfire Vegetation Management Program

Utility VM programs are generally designed to protect infrastructure from vegetation-caused damage, and help reduce injury to the public, the risk of wildfires, and interruptions of electric service. A comprehensive VM program incorporates tree pruning, brush control/removal, and tree removal to reduce the frequency with which vegetation can damage electrical equipment, and the frequency of vegetation-caused outages and

ignitions. VM programs are part of the overall obligation to provide safe and reliable service, as well as the specific goal of reducing wildfire risk.

Public Service has been performing VM activities for decades. Those activities are designed to address a large service territory with multiple ecosystems. The Company's service territory, across 27 Colorado counties, contains ecoregions that range from Central Shortgrass Prairie (East) to Southern Rocky Mountains (Central) to Colorado Plateau (West). Most of the forested landscapes contain a majority of coniferous rather than deciduous tree species. Colorado's forest conditions warrant particular concern primarily due to trends in forest cover change, insect population and disease cycles, and expansion of WUIs. The decline in forest health and the lengthening of wildfire seasons linked to climate change are pressing issues.[42]

Vegetation Management guidelines are based on the International Society of Arboriculture ("ISA") Best Management Practices ("BMP") and the American National Standards Institute ("ANSI") standards. Public Service uses specialized VM vendor resources to perform these activities, creates VM prescriptions,[43] provides VM field services, and performs quality assurance and quality control for VM-related activities.

Specific to the Updated WMP, the Wildfire VM Program is designed to build on the foundation presented in the 2020 WMP, with programmatic changes to reflect:

- Changing forest and environmental conditions (*e.g.* mountain pine beetle infestation, drought, extreme wind, climate fluctuations);
- Expansion of the WUI;
- Company experience gained from the 2020 WMP;
- Updates to industry practices and new processes (increased inspection frequency programs, increased radial clearance and trim cycles); and,
- Published standards and practices.

Public Service's wildfire VM activities are designed to reduce fuels and ignition risk that contribute to wildfires and minimize the risk posed to facilities and the communities it serves. VM practices and maintenance activities mitigate risks by removing hazard trees, clearing dead vegetation, creating firebreaks, and thinning dense forests on utility easements and ROW.

For the Updated WMP, the wildfire VM Program consists of five major activities to help protect electrical distribution, transmission, and substation assets: (1) VM Wildfire Corridor Maintenance; (2) VM Wildfire Hazard Tree; (3) VM Wildfire Defensible Space

[42] *The Condition of Colorado's Forests*, Colorado State Forest Service and Colorado State University (2023), www.csfs.colostate.edu/colorado-forests/condition-of-colorado-forests.

[43] Prescriptions refer to a unique plan for work on an individual property and typically describes in detail the trees to be pruned, removed, treated, etc., and are created by inspectors for each property/site.

Around Facilities; (4) VM Wildfire Right-of-Way Clearance: and (5) VM Wildfire Quality Assurance/Quality Control ("QA/QC"). These different activities are discussed below.

Federal and State Requirements

Generally, federal and state regulations require electric utilities to maintain reliable electric service, comply with reliability standards, and maintain their systems in accordance with the National Electric Safety Code ("NESC"). VM is a critical component of complying with these regulations. The following provides a brief overview of the regulatory and practice drivers behind the Wildfire VM Program.

North American Electric Reliability Corporation ("NERC") developed and enforces Reliability Standard FAC-003-5 – Requires transmission owners to maintain a reliable electric transmission system (greater than 200 kV) by using a defense in-depth strategy to manage vegetation located on transmission ROW and minimize encroachments from vegetation located adjacent to the ROW, thus preventing the risk of those vegetation related outages.

U.S. Department of Agriculture, Forest Service, Rocky Mountain Region (11/12/2021) – Master Operations and Maintenance Plan describing the Company's required activities to operate and maintain safe and reliable electric and ancillary facilities throughout the five local National Forests with electric transmission and distribution lines and utility infrastructure within Region 2.

Colorado Revised Statutes Title 9 Safety – Industrial and Commercial, Article 2.5 – High Voltage Power lines – Safety Requirements. Only qualified employees of an electric utility can perform any activity that may bring an individual or equipment within 10 feet of high voltage (lines more than 600 volts) overhead lines. Certain vendors working directly for the utility are considered qualified. Non-qualified employees or individuals must contact the appropriate utility to arrange for safe activity.

National Electric Safety Code Section 21 Part 2 Rule 218 – Addresses VM by requiring that vegetation that may damage ungrounded supply conductors be pruned or removed as experience has been shown to be necessary. Factors that should be considered when determining clearance distances include line voltage class, species growth rates and failure characteristics, ROW limitations, vegetation location in relation to conductors, potential combined movement of vegetation and conductors during routine winds and sagging conductors due to elevated temperatures or icing.

Occupational Safety and Health Administration ("OSHA"), Standard 1910.269: addresses labor standards and training requirements for tree work in proximity to electric hazards.

American National Standard for Arboricultural Operations ("ANSI"), Z133 – Pruning, Repairing, Maintaining, and Removing Trees, and Cutting Brush – Safety Requirements: ANSI Z133 provides standards to comply with the requirements contained in OSHA Standard 1910.269, such as on clearance distances in relation to voltages and elevation for qualified and non-qualified tree workers.

ANSI, A300, Part 1 Pruning: performance standards for pruning of trees, shrubs, palms, and other woody plants.

ANSI, A300, Part 7 Integrated Vegetation Management ("IVM"): providing standards for developing specifications to implement an integrated approach to management of vegetation on utility rights of way.

ANSI, A300, Part 9 Tree Risk Assessment: providing performance standards for the practice of tree risk assessment for risk associated with failure.

International Society of Arboriculture ("ISA"), Best Management Practices: aids in the interpretation and implementation of ANSI A300 standards and assists in the promotion of industry standards.

Wildfire VM Program Activities

Public Service's Updated WMP consists of five major activities that will be performed in Tier 3 and Tier 2 wildfire risk areas: (1) VM Wildfire Corridor Maintenance; (2) VM Wildfire Hazard Tree; (3) VM Wildfire Defensible Space Around Facilities ("DSAF"); (4) VM Wildfire Right-of-Way Clearance; and (5) VM Wildfire Quality Assurance/Quality Control ("QA/QC"). The table below provides an overview of these activities.

Table D-17: Wildfire VM Program Component Summaries

Activity #	Name	Task	Targeted Maintenance Cadence*	Updated Scope Summary
1	**VM Wildfire Corridor Maintenance**	Pre-Inspection of Work & Work Execution	Every 4 years	• WF Corridor Maintenance is an enhanced activity to the previous maintenance activity in the Inaugural WMP. • Governs vegetation management to an enhanced clearance standard. • Additional removal of mature trees within the new clearance target ranges.
2	**VM Wildfire Hazard Tree**	Inspection for Hazard Tree Work & Work Execution	At least every 2 years	• WF Hazard Tree replaces the previous Mountain Hazard Tree activity. • Expanded criteria and qualifications for hazard tree identification and assessment personnel. • Includes re-inspection of any documented exception trees. • Added a mitigation prioritization for identified high priority trees.
3	**VM Wildfire Defensible Space Around Facilities (DSAF)**	Facility Clearance	Distribution – at least every 2 years Substations – Annually	• DSAF is an expansion of DSAP that was in the Inaugural WMP.

Activity #	Name	Task	Targeted Maintenance Cadence*	Updated Scope Summary
4	**VM Wildfire Right-of-Way Clearance**	Brush Removal	In combination with Corridor Maintenance	• WF ROW Clearance is a new activity. • Standardizes objective of removing woody vegetation from within the maintained ROW, focusing on the smaller statured bushes and small or young trees. • Cadence will typically occur in conjunction with VM Corridor Maintenance.
5	**VM Wildfire QA/QC**	QA/QC	On-going	• QA/QC expanded to include enhancements of existing activities.

*Targeted cadence barring circumstances that could impact the schedule (weather, materials, access, safety issues).

Additional information on these VM Program elements included in the Updated WMP is provided in the following sections.

VM Wildfire Corridor Maintenance Activity

The VM Wildfire Corridor Maintenance Activity occurs on the distribution system and includes VM work activities performed on a risk-informed, time-based interval. The interval is typically four years and is driven by wildfire risk, system voltage, asset location, reliability risk, and vegetation conditions. This four-year targeted cycle is unchanged from the inaugural WMP.

Trees will be pruned on primary lines with the objective of maintaining a clearance distance of approximately four-feet throughout the four-year targeted cycle in Tier 3 and in Tier 2 areas, where possible. Trees that have shown previous contact with energized facilities will be assigned a P1[44] designation and considered for mitigation. Trees will be pruned to provide a minimum of approximately 10-feet of side clearance for single phase and multi-phase construction from the outermost phases, where possible. A radial clearance of two feet will be obtained on open wire secondary lines as part of VM Corridor Maintenance.

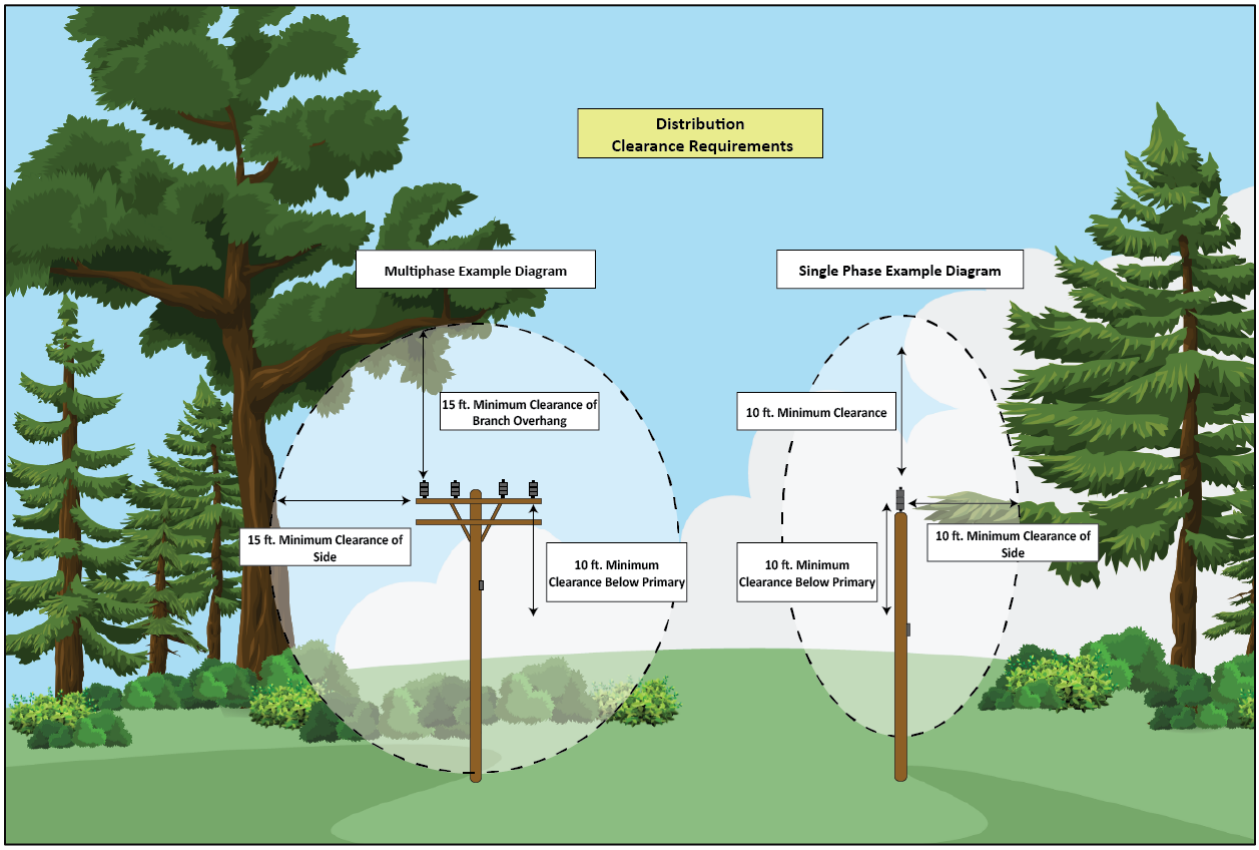
Bundled or spun triplex and duplex (i.e., covered) lines will be cleared of broken limbs to resolve wire deflection, abrasion, and contact to prevent an unintended ignition risk.

The Company will seek to avoid overhanging branches within ten vertical feet on single-phase and multi-phase construction. Dead or visibly declining overhanging branches will be removed from overhead facilities where practicable. If a live branch above ten feet of construction has the potential to hinge upon failure and strike the conductor, it will be reduced in length or removed depending on the vigor and vitality of the limb.

[44] P1 designates a “Priority 1” hazard and represents an immediate risk to utility infrastructure. A P2 designation indicates a damaged or diseased tree that could fall into transmission or distribution assets.

This clearance activity is illustrated in the following figure.

Figure D-23: VM Wildfire Corridor Maintenance Activity



VM Wildfire Hazard Tree Activity

The VM Wildfire Hazard Tree activity is a VM field assessment and mitigation activity that occurs at least biannually within Tier 3 and Tier 2 areas for both transmission and distribution facilities to reduce the likelihood of tree conductor contact and resulting ignition potential. The purpose of the Hazard Tree activity is to identify hazard trees that exhibit signs of insect/disease infestations, are dead or declining in health, have been subjected to grade changes, exhibit exposed/damaged roots or are structurally unsound, will not maintain required clearance or that may fail prior to the next maintenance cycle with potential of striking the adjacent facilities. Any such trees would be mitigated or removed to prevent a potential ignition event. This activity replaces what Public Service previously referred to as the Mountain Hazard Tree program because it covers non-mountainous terrain as well.

Identification of hazard trees in higher fire risk areas is conducted by trained ISA Tree Risk Assessment Qualification ("TRAQ") credentialed contracted VM resources. Tree species with a higher risk of susceptibility to insect or disease activity, high growth rate potential, failure characteristics, or are known to be responsible for increased outage

rates may be preemptively targeted to achieve expanded clearances around Company assets. The TRAQ credentialed inspector conducts an assessment using a standardized checklist.

There are two levels of utility tree risk inspections:

- Level 1 inspection is an assessment of trees within the ROW to determine the amount of required pruning for the annual cycle based on tree growth and/or to abate a hazardous condition.
- Level 2 inspection is a 360-degree visual assessment of a tree where the crown, trunk, canopy, and above-ground roots are evaluated for specific hazards to the electric infrastructure. This may involve tools such as a mallet to "sound" the tree trunk.[45]

Company or contracted VM inspectors will conduct a Level 1 inspection on trees that can strike the primary conductor, secondary conductor, pole, or guy wire if the tree or parts of the tree were to fail. If the Company/contracted inspector identifies a tree that is dead, shows signs of disease, decay, or ground or root disturbance, they will perform a Level 2 inspection. Tree(s) identified as having a moderate to high probability of failure and that pose an unacceptable risk to the facilities will be mitigated. The Company defines a tree that poses an unacceptable risk of failing onto assets as a hazard tree.

VM Wildfire Right of Way Clearance

Public Service has designed a VM Wildfire ROW Clearance activity to promote vegetation that is sustainable, fire-resilient, and compatible with land used as an electrical utility ROW. Generally, the activity removes the woody vegetation (brush) within the easement and below conductors in Tier 3 and Tier 2 areas—leaving behind grasses and forbs.

Standard ROW clearing widths are twenty feet total width, ten feet from centerline, for both single-phase and multi-phase distribution primary conductor.

The following figures illustrates the activity for both single- and multi-phase facilities.

[45] ISA Utility Tree Risk Assessment BMP.

Figure D-24: Single Phase Right-of-Way Clearance

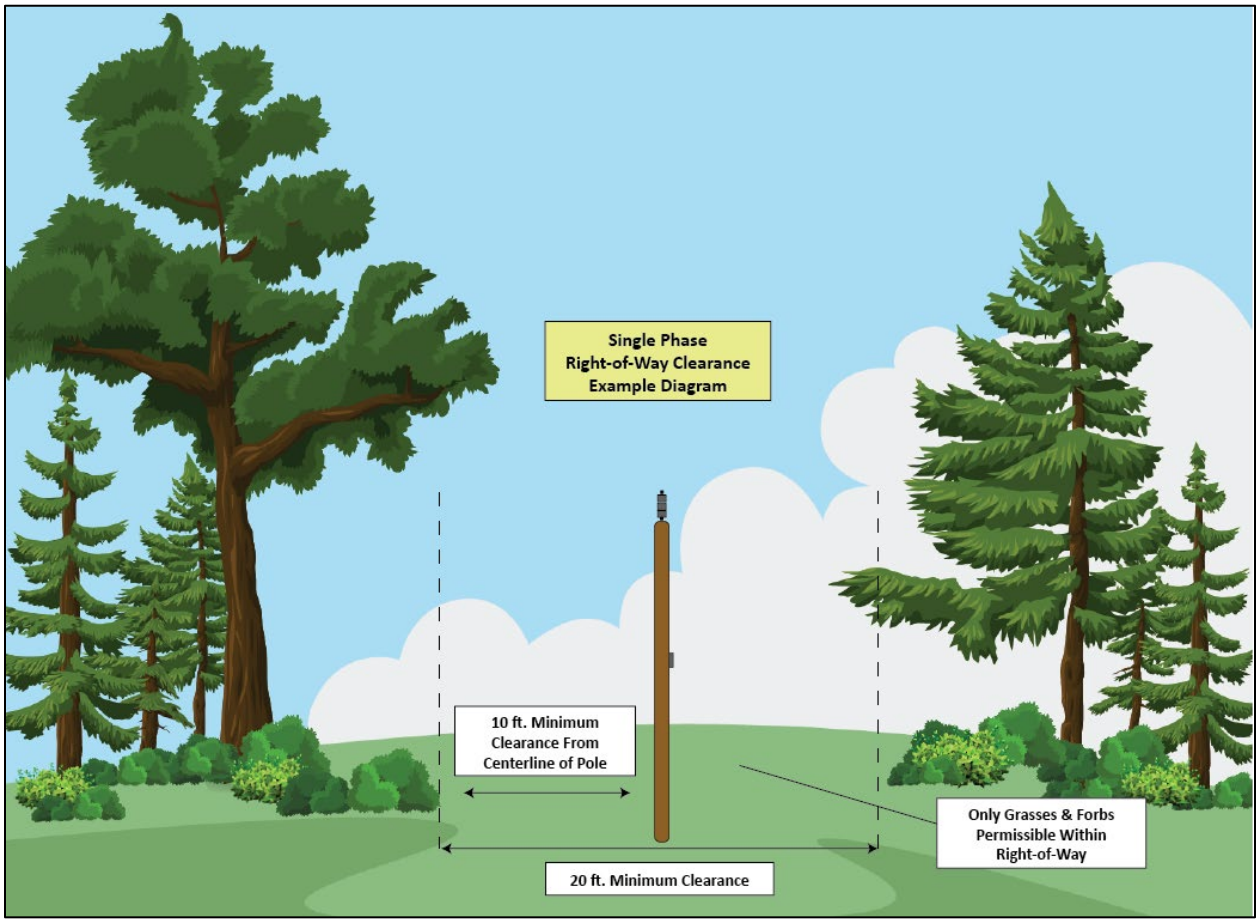
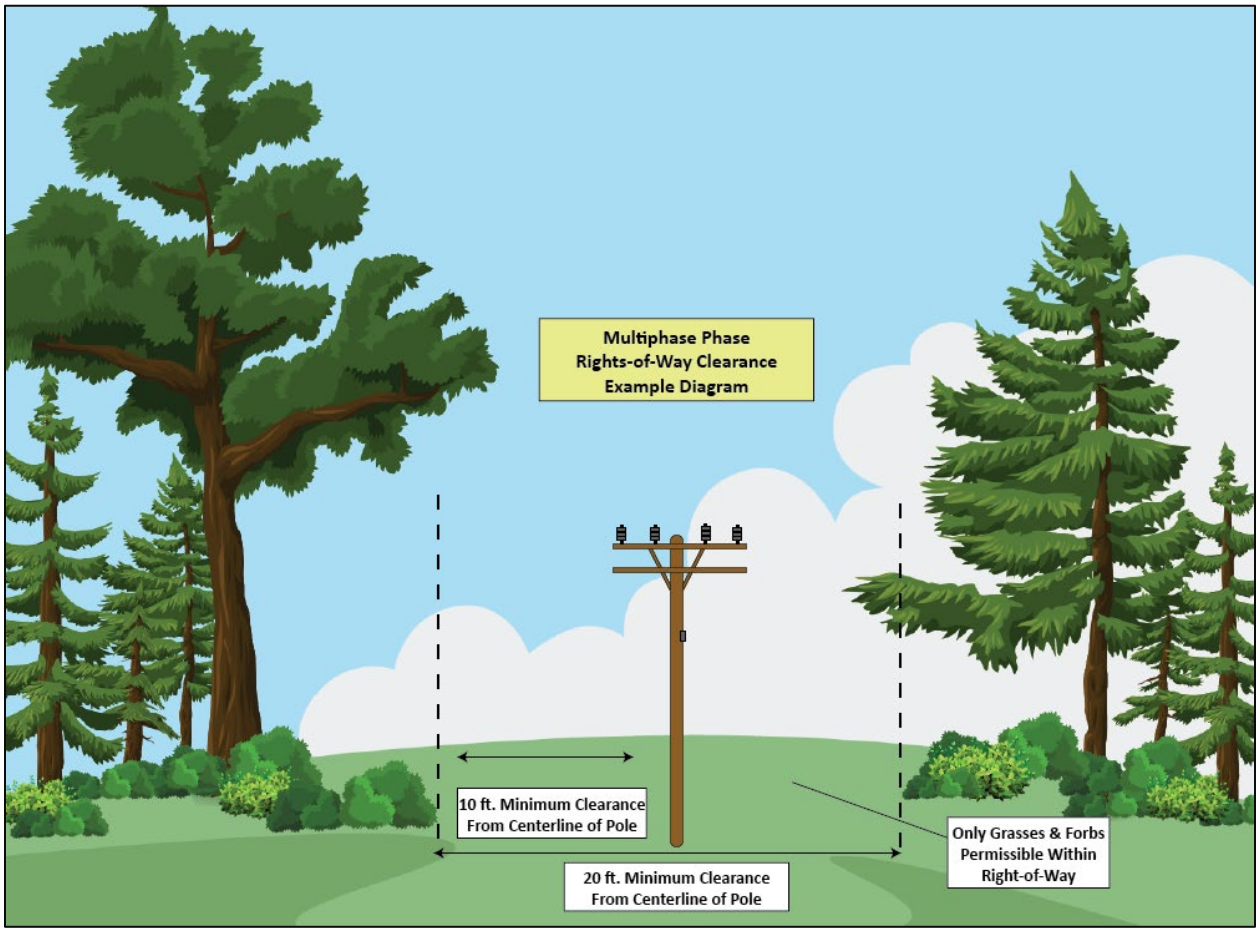


Figure D-25: Multiphase Right-of-Way Clearance



Neutral High construction type will be considered as high priority when conducting the VM Wildfire ROW Clearance due to the proximity of the primary conductor to young trees and brush growing underneath the lines.

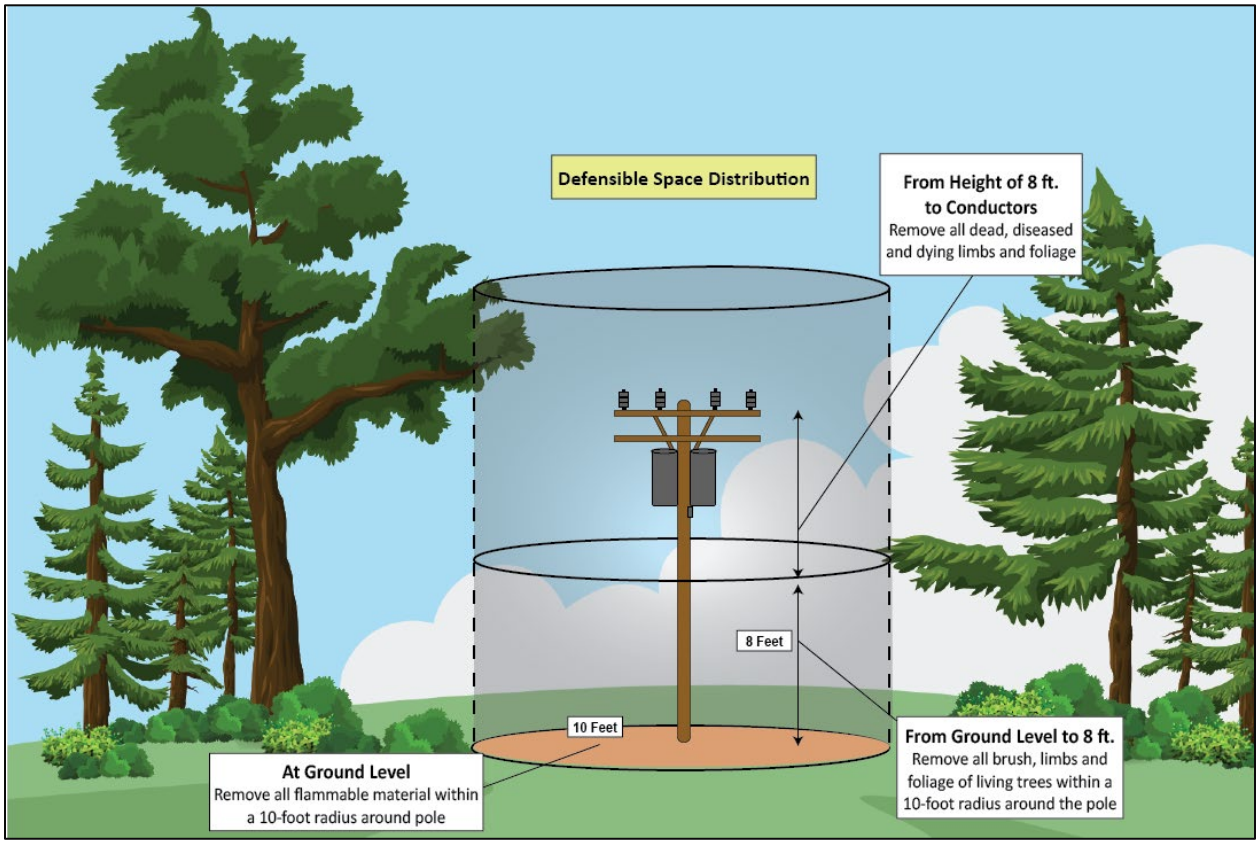
The Company already undertakes similar clearance activities for transmission assets as part of its routine work. Because the Company is already addressing this activity on transmission assets in all areas of its system, it is not necessary to create a wildfire-specific program as part of the Updated WMP for transmission assets.

VM Defensible Space Around Facilities Activity

Defensible Space Around Facilities (DSAF) is designed to establish a woody vegetation-free zone around assets to reduce ignition potential. The DSAF is specific to the type of asset as well as the equipment it may contain. As part of the DSAF activity, existing wood debris (cut brush, logs, or limbs, fallen trees/branches) not generated by the Company's activities, may be removed to the extent practicable in high fire threat areas (Tiers 3 and Tier 2) or as directed by Company representative through discussions with landowners or land management agencies.

The DSAF activity for distribution assets is specific to the type of equipment contained on a distribution pole. If the pole houses equipment that is known to have a higher fire risk potential, DSAF will be employed around the base.[46] The DSAF for distribution consists of a 10-foot radius and eight-foot vertical zone around the pole targeting to remove all brush, limbs and foliage, and grasses where practical to the height of the conductors on qualifying distribution poles.

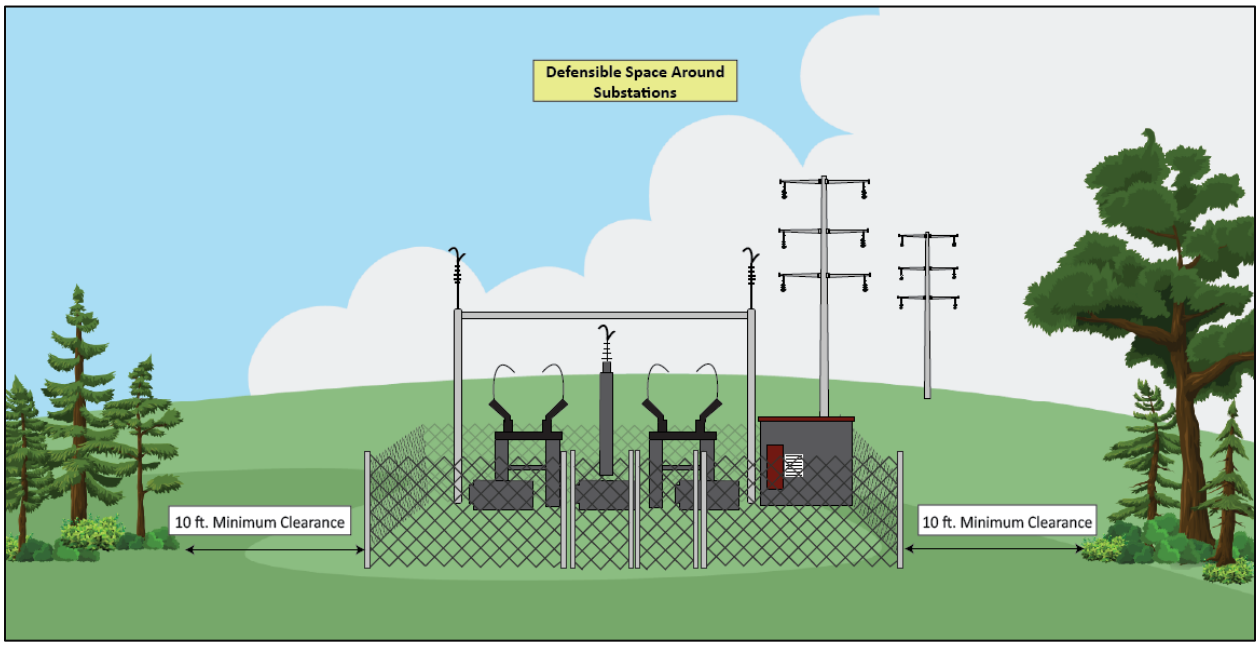
Figure D-26: Defensible Space Distribution



The DSAF Activity around substations is designed to reduce ignition probability and wildfire consequence due to vegetation contacting or growing in and around a substation. The prevention of herbaceous and grassy vegetation from establishing within substations is vital to provide safe and reliable electrical operations. The Company will target an annual inspection of all transmission and distribution substations to identify any vegetation growing around or within the substation. Vegetation should be maintained at approximately a 10-foot distance from the perimeter of the substation fences for safety and security purposes, where land rights allow.

[46] Examples of such equipment are contained in the California Power Line Fire Prevention Guide 2021 Edition published by the California Department of Forestry and Fire Protection.

Figure D-27: VM Wildfire DSAF Substations



The Company is also completing DSAF on its transmission facilities in its service territory on a routine basis. This means that it is not necessary to include transmission DSAF as a specific mitigation program in the Updated WMP.

VM Quality Assurance/Quality Control Activity

QA/QC activity is a significant component of the Wildfire VM Program. QA/QC confirms that VM activities are being executed in the field as defined in the specifications, and to identify gaps in implementation of the WMP programs.

Public Service has established a QA/QC process to evaluate the effectiveness of the Wildfire VM Program. The QA/QC assesses VM activities in the high fire risk areas and includes documenting any trees that were missed/skipped, unexpected growth, insufficient clearances (as compared to standards and requirements), and customer refusals (not previously recorded) and tracking trends seen post completion. Results of QA/QC activities are used to adjust program activities, provide additional training where needed, and measure specification and standards adherence.

The Company's QA/QC process includes a 100 percent audit of all VM Wildfire Corridor and VM Wildfire Hazard Tree completed tree work in Tier 3 and Tier 2 areas. Planned work (or trees) that are missed or have inadequate clearances will be resolved at the cost of the VM contract vendor. All other quality issues that do not meet specifications or standards will be documented and included in the contractor report card. Pass rates for vegetation clearances or missed trees must achieve 100 percent prior to project final close out.

Contract QA/QC staff are responsible for auditing all VM field activities, while Company VM personnel are responsible for examining effectiveness of the audit vendor plus random tree crew inspections. Auditing is the primary activity function of the QA/QC vendor. There may be exceptions or limitations to meeting quality expectations in some instances due to inaccessibility of work locations and/or constraints. The contractor is accountable for providing quality work and should sign off when an assigned area/circuit has been completed and reviewed for deficiencies. The third-party QA/QC contractor who is responsible for auditing work performed in high fire risk areas should be a separate vendor from the VM work planning or VM tree pruning contractor.

C. Operational Mitigations

Operational mitigations involve the Company adjusting something about how it operates the electric system in order to reduce the risk of a utility-caused wildfire. These adjustments will be coordinated with neighboring transmission owners.

The Updated WMP includes two operational mitigations: (1) EPSS, the most sophisticated form of WSO; and (2) PSPS. Both mitigations are discussed below.

I. Enhanced Powerline Safety Settings Program

EPSS is the most sophisticated form of WSO. All forms of WSO provide for disabling automatic reclosing on relays and reclosers that are normally set to automatically reclose. More sophisticated versions of WSO enable faster (but not necessarily coordinating) trip settings for relays and reclosers that have those capabilities. EPSS is the most sophisticated version of WSO, as it has faster and coordinating trip settings and is intended to address operations in heightened wildfire risk conditions.

EPSS modifies settings in the relays and reclosers on the distribution system (both within the substation and outside the substation on the feeder) to create a wildfire-specific operating mode. When EPSS is activated, relays and reclosers are more sensitive to electrical faults and react faster to those faults (compared to normal settings in each such device). EPSS, when activated, also disables reclosing in relays and reclosers that would normally be set to automatically reclose after tripping because of a fault. Ultimately, EPSS allows for powerlines to remain in-service during periods of elevated wildfire risks, but with protection settings that mitigate the wildfire risk.

Figure D-28 shows how the distribution system reacts to an electrical fault (such as may be initiated by a tree limb falling on a power line) under normal circumstances. Under normal settings, the electrical fault causes the fuse to trip, de-energizing the line downstream. With the fuse tripping, the recloser and substation relay generally will not trip, as they are set to clear faults slower than the downstream fuses. Also, if the recloser and substation relay trip (generally for a fault upstream of any fuses), they will automatically reclose one or more times.

Figure D-28: Normal (Non-EPSS) Configuration

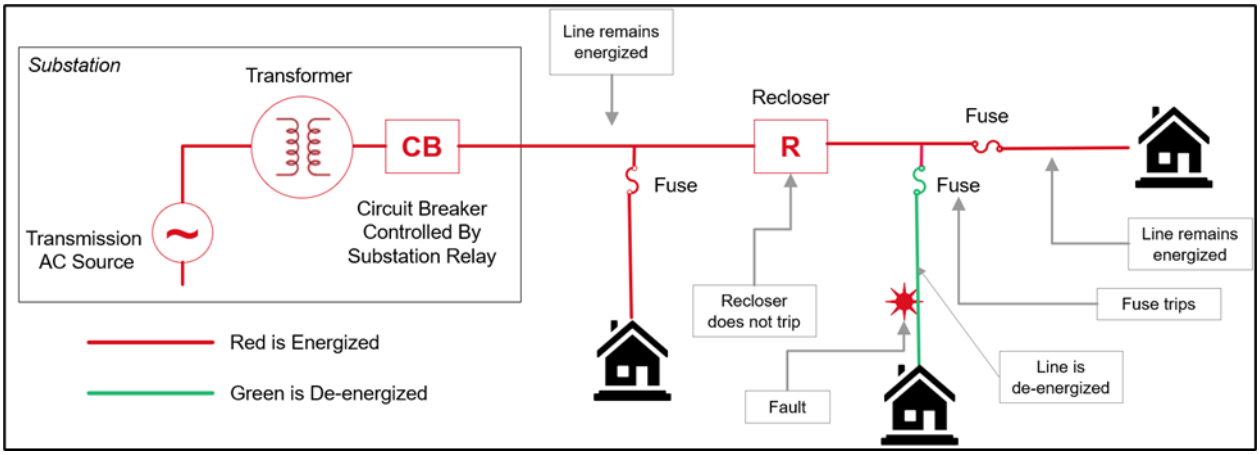
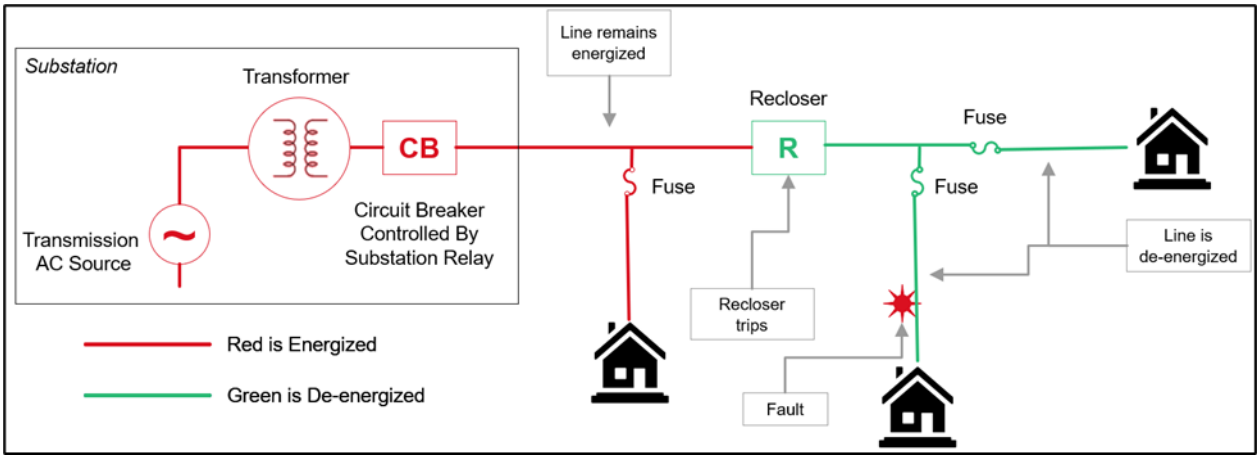


Figure D-29 shows the same fault scenario, but with the distribution system operating under EPSS. Because relays and reclosers are operating at heightened sensitivities and faster speeds, the fault generally causes the recloser to open before (or at the same time as) the fuse. With automatic re-closing disabled, all portions of the distribution system downstream from the recloser will be de-energized. However, the distribution system between the substation circuit breaker and the recloser remains energized. EPSS also provides the option of non-coordinating fast tripping when a fault occurs.

Figure D-29: EPSS Configuration



Public Service began implementation of its own EPSS pilot program under the 2020 WMP; installing it on eight feeders covering approximately 369 circuit miles of the distribution system. The Company is planning to expand EPSS as part of the Updated WMP, so that by the end of 2027, all non-undergrounded Tier 3 and Tier 2 feeders will have EPSS capability. Projected Updated WMP EPSS quantities of work are identified below, which represents adding EPSS capability to approximately 100 feeders per year, achieving 100% coverage of all 300 Tier 3 and Tier 2 feeders by the end of 2027.

Table D-18: Updated WMP EPSS Expansion

EPSS Work Categories	**2025** (Forecast)	**2026** (Forecast)	**2027** (Forecast)	**2025-2027 Cumulative** (Forecast)
Substation Relay Replacements and Upgrades	26	30	35	91
Distribution Recloser Installations[47]	300	300	300	900
Distribution Protection Studies	120	120	120	360
Non-Traditional Fault Detection Sensors	4,500	9,500	15,000	29,000

The situational awareness tools described in Section 8 will be used to forecast the potential need to enable EPSS. As noted, the primary data inputs considered for enabling EPSS may include projected/actual wind speed, relative humidity, and fuel moisture. As situational awareness capabilities mature at the Company, improved methods of forecasting and enabling EPSS will occur. This maturity may include forecasts with more geographic granularity, longer-term forecasting approaches, and overall improved data and logic to improve the risk-based decisions to implement EPSS.

EPSS and WSO implement protection settings that could de-energize more of the Company's system following an electrical fault. EPSS and WSO therefore are only activated during conditions of elevated wildfire risk. That activation can occur either by automation or manually.[48] The Company estimates that it will incur approximately $44,000 in staging costs per WSO event on average across 2025-2027, for a total of approximately $7.3 million across 2025-2027.

Distribution lines must be physically inspected if a fault is detected and a sectionalizing protective device operates during a WSO event (including EPSS events). When a recloser or breaker trips while EPSS is active, the distribution operations team will patrol and restore the outage, including initiating corrective maintenance if needed, and will document any visible cause of the trip in writing and with imagery. If there is a second trip on the same line segment within five minutes of the line being reenergized (including a trip immediately upon the line being reenergized), a review will be conducted with the distribution control center and distribution operations leadership to determine the next

[47] For planning purposes, the Company assumed an average of three reclosers per feeder, though actual installation numbers will be dependent on detailed design and engineering.

[48] WSO events require field crews to put each recloser into WSO mode at the beginning of the WSO event and to put the recloser back into normal mode at the end of the WSO event. EPSS is a form of WSO, but generally does not require field crews for activation and deactivation. The WSO events requiring pre- and post-event staging relate to WSO that requires manual activation and deactivation.

steps for restoration. Patrols and restorations after daylight hours will be at the discretion of the distribution control center and distribution operations leadership based on factors such as weather conditions, terrain and geography of the service territory, lighting, and other operational factors limiting the ability to fully assess the line. The Company has developed and implemented a process to capture the causes of outages that occur while EPSS is activated for assessment and quantification of the effectiveness of EPSS.

The Company needs to execute a conditions assessment of facilities de-energized as part of a PSPS event. This assessment includes patrolling for equipment failures, identifying hazards within facilities, and identifying any needed repairs. Once a determination is made that it is safe to proceed with restoration, the Company will re-energize affected facilities in a logical sequence.

II. Public Safety Power Shutoff Overview

The Public Safety Power Shutoff (PSPS) Plan is described fully in a separate plan document. The PSPS Plan provides an overview of the situational awareness resources, decision-making processes, and procedures for communicating internally and externally before, during, and after a PSPS event. A PSPS will be initiated during severe fire weather conditions that pose elevated risk of wildfire caused by Company equipment as a tool for use in cases where risk is not adequately reduced by other methods. When conditions dictate, the PSPS process will culminate in de-energization of those portions of Company assets that pose a severe fire risk to surrounding communities based on information from Public Service's situational awareness resources, observations, science, and experience gained from other utilities. Public Service will consider the risks and potential negative effects on its customers along with the risks and potential consequences of a wildfire caused by Company equipment when making PSPS decisions. The Company will complement a decision to engage in a proactive de-energization with robust communication and engagement efforts, supporting our customers with the information and resources necessary to limit the impacts of service outages.

D. Customer Support

The Company plans to enhance and expand its communication and engagement with its customers, stakeholders, and external partners to help manage wildfire risk across its service territory. This engagement will include road education efforts, and enhanced collaboration with other utilities and community partners.

The Company has started and will continue to conduct informational sessions and present its Updated WMP to legislators, regulatory stakeholders, public safety partners, OEMs, and members of the communities it serves. Soliciting input and support from managers of public lands, especially those overseeing high-risk areas, is also a priority.

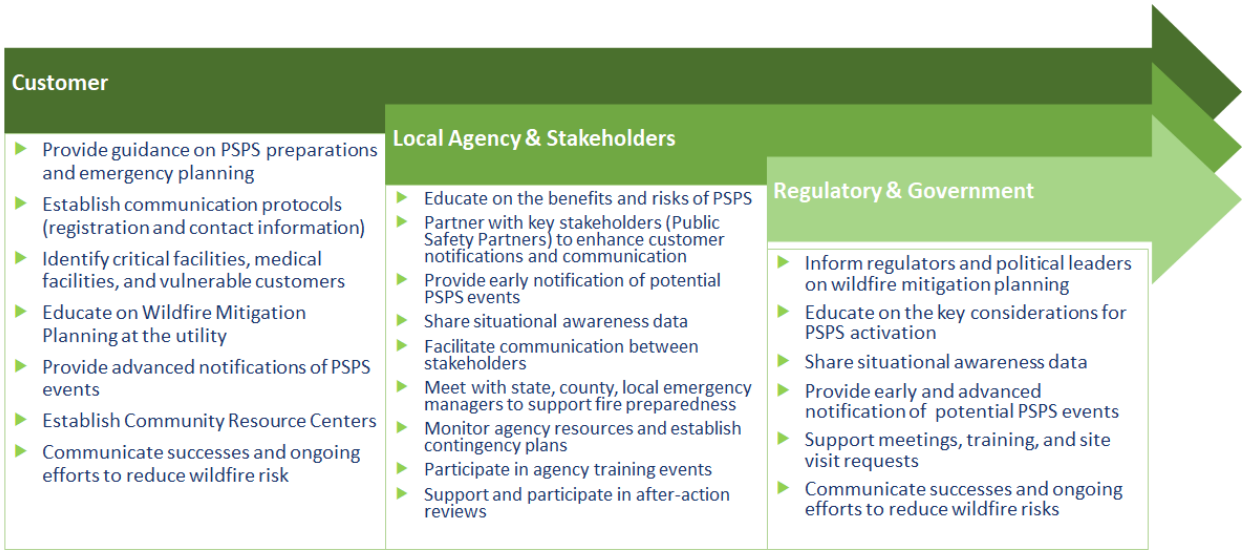
The Company continues to build its outreach, education, and engagement efforts since the filing and execution of the 2020 WMP. Stakeholder engagement is an essential element of the Updated WMP because wildfire mitigation is something where everyone has a part to play. For example, in the State of Colorado alone, there are over 400 agencies (federal, tribal, state, local) that touch on wildfire mitigation. Ongoing

communications with customers, regulators, public safety partners, government officials, academia, research institutions, peers, and industry groups has helped to formulate the Updated WMP and will be key in execution and implementation going forward.

Stakeholder engagement refers to the development of inclusive and collaborative processes for engaging various parties with a particular interest in aspects of Public Service's Updated WMP. Clear and established lines of communication with external partners are a necessity as the Company develops new programs and augments existing ones.

Figure D-30 provides a high-level overview of the communication strategy in the Updated WMP, followed by more detailed summaries of the Company's planned engagement efforts by constituent group. The Company has also developed a communications and engagement strategy to support its PSPS Plan, which is detailed in greater detail in the PSPS Plan and supporting documents.

Figure D-30: Overview of Updated WMP Communication & Engagement Strategy[49]



Beyond communications and engagement, the Company is including in the Updated WMP a new rebate offering to support certain residential customers from the impacts associated with service outages during wildfire and severe weather events.

Our customer support approaches are addressed below.

[49] The stakeholder references in this illustration are generalized, with the Company's specific definitional proposals for communications and engagement addressed by its witnesses and supporting attachments. In addition, while the Company encourages all customers to update their contact information, only certain customers such as critical customers and Qualifying Medical Customers will receive targeted advance PSPS notifications. Last, Community Resource Centers are also envisioned to be developed in partnership with third party implementers.

I. Customers and Communities

Outreach and engagement with our customers and communities is a top priority for the Company. Without their engagement, particularly those located in the top tier wildfire risk zones, our work cannot be as effective.

For this Updated WMP, the key themes of our outreach and engagement efforts are preparedness and education around the Company's wildfire mitigation efforts, improving outreach and engagement processes, and incorporating special considerations for Qualifying Medical Customers, OEMs, IQ/DI Community customers, and Critical Customers.

II. Preparedness and Education

The goal of preparedness outreach and engagement is to confirm, identify, and/or address the unique energy or preparedness requirements of our communities, particularly Critical Customers and Qualifying Medical Customers or IQ/DI Community customers during an EPSS, PSPS, or wildfire event. Although the Company has already identified many customers with unique energy requirements and has established relationships with these customers, the Company recognizes more work needs to be done to identify and address customers with unique energy requirements that may be impacted by a PSPS or wildfire event and will continue to identify and determine the functional needs or dependencies for those customers. The Company is also establishing internal processes for assigning and managing the relationship with these customers and stakeholders before, during, and after an outage or emergency event.

The Company's outreach and engagement efforts focused on preparedness are interrelated to and a subset of our broader educational efforts. Our educational outreach and engagement efforts are intended to educate customers, communities, and other stakeholders more broadly on the Company's wildfire mitigation efforts, including programs like vegetation management, wildfire safety, and PSPS. These efforts include:

- Establishing communication channels: such as the dedicated website, email contact, telephone calls, and opt-in text messaging.
- Sending letters and making outbound calls to inform customers of wildfire mitigation work in their community.
- Developing social media, blog posts, newsletter articles, and a video series to promote program initiatives and provide preparedness tips.
- Completing proactive media outreach to share timely, relevant news about our programs and initiatives and help raise awareness across our service area.
- Hosting, attending, and sponsoring community meetings and events.
- Expanding the number of annual town halls and webinars hosted in wildfire risk zones and increasing our presence at community events.
- Increasing the frequency and reach of social media campaigns across Colorado and expanding the use of various social media platforms.
- Developing comprehensive outreach campaigns regarding PSPS events.

- Developing an interactive outage map on the Company's website where customers can input their home address to an approximated geographical extent of customer impacts in a PSPS and/or wildfire event.

III. Improving Outreach and Engagement Processes

The Company will further enhance its outreach and engagement by improving internal processes supporting those efforts. Specifically, for this Updated WMP the Company is:

- Hiring a Community Resilience Manager to serve as a single point of contact for all county emergency operations centers, first responders, and other emergency preparedness and response directors and officers.
- Continuing to deploy our communications and outreach plan and improve internal coordination of engagement activities with local municipalities, first responders and community organizations.
- Participating in conferences and engaging in utility outreach and engagement focused on wildfire mitigation efforts and industry practices.
- Collaborating and benchmarking with the Electric Power Research Institute, Edison Electric Institute, national labs, and educational institutions.

IV. Outreach and Engagement with Qualifying Medical Customers, Critical Customers, and DI Communities and IQ Customers

Qualifying Medical Customers

The Company is establishing processes for identifying and tracking information for customers with particularized medical needs. Qualifying Medical Customers include Critical Care Customers, Medical Baseline Customers, and customers enrolled in the Safe For Colorado Program, which includes customers enrolled in the Colorado Medical Certification Program or Colorado Medical Exemption Program. The Company will contact all Colorado residential customers on an annual basis to inform them of the Company's medical program offerings and encourage them to opt-in if eligible. The Company is updating its medical programming by better defining the programs, including what devices are included and how these customers can navigate the opt-in process to register their information with the Company.

The Company will conduct outreach to and partner with the healthcare industry to enhance identifying and supporting Qualifying Medical Customers.

Critical Customers

The Company defines Critical Customers as "Critical Facilities," "Critical Infrastructure," and "Large Electric Load Customers" with automatic throw-over capabilities. Critical Infrastructure means those systems and assets, whether physical or virtual, that are vital to the state of Colorado so that the incapacity or destruction of such systems and assets would have a debilitating impact on public safety, public health, or economic security. This list of customers is identified in partnership with our local and state emergency managers and deemed highly critical for the health and safety of a community. It can

include state and local government infrastructure, identified power users within emergency operations centers, fire stations, smaller water treatment plants, telecommunications companies, and other local government safety infrastructure.

As explained in our PSPS Plan and PSPS Communications Plan, in advance of a PSPS or imminent wildfire event, the Company will provide emergency alerts, warnings, and reminders directly to Critical Customers 72 hours in advance of a PSPS event. Our outreach and engagement team will communicate about the event using telephone calls, text messages, and emails through a single point of contact from the Company that is assigned to designated representatives. The advance notifications will correspondingly trigger Critical Customers to activate their emergency preparedness plans and enable them to use their communications channels to share information provided by the Company. The Company will share a resource guide with Critical Customers in advance of the interruption.

IQ Customers and DI Communities

From an outreach and engagement perspective, the Company considers a DI Community to be a community that experiences higher levels of environmental related to environmental exposures such as pollution, hazardous waste, or other health risks. Specifically, a DI Community is one where:

(1) more than 40 percent of households are at or below 200 percent of the federal poverty line;

(2) more than 40 percent of the population identifies as anything other than non-Hispanic White;

(3) more than 50 percent of households spend more than 30 percent of their income on housing costs like rent or mortgage payments;

(4) more than 20 percent of the population live in households where all adults speak a language other than English; or,

(5) the community has been historically impacted by environmental racism created through a series of systemic issues, including redlining or discriminatory laws, policies, or practices and they continue to experience present-day environmental health disparities.

An IQ customer is an individual who has a household income below 60 percent of the state of Colorado's median income, below 200 percent of the relevant federal poverty level, or below 80 percent of area median income.[50]

As equity issues in the utility space have gained increased prominence in recent years, the Company has incorporated equity considerations for DI Communities and IQ customers into many programs, including this Updated WMP. The Company is and has

[50] The Company will update its definitions of IQ Customer and DI Community as appropriate to comply with Commission rules.

been committed to implementing successful programs for IQ customers and DI Communities and has implemented a comprehensive plan to engage this subset of customers. As part of its Updated WMP and in coordination with its broader equity strategy, the Company will collaborate and partner with community-based organizations like Energy Outreach Colorado, the Latino Community Foundation of Colorado, the Food Bank of the Rockies, and Mile High United Way to better understand and tailor our outreach and engagement to the unique needs of IQ customers and customers that live in DI Communities.

Specific outreach and engagement efforts for DI Communities and IQ customers will include door-to-door canvassing, expanding our media outlets to include Spanish language channels, providing all communications and materials in both English and Spanish, and ensuring an interpreter attends community meetings. Additionally, the Company's Resources. Education. Delivered. ("RED") Truck Initiative, launched in May 2023, will provide a direct route to engage and interact with IQ customers and DI Communities and provide a forum for community members to give feedback as well as ask questions about the Company's wildfire mitigation programs, energy initiatives, and other issues of interest to our customers.

The Company is also hiring a DI Community and IQ Customer representative to lead educational initiatives to increase awareness and understanding wildfire risks, emergency preparedness, and response strategies. The DI Community and IQ Customer representative will be responsible for outreach and engagement with DI Communities and IQ customers and will develop and maintain relationships with community action partners and connectors, organizations, and IQ customers and DI Communities. This includes attending community meetings, events, and other public forums to understand community needs and concerns related to wildfire preparedness and response. This position will also help develop and implement outreach programs aimed at increasing community awareness and resilience to wildfires. This includes working with local agencies, nonprofits, and other stakeholders to design programs that meet the specific needs of a given community.

V. Public Safety Partners

The next group of stakeholders that are key to the Company's successful execution of the WMP are our public safety partners and OEMs. Public Safety Partners include fire protection districts, offices of emergency response, county sheriffs, and local police departments.

The Company is meeting with and identifying these stakeholders. One example of this is when the Company held community and development meetings with Evergreen Fire and Rescue, Lake County, the Center for Climate and Energy Solutions, Pikes National Forest Shared Steward Meeting, Garfield County Commissioners, and the Two Rivers Coalitions, among others.

Public Service has also leveraged its partnership with Pano AI to build relationships with the different fire protection districts whose jurisdictions are covered by Pano cameras.[51] Pano has done outreach and onboarded 21 unique fire protection districts, offices of emergency management, and sheriff's offices in 2023. By continuing to extend the AI camera network through 2024 and beyond, we will continue to use these opportunities to build relationships and create ongoing channels of communication.

Incorporating outreach and engagement with Public Safety Partners, such as OEMs, is reflected and engrained in our communications plans, including for PSPS notifications.

Government Agencies and Other Public Partner Organizations

Approximately 50 percent of the Company's Colorado service territory includes land managed either by USFS or the Bureau of Land Management ("BLM"). Over 50 percent of the Company's Tier 3 service territory is federal land. Approximately 47 percent of Tier 2 service territory is federal land. Frequently, execution of wildfire mitigation work in land subject to federal jurisdiction requires permitting or other approval processes. In order to streamline some of these processes and create efficiencies, the Company and USFS, over an 18-month period, negotiated a comprehensive Master Operations & Maintenance Agreement. The Company is undergoing similar discussions to address wildfire mitigation or potential control lines with the BLM and hopes to enter into a similar agreement the Updated WMP.

Another way the Company is engaging with governmental agencies is through the identification of and application for funding to support its wildfire mitigation work. Xcel Energy was awarded a $100 million grant from the Department of Energy under the Grid Resilience and Innovation Partnerships ("GRIP") program to be administered from 2024-2028. In the application, the Company indicated $42 million of this was designated for projects in Colorado, and the Company would match those funds at the level of $67 million. In January 2024, the Company submitted concept papers as the first step in applying for further funds under the GRIP program and the Company will continue to pursue similar opportunities. The additional funding from the DOE would aid the Company in balancing the cost of system improvements and advancing a more resilient grid. The Company continues to seek out additional external funding to support its wildfire and extreme weather mitigations.

Research and Academia

Research and academic institutions offer new and exciting partnership opportunities for the Company. We are working hard to leverage existing relationships and develop new relationships with key wildfire research stakeholders at the Colorado State University, the National Renewable Energy Laboratories, the National Center for Atmospheric Research, and the Los Alamos National Lab.

Engagement with Other Utilities

Other utilities within the State of Colorado and throughout the Western United States are an additional source of information and collaboration regarding wildfire mitigation. Beginning in 2020, the Company sponsored the first Colorado Wildfire Summit to discuss wildfire risk and actions being implemented to mitigate that risk. This Summit has continued on an annual basis and expanded to include stakeholders beyond Colorado energy providers.

To enhance engagement, the Company started the Colorado Utility Wildfire Consortium with other utilities in the state to discuss wildfire mitigation work. This group discusses best practices, emerging technologies, and experiences gained through the work they're doing in their different geographic regions. Ongoing engagement with peers is valuable and the Company intends to continue this dialogue to evolve our benchmarking in areas such as organizational structures, risk assessment methodologies, and mitigation tools used.

Industry

Industry trade groups and conferences provide valuable sources of information. The Company is very engaged in the Edison Electric's Institute's wildfire mitigation efforts. Further, the Company is participating in a joint DOE and Electric Power Resource Institute effort, servicing on both the working group and the leadership group.

VI. PSPS Resiliency Rebates

The Updated WMP establishes a new rebate program as part of the Updated WMP, where the Company will assist certain residential customers in the purchase of Battery Energy Storage Systems ("BESS") and Vehicle-to-Home electric vehicle equipment. The residential customers include those that are income-qualified, part of the medical exemption rate, and medical certificate program customers. The rebates will assist these customers in installing and using back-up power systems to help mitigate the impacts of a proactive de-energization. Through the use of BESS and Vehicle-to-Home equipment, these residential customers will have appropriate resources available to them to prepare to meet the challenges of wildfire risk. The rebates are intended to cover 100 percent of the cost of purchase and installation of eligible equipment, and the rebate offerings will be encouraged through the Company's communication and engagement efforts.

VII. WMP Leadership, Governance, and Organization

While wildfire mitigation efforts span multiple business units, Xcel Energy is consolidating its wildfire expertise within a centralized wildfire organization. The intent of this consolidation is to have requisite wildfire-supporting roles in a standalone business unit. This consolidation and expansion will add new in-house technical capabilities in the areas of meteorology, fire science, ignition analysis, risk modeling and data analysis, communication specialists, data governance and data collection, engineers, field personnel, and operators. These additions will build out the organizational structure necessary to effectuate Public Service's wildfire mitigation efforts. As with many other

aspects of this Updated WMP, this will be an iterative process, designed to adapt as new competencies and demands change over time.

WMP Leadership and Wildfire Risk and Governance Steering Committee

Xcel Energy's wildfire organization will be led by a Vice President of Wildfire Risk Management. Other leadership positions within the wildfire organization include:

- Area Vice President, Wildfire Mitigation: Regulatory and Policy
- Director, Wildfire Strategy and Performance
- Senior Meteorologist
- Director, Wildfire Mitigation and Resilience

Each of these individuals are responsible for leading different aspects of the Company's wildfire risk management and reduction efforts.

The Company has also established a Wildfire Risk and Governance Steering Committee. The Wildfire Risk and Governance Steering Committee will be composed of the WMP leadership team and Company executives. The Wildfire Risk and Governance Steering Committee will make ongoing decisions about developing and prioritizing mitigation initiatives, with the goal of making decisions that will help prevent catastrophic wildfires, mitigate wildfire risk, and reduce customer impacts. While the Updated WMP establishes the selected mitigations, timelines, and work scope (see Section 7(E) for more information on the selection process), these programs will continually be updated in light of new information and circumstances, resource availability, and other constraints.

The Wildfire Risk and Governance Steering Committee will meet weekly or more frequently as necessary to receive presentations from internal subject matter experts. Items that may be brought to the Wildfire Risk and Governance Steering Committee for informational purposes or approval include things such as:

- Work plan reprioritizations that may impact risk reduction timelines or commitments;
- Updated Risk models that introduce new, more granular modeling capabilities, or that contain material changes to methodology or inputs, and that may impact future work plan execution;
- Approval of safety or quality improvement initiatives;
- Approval of any corrective action plans to bring program execution back into alignment with plans; and,
- Progress report on WMP program execution, ignition/outage trends requiring attention, benchmarking against other utilities.

Wildfire Organizational Support

In total, 41 new positions will support this 2025-2027 WMP from within Xcel Energy's wildfire supporting organizations. Some of these roles have already been filled while others are proposed to be added during implementation of this 2025-2027 WMP. The

table below reflects the number of proposed FTEs to support specific mitigation strategies for the 2025-2027 WMP.

Table D-19: FTE Position Growth

Mitigation Strategy	Proposed FTEs
Wildfire Risk Management and Reduction	31
Vegetation Management	4
Transmission	1
Communication	3
Integrated System Planning	2
Total:	41

Certain positions will support Xcel Energy's entire enterprise while others will be dedicated solely to Public Service. For those enterprise-wide positions, the budget for those positions has been adjusted to reflect the proportional allocation of those positions between Public Service and Xcel Energy's other jurisdictions.

Of the proposed new positions, 31 will be individuals dedicated to wildfire risk management and reduction as part of the Wildfire Risk team. The Wildfire Risk team includes positions with expertise in the following areas:

1) Risk Management, Assessment, and Analytics;
2) Wildfire Strategy and Performance;
3) Regulatory and Policy (including a dedicated outreach and communications resource); and,
4) Incident Command for Severe Risk Events

The Wildfire Risk Team also includes staffing and support for a new Wildfire Command Center to serve as Public Service's 24/7 hub for monitoring wildfire risks and processing weather, remote sensing, and other data from the Company's situational awareness programs. The Wildfire Command Center will also serve as a central location for wildfire coordination, response, and recovery efforts.

9. CONCLUSION

Wildfire risk mitigation remains an evolutionary process, where improving data analytics and successful mitigation implementation will enable deeper levels of risk mitigation. The Updated WMP demonstrates the progression and leadership of Public Service's wildfire risk mitigation program. It has been designed with complementary mitigation strategies that promote prioritization of risk reduction in an expedient, comprehensive, and reliable manner. The Updated WMP and its programs, standards, and goals are intended to protect customers, enhance the safety of Colorado's electric system, and keep the lights on while responding to a changing climate and more frequent severe weather events.

Public Service looks forward to continuing collaboration with state and federal policymakers; state, local, and tribal government officials; safety partners; community-based organizations; customers; and other stakeholders to help build a safer and more fire resilient Colorado.

LIST OF FIGURES

LIST OF TABLES

WHAT ARE ENHANCED POWERLINE SAFETY SETTINGS?

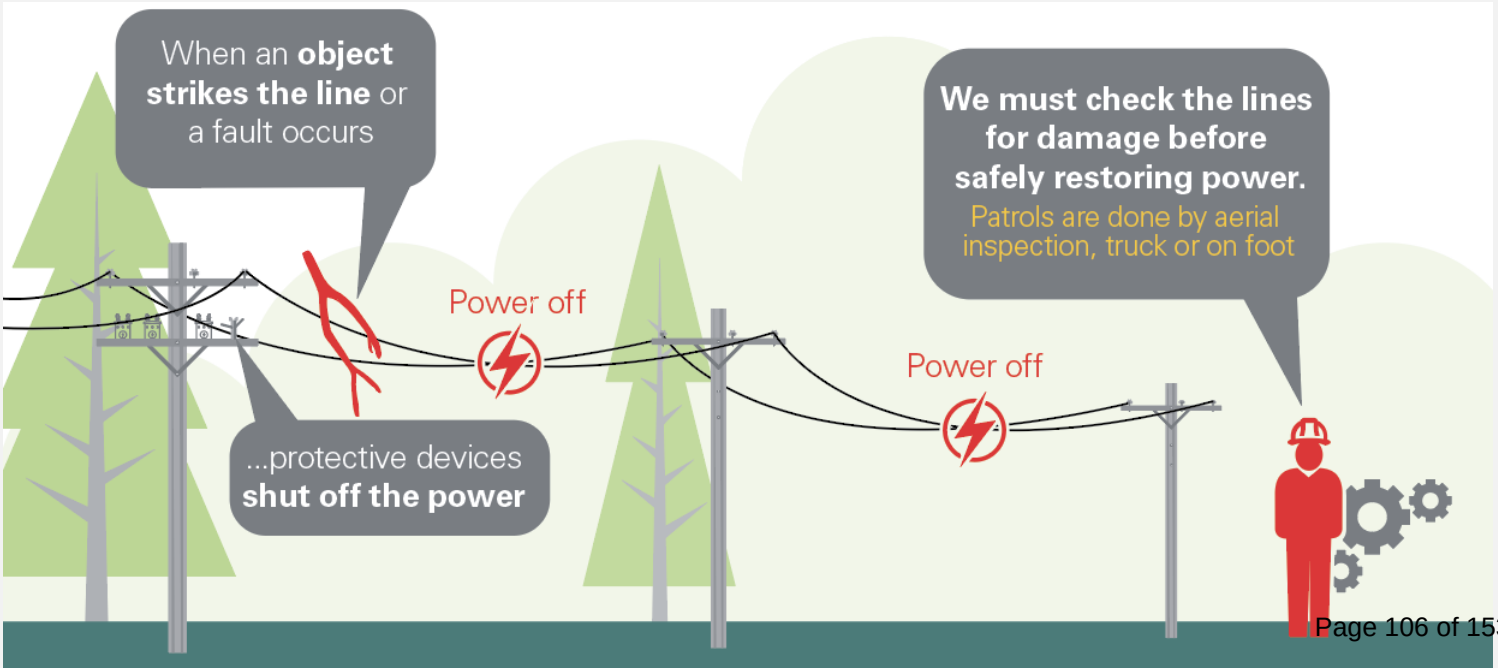
Enhanced Powerline Safety Settings (EPSS) are a proven wildfire mitigation tool.

EPSS allows for power lines to remain in-service during periods of elevated wildfire risk, with protection settings enabled.

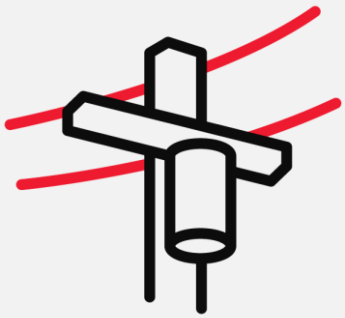
- EPSS is used in risk zones identified by the Colorado State Forest Service and risk probability models considering facts like weather, housing density, terrain, and miles of overhead lines.
- It is intended to enhance public safety during heightened risk conditions, but it means power outages are likely to occur more frequently, and if they do, are likely to last longer because crews need to patrol the line before restoring power.

When EPSS is activated, **power lines are more sensitive and can quickly stop the flow of energy if an issue is detected,** like a tree branch or other object touching the line.

When that occurs, the **power will remain off until our crews can inspect the line** to make sure it's safe to turn it back on.



POTENTIAL OUTAGE PREPARATION



As outages due to EPSS are not planned, it is not possible to notify customers in advance.

We understand how disruptive it is for customers to lose power. That is why we are working hard to support our customers and communities, reduce the impact of outages, and help you be prepared.

Customers can sign up for outage notifications through the My Account feature on xcelenergy.com. You can also view an outage map that displays outage details and anticipated time for restoration.

If a customer depends on a powered medical device, we encourage them to register through our medical assistance program, create an outage plan and have a backup power source. Find more on the benefits of the program at xcelenergy.com.

Outage info, including safety tips, is available at xcelenergy.com/Outages

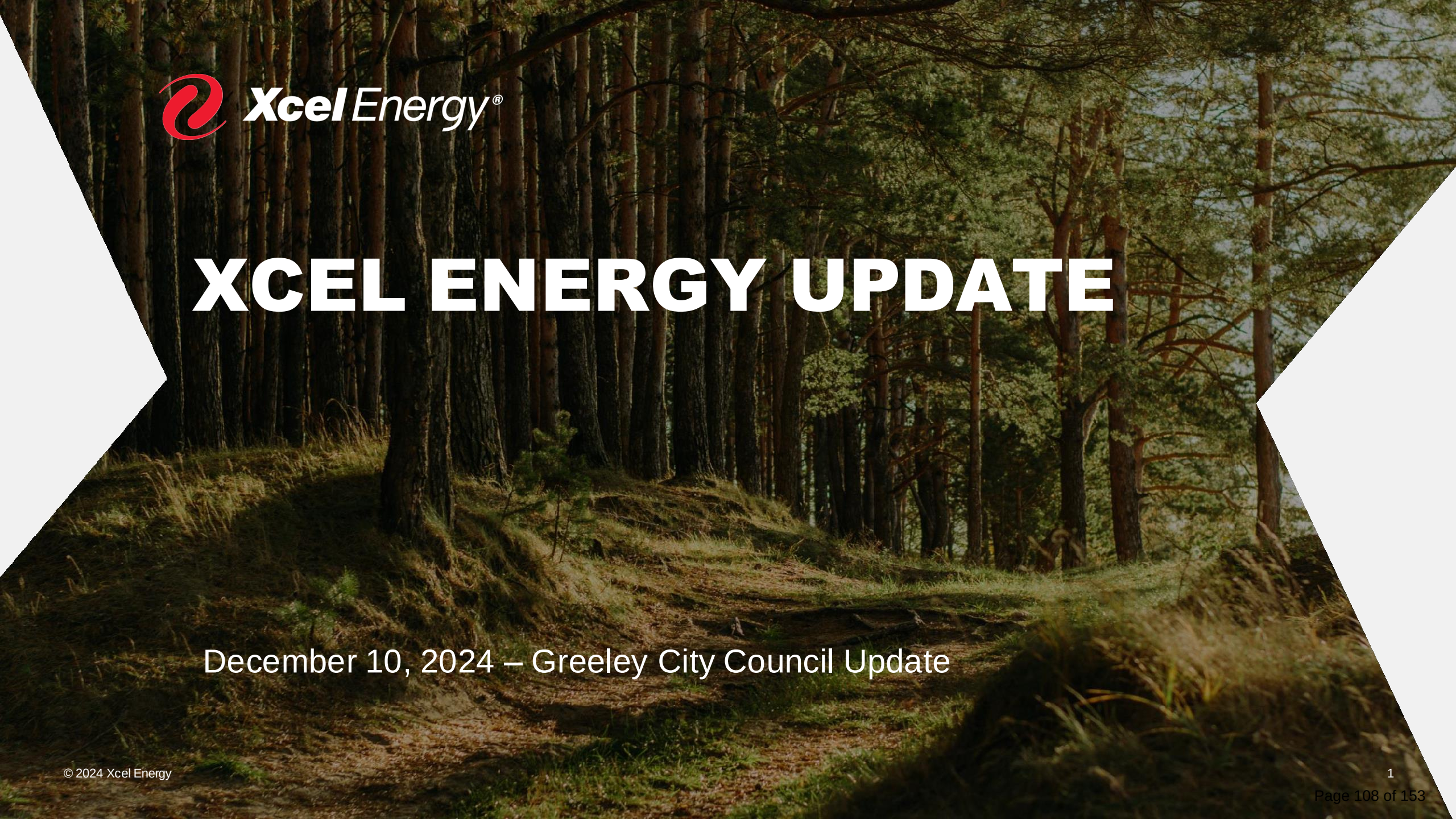
Report an Outage

Our customers have a number of ways to report an outage.

- Text OUT to 98936 to report an outage or text STAT to check the status of your outage
- Xcel Energy mobile app available on iOS and Android
- Online at www.xcelenergy.com/outages
- Call 1-800-895-1999

Xcel Energy puts safety at the foundation of everything we do. Our comprehensive fire risk mitigation program is designed to help protect lives, homes, and communities from the threat of wildfire.

For more information on these safety settings, visit xcelenergywildfireprotection.com.
For questions, call 800-895-4999 or visit my.xcelenergy.com/customersupport.



XCEL ENERGY UPDATE

December 10, 2024 – Greeley City Council Update

AGENDA

1. Introductions & Overview
2. Ongoing Wildfire Mitigation Work
3. 2025-2027 Wildfire Mitigation Plan
4. Outage Information

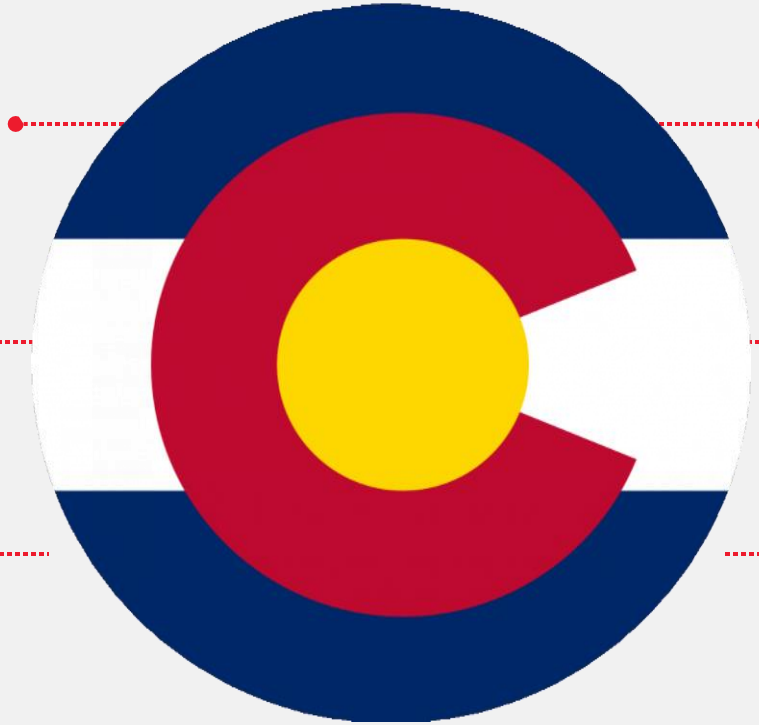
INTRODUCTIONS

Delivering safe, reliable, affordable, and clean energy to Coloradoans

1.6 million
Electric Customers

1.5 million
Natural Gas Customers

99.98%
Electric Reliability



36,671,000 MWh
power generated

24,533
miles of transmission lines

80,176
miles of distribution lines

CITY OF GREELEY ENERGY OVERVIEW

Solar Rewards® installations
1,548

Community solar garden customers
259

Windsource® customers
1,783

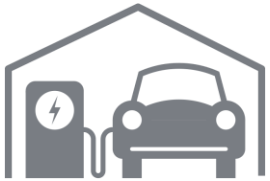
Renewable Connect® customers
1,809

Business customers

Electric
5,288

Residential customers

Electric
39,189



EV program customers
31

Xcel Energy®

ONGOING WILDFIRE MITIGATION WORK

Wildfire Mitigation:

Extreme weather and drier conditions mean that wildfires are a near year-round growing threat in regions across the country, even in areas that haven't traditionally been wildfire prone.

Xcel Energy is committed to doing our part and will continue to make strategic investments to help protect our customers, communities, and way of life.

Our goal is to ensure that no catastrophic wildfire is started by Xcel Energy assets–and our wildfire mitigation efforts are intended to support that goal.

Ongoing Wildfire Mitigation Work

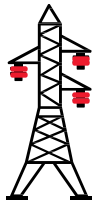
Since 2020, we have invested over $500 million in wildfire mitigation activities in Colorado. In 2023 alone, these measures included:

2,777

DISTRIBUTION POLES
REPLACED

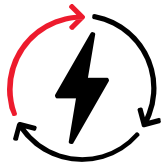
15,067

DISTRIBUTION POLES INSPECTED
USING UNMANNED AERIAL SYSTEMS



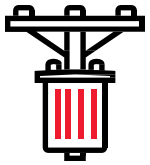
312

PRIORITY CORRECTIONS
ON TRANSMISSION EQUIPMENT



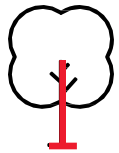
2,832

MILES OF TRANSMISSION LINE INSPECTED
USING VISUAL INSPECTIONS



19

SUBSTATION PROTECTION
RELAYS INSTALLED

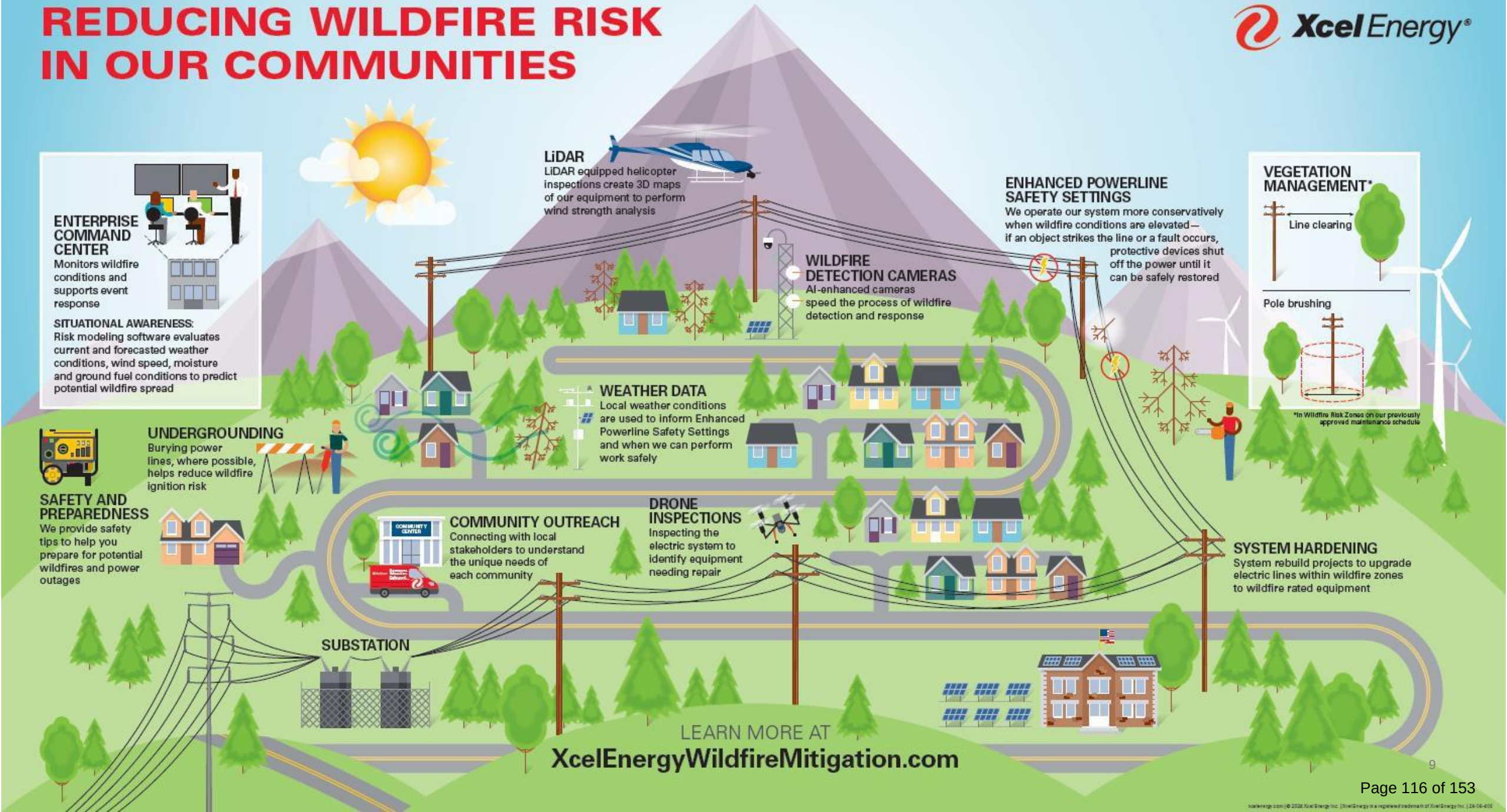


94%

COMPLETION RATE OF PLANNED VEGETATION MANAGEMENT
EXCEEDING 90% ANNUAL GOAL

REDUCING WILDFIRE RISK IN OUR COMMUNITIES

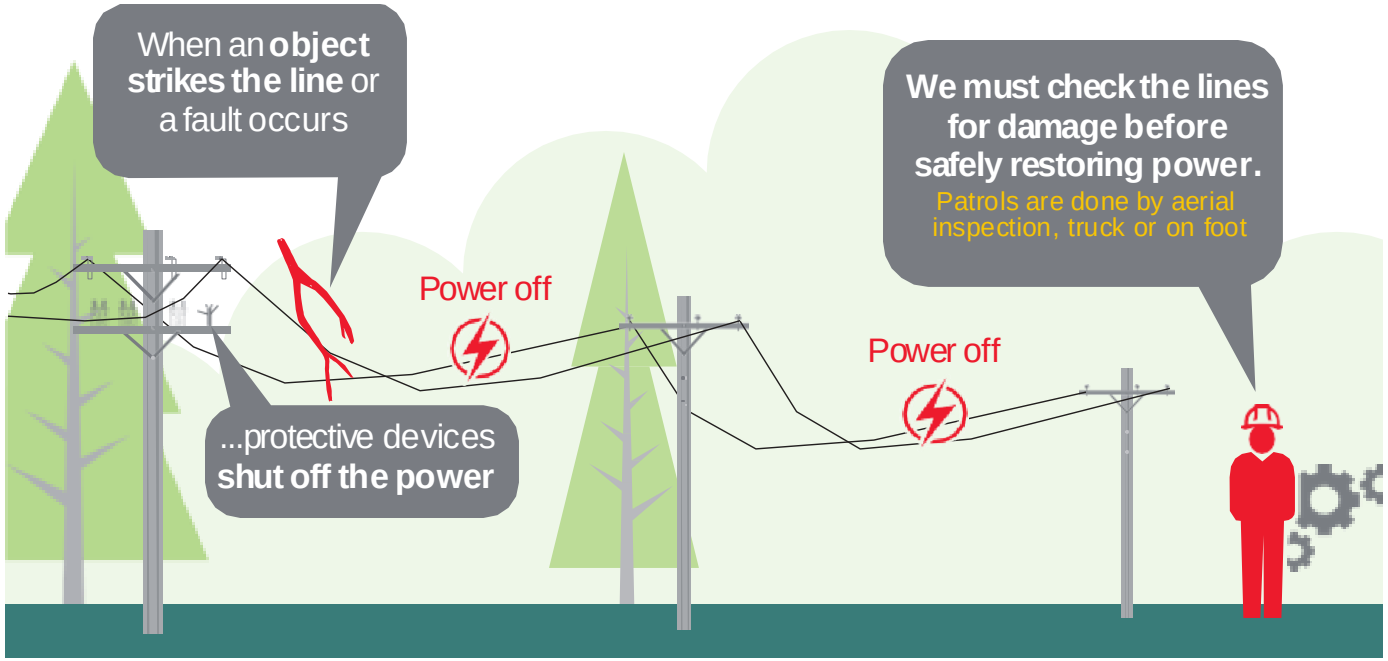
Xcel Energy®



Spotlight: Enhanced Powerline Safety Settings (EPSS)

EPSS is a proven wildfire mitigation tool.

It allows for power lines to remain in-service during periods of elevated wildfire risk, with protection settings enabled.



When EPSS is activated, power lines are more sensitive and can quickly stop the flow of energy if an issue is detected, like a tree branch or other object touching the line. When that occurs, the power will remain off until our crews can inspect the line to make sure it's safe to turn it back on.

It is intended to enhance public safety during heightened risk conditions, but it means power outages are likely to occur more frequently, and if they do, are likely to last longer because crews need to patrol the line before restoring power.

EPSS is used in risk zones identified by the CO State Forest Service and risk probability models considering facts like weather, housing density, terrain, miles of overhead lines.

Spotlight: Public Safety Power Shutoff (PSPS)

Xcel Energy decides whether, when, and where to implement a PSPS event using customized industry-leading modeling software (Technosylva).

Company assets including

Transmission and Distribution

- Overhead conductor
- Poles and structures
- Fuses, switches, transformers, etc.

Detailed fuel information including

- Up to date fuel data consistent with the Colorado Wildfire Risk Assessment and US Forest Service
- High detailed satellite resolution data
- Woody and Herbaceous Life Fuel Moisture (LFM) and Dead Fuel Moisture (DFM) field observations

Weather Data

- Hourly weather predictions input by DTN, world leader in meteorological science
- 2 km weather radius predictions
- Historical weather observations input by hundreds of local stations
- Weather analysis comparisons (predicted-observed)

External Data

- Integrated with the National Fire Danger Rating System and Landsat Normalized Difference Vegetation Index 6-day forecast.
- AI-powered wildfire detection cameras and other statewide camaras for live field visualization
- Integrated with IRWIN incident reporting system
- Integrated with FireGuard (FG) satellite observations
- Identification of hot spots
- Includes buildings-structures footprint data

System performs millions of daily overnight simulations based on asset-weather-fuel-population data assuming each asset data-point as a potential source of ignition to predict impact following 8 hours of initial ignition

Comparing EPSS to PSPS

Both EPSS and PSPS are only used when the temperature, wind speed, relative humidity, and available fuel sources indicate a high risk for wildfires.

Enhanced Powerline Safety Settings (EPSS)

- EPSS allows for power lines to remain in-service during periods of elevated wildfire risk with protection settings enabled—unless an object actively causes a fault on the line.

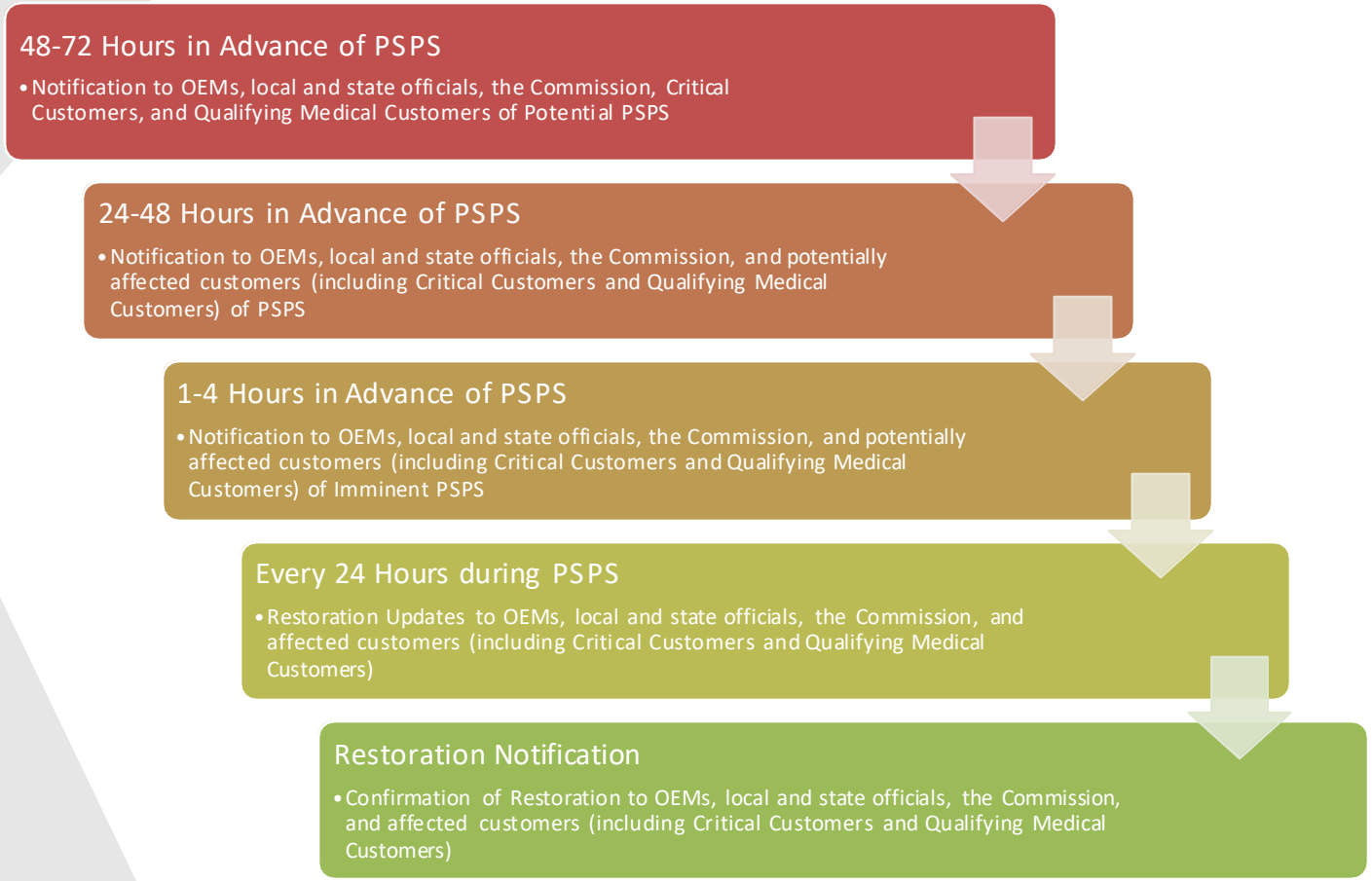
Public Safety Power Shutoff (PSPS)

- In a PSPS event, power is proactively shut off for safety. This is not a step we take lightly.
- PSPS is a mitigation tool used when risk cannot be adequately reduced by EPSS and other methods.

Xcel Energy is continually investing in and building out our systems to limit the size, scale, and duration of potential power disruptions.

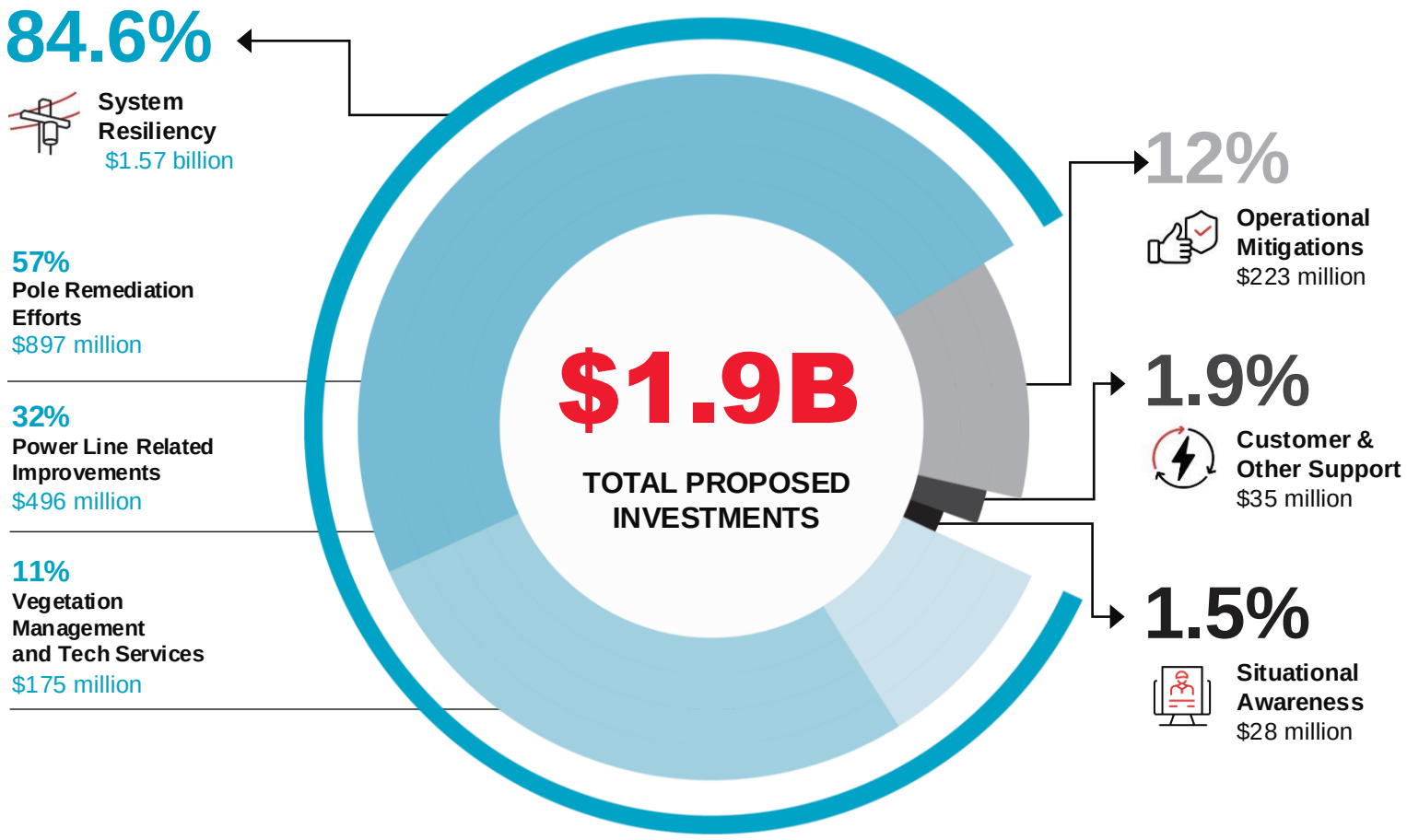
Future PSPS Communication

The Company is working toward earlier and more frequent PSPS communications whenever possible



2025 – 2027
WILDFIRE MITIGATION PLAN

Proposed investments and improvements



System Resiliency

50
miles of undergrounded power lines

10,000
pole replacements, with a focus on higher risk areas

Operational Mitigations

100%
feeders enabled with Enhanced Powerline Safety Settings (EPSS) capability for higher risk areas

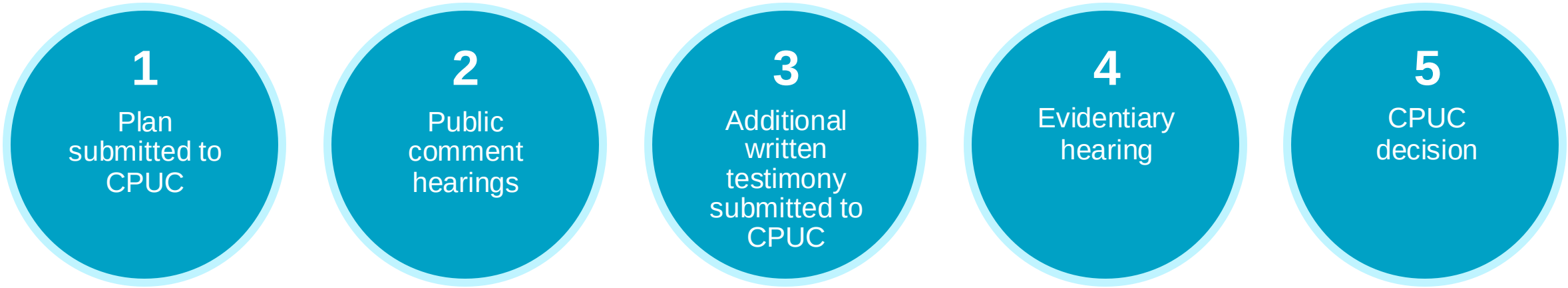
Situational Awareness

3x
the number of AI-enabled wildfire monitoring cameras

29,000
non-traditional fault detection sensors deployed

Next steps

The 2025-2027 Wildfire Mitigation Plan is subject to regulatory review and approval.



The regulatory process will allow for public participation and in-depth evaluation and analysis by state regulators and other parties to ensure the investments are prudent, necessary, and in our customers' best interest.

We expect the regulatory process to take several months or longer. We will share updates with stakeholders as we have more information.

Outage Information

Why Do Outages Occur?

1. **Severe Weather**
2. **Vegetation / Trees**
3. **Vehicle Accidents**
4. **Equipment-Related Upgrade or Failure**
5. **Wildlife / Other Objects**
6. **Undergrounding / Hit Lines**

Outage Classifications

Xcel Energy classifies outages according to the industry definitions defined in the Institute of Electrical and Electronic (IEEE) standards.

Momentary Outage

- Outage that is 5 minutes or less in duration.

Sustained Outage

- Outage that is greater than 5 minutes in duration.

Planned Outage

- Outages that are customer or public official-requested or the company has provided advance notice to the customer.

Major Event

- A set of outages which occurred during a specific time and location which combined, exceeds historically expected outage duration for at least on day.

Preparing for Outages

Building a Home Emergency Kit

- Acquire a first aid kit of sufficient size for the household and keep it stocked.
- Stock up on batteries and consider purchasing portable chargers and communications devices that do not require electricity, such as a battery-powered radio or a phone not reliant on electricity.
- Write down emergency numbers and critical contact information.

Medical and Food Considerations

- Keep an emergency supply of prescription and non-prescription medications on hand, and plan for medications, like insulin, that require refrigeration.
- Fully charge personal medical devices and ensure a backup power source is available for electrically powered medical equipment.
- Purchase non-perishable food (and a manual can opener if needed) and bottled water.

If outages occur, it's important to have access to the most recent updates about power restoration.

Customers should make sure their account information and communications preferences are up to date through the **My Xcel Energy mobile app** or visiting the **Xcel Energy website**.

OUTAGE HISTORY

September 19:

- Vehicle crashed into switch cabinet on W 10th St./43rd Ave.
- While fixing that, a breaker at the Greeley Substation had a problem
- Loads were too large when power restoration was attempted so another feeder line was used while breaker at substation was repaired
- Power originally was out for 3 ½ hours; 3,700 customers impacted

October 24:

- System was in Enhanced Powerline Safety Settings (EPSS) due to weather conditions
- Significant winds in Greeley that day
- Troubleman patrolled line both times, no clear cause found
- EPSS settings detected disturbances and de-enegized the lines
- 1st outage from 11:22 am – 12:15 pm; 3,702 customer impacted
- 2nd outage from 3:37pm – 4:32 pm; 3,553 customers impacted

CONTACT INFORMATION

Hans Rodvik, Northern Colorado Area Manager, Community & Local Government Affairs

- Hans.Rodvik@xcelenergy.com / 907-947-4784

Outage website

- Outages and Safety | Xcel Energy

Key Phone Numbers

- Electric emergency/outage: 800-895-1999
- Gas emergency/gas odor: 800-895-2999
- Residential customer service: 800-895-4999
- Business line: 855-839-8862
- Builder’s call line: 800-868-2121

Work Session Agenda Summary

December 10, 2024
Key Staff Contact: John Hall, Economic Development Director

Title:

Alquist 3D Update

Background:

The Economic Development and Urban Revitalization Department (EDUR) strives to attract, retain and grow innovative companies that add to the economic vitality of the City. Alquist 3D is one of the companies EDUR is working with.

In 2023, Alquist 3D, the City of Greeley, Aims Community College and the State of Colorado created an innovative ecosystem partnership, aiming to make Greeley the center of 3D technology growth in Colorado. Alquist 3D utilizes high-precision robotics and carbon-neutral materials to pioneer faster, stronger, and economical building innovations that are environmentally responsible.

The City provided financial support to Alquist 3D in 2023 and 2024 with the goal of locating the company's growing operations to Greeley. The financial support also contributed to the goal of developing a 3D robotic printing certificate program with Aims Community College and leveraging both activities to promote and grow the innovation and entrepreneurial ecosystem in Greeley.

Staff requested that representatives from Alquist 3D provide Council an update on their progress.

Strategic Focus Area:

Business Growth

Attachments:

1. Item 6 - Presentation

Alquist 3D Update

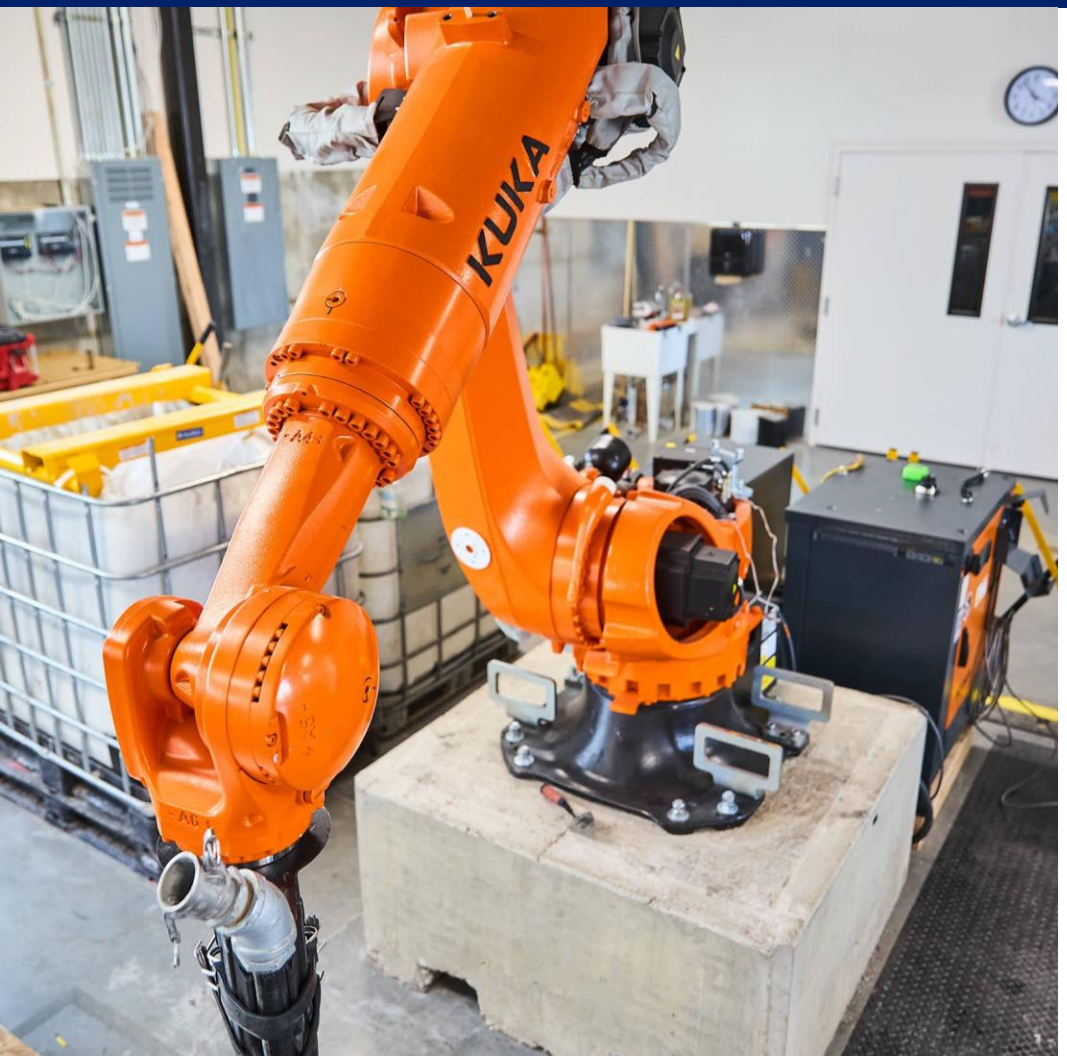
John Hall, Director of Economic Development

City Council Work Session - December 10, 2024

Agenda

- Introduction
- Partnership and project overview
- Alquist 3D company update from CEO
- Summary

Introduction



- Alquist 3D is a technology company that utilizes high-precision robotics and carbon-neutral materials to pioneer faster, stronger, and economical building innovations that are environmentally responsible.
- In 2023, Alquist 3D, the City of Greeley, Aims Community College and the State of Colorado created an innovative ecosystem partnership, aiming to make Greeley the center of 3D technology growth in Colorado.

Partnership and Project Overview

The purpose for the public/private partnership

- Relocate and grow Alquist 3D's operations in Greeley
- Work with Aims Community College to build a 3D robotic printing certificate program
- Leverage Alquist 3D and the new workforce training (certificate) program to promote and grow the innovation and entrepreneurial ecosystem in Greeley

Financial support was provided to Alquist 3D in 2023 and 2024

- State of Colorado invested $1.43 million in tax credits and a cash grant
- City of Greeley invested $2.85 million
  - Forgivable loan (working capital) -- $750,000
  - Construction grant -- $2 million
  - Relocation expense cash grant -- $100,000

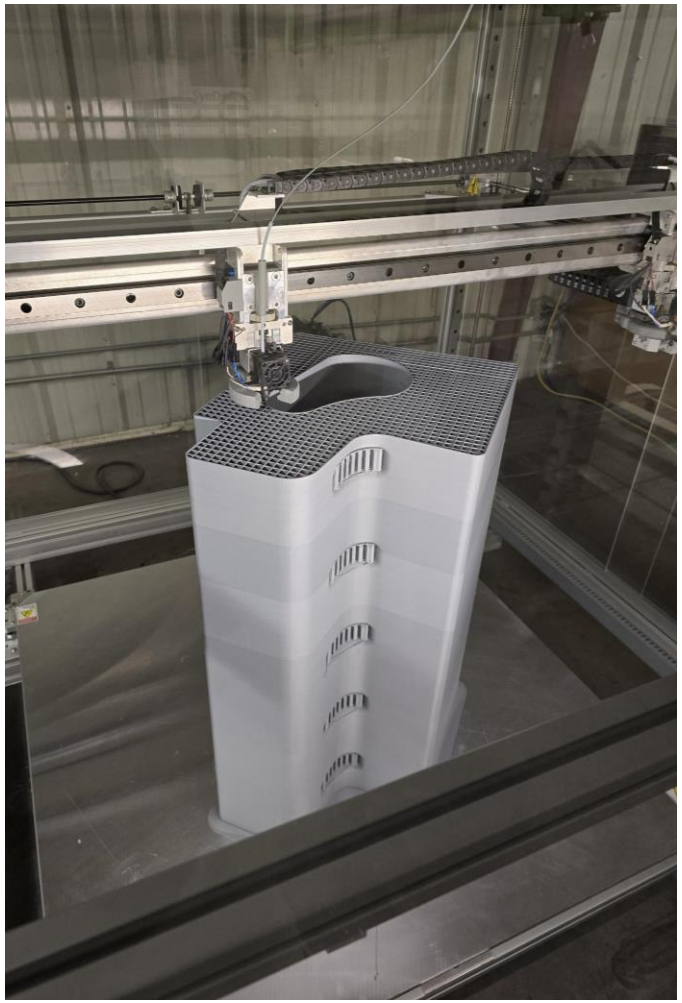
Alquist 3D Company Update

Patrick Callahan, CEO

MAKING THE CITY OF GREELEY THE HOME OF 3D CONCRETE PRINTING INNOVATION

Thanks to continuous support from the City of Greeley, Alquist 3D has rapidly become the 3D concrete printing industry thought leader in commercial, residential, and municipal projects.

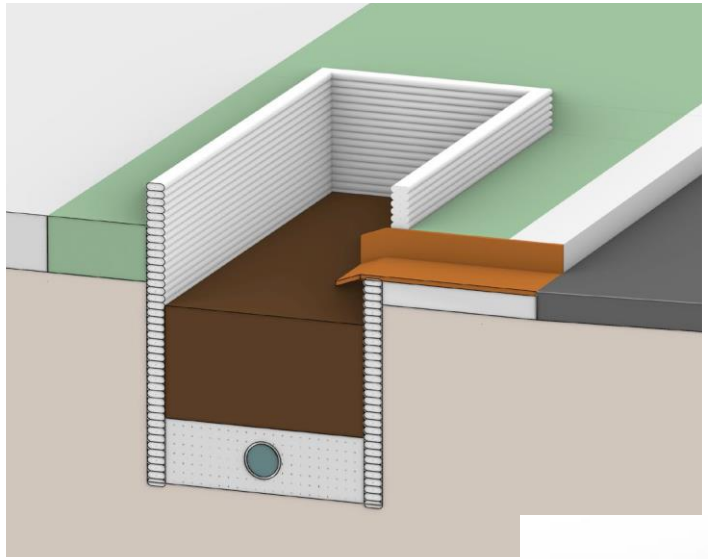
Since moving to Greeley in January, the company has grown from 13 to 22 employees, created a first of its kind 3D concrete printing curriculum, and completed the largest printed corporate structure. Alquist 3D views these accomplishments as just the beginning and looks forward to advancing its capabilities alongside the City of Greeley.



A FIRST OF ITS KIND INFRASTRUCTURE DESIGN

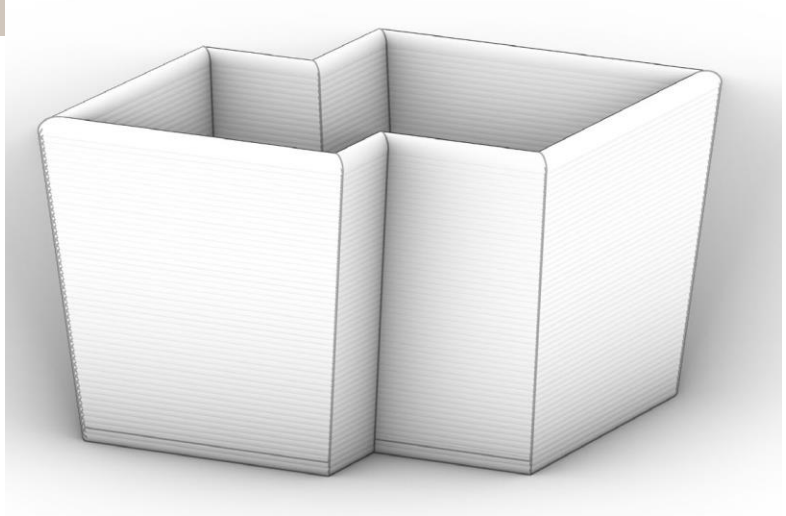
- Currently in mold prototyping phase.
- Multiple cementitious material options being tested for variance on strength, carbon footprint, and color.
- Alquist 3D and City of Greeley have applied for federal funding via Build to Scale Grant are finalizing application for Low Carbon Transportation Materials grant with Driven Plastics.

The Forefront of a **CONSTRUCTION REVOLUTION**



Water retention planter

City's planter selection



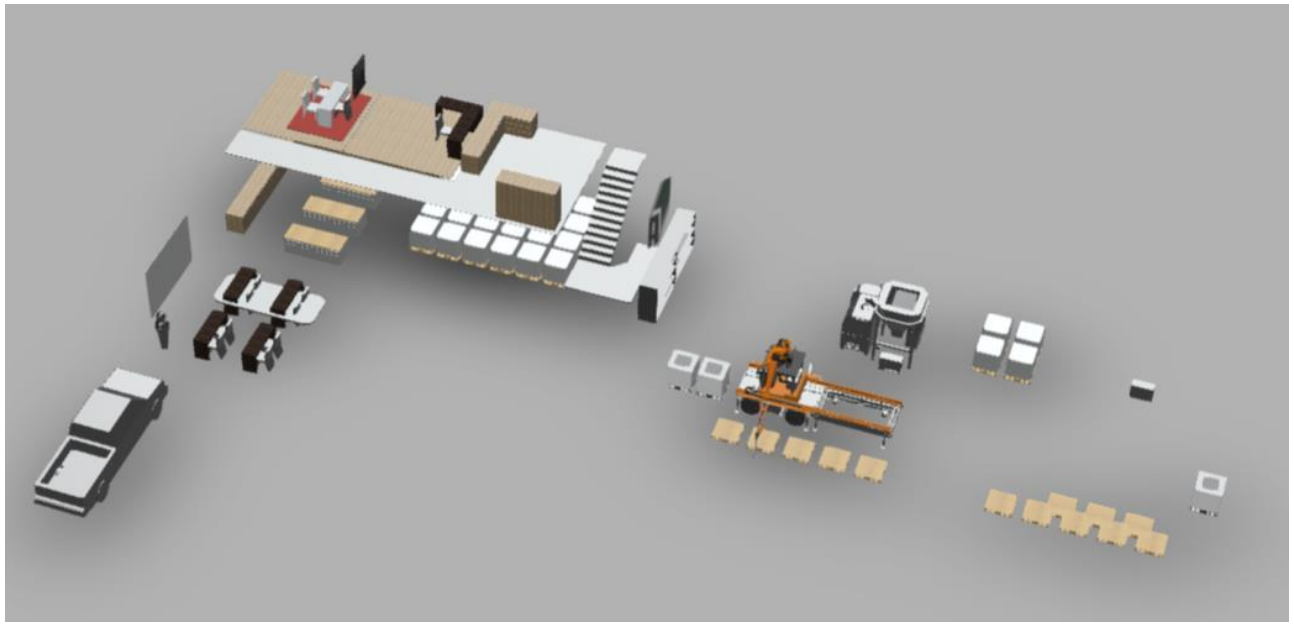
A FIRST OF ITS KIND LANDSCAPE CONCEPT

- Currently in design selection phase for 16th Street corridor.
- Alquist 3D, in collaboration with makerSKAPA, have presented preliminary designs for water retention planters for integration into the drainage curb project.

A FIRST OF ITS KIND 3D CONCRETE PRINTING CURRICULUM

- 50 students currently signed up for online certificate course.
- Alquist 3D is finalizing in person workshops for Design & Coding, Material Science, Robotics, and Kinematic Motion to supplement online curriculum for Spring 2025.
- Alquist 3D is engaging with additional education institutions for curriculum adoption.

Aims COMMUNITY COLLEGE



BUILDING UPON THE EDUCATION ECOSYSTEM

- AIMS to build a permanent 25,000 square foot facility on campus to house Alquist 3D research & design, business development, and training.
- Alquist 3D is proposing to 3D print the facility's retaining walls and landscaping.
- Manufacturing to remain at 6th St location.

Aims COMMUNITY COLLEGE

GREELEY-WELD HABITAT FOR HUMANITY
HOPE SPRINGS

SUSTAINABLE AFFORDABLE HOUSING

- South duplex completed.
- North duplex printing in place for as long as weather permits.
- When cold weather hinders outdoor print operations, Alquist 3D will begin modular print assembly at its warehouse to stay on schedule.

WALMART SUPERCENTER EXPANSION

THE LARGEST 3D CONCRETE PRINTED COMMERCIAL STRUCTURE IN THE U.S.

- 8,000+ Square foot expansion to Walmart's Athens, TN location.
- 3D concrete printed walls averaging 19' 4" height and 14" width.
- Significant developments in IP, including 3DCP processes for hot weather jobsites.
- Alquist 3D to work with Walmart on a second 3DCP project in Huntsville, AL in Q1 2025.

Summary

- Alquist 3D relocated its headquarters to Greeley in early 2024. The company currently has 22 employees and expects to grow to 79 employees over the next 8 years.
- There are 50 students signed-up at Aims Community College for the new 3D concrete certificate program.
- Alquist 3D continues to make advancements in 3D concrete technology and materials that can be utilized in the construction industry.
- The City of Greeley is becoming more widely known for its innovation and entrepreneurial ecosystem.

Thank you

City of Greeley Colorado

Work Session Agenda Summary

Title

Scheduling of Meetings, Other Events

Summary

During this portion of the meeting the City Manager or City Council may review the attached Council Calendar or Work Session Schedule regarding any upcoming meetings or events.

Attachments

Council Meetings and Other Events Calendar
Council Meeting and Work Session Schedule
Status Report of Council Initiatives and Related Information

Council Meetings and Other Events Calendars

December 8 – January 4, 2025

Tuesday, December 10, 2024

- City Council Work Session Meeting 6 p.m. (1001 11th Ave Greeley CO 80631) City of Greeley Council Chambers

Thursday, December 12, 2024

- City of Greeley Holiday Party 11 a.m. Zoe's Cafe & Events (715 10th St, Greeley, CO 80631)

Saturday, December 14, 2024

- Wreaths Across America Proclamation - Linn Grove Cemetery 9:45 a.m. (1700 Cedar Ave, Greeley, CO 80631)

- Wreaths Across America Proclamation - Sunset Memorial Gardens 9:45 a.m. (3400 W 28th St, Greeley, Colorado 80634)

Tuesday, December 17, 2024

- City Council Meeting 6 p.m. (1001 11th Ave Greeley CO 80631) City of Greeley Council Chambers

Wednesday, December 18, 2024

- Water & Sewer Board Meeting 2 p.m. (1001 11th Ave Greeley CO 80631) City of Greeley Council Chambers

- Police Officer Swearing in Ceremony 3 p.m. Greeley Police Department (2875 W 10th St, Greeley, CO 80634); Donahue Room

Thursday, December 19, 2024

- Downtown Development Authority 7:30 a.m. (802 9th Street, Greeley CO 80631)

- Airport Authority 3:30 p.m. (600 Airport Road, Greeley CO 80631) Greeley-Weld Airport

Monday, December 23, 2024

- Greeley Chamber of Commerce 11:30 a.m.

Thursday, December 26, 2024

- Poudre River Trail Meeting 7:30 a.m. Poudre Learning Center (8813 W. F Street Greeley CO 80631)

Monday, December 30, 2024

- Menorah Lighting 5 p.m. Downtown Greeley 8th Street Plaza

Tuesday, December 31, 2024

- Council Meeting – No Meeting 5th Tuesday

Tuesday, January 2, 2025

- Island Grove Advisory Board 3:30 p.m. (600 N. 14th Ave Greeley CO 80631)

- North Front Range MPO Meeting 6 p.m. Fort Collins Colorado River Community Room (222 LaPorte Avenue Fort Collins, CO 80521)

City Council Meeting Scheduling 2024

	12/3/2024		
	This schedule is subject to change		
Date/Type	**Description**	**Sponsor Presenter/Director or Project Manager**	**Placement/Time**
December 10, 2024 Council Work Session	Xcel Energy Update	Will Jones/Paul Trombino	WS
	Alquist 3D Printing Update	John Hall	WS
December 17, 2024 Council Meeting	Minutes - Nov 19 and Dec 3 CC; Nov. 20 SM	Heidi Leatherwood	Consent
	Resolution - Change Order Plante Moran	Robert Miller/Tyra Litzau	Consent
	Intro & 1st Rdg Ord - Collective Bargaining for Sergeants	Halle Kemp	Consent
	Q3 Financial Report	Robert Miller/Tyra Litzau	Regular (Informational)
	Eminent Domain Discussion	John Hall	Regular (Informational)
	Sidewalk Funding Projects	Steven Younkin/Paul Trombino	Regular (Informational)
	Boards & Commissions Appointments	Heidi Leatherwood	Regular
	Executive Session - West Greeley	John Hall/Rachel Flynn	Regualar
December 24, 2024 Council Work Session	Cancelled due to Holiday		
January 07, 2025 Council Meeting	Minutes	Heidi Leatherwood	Consent
	Resolution - Council Policies and Protocol (Tentative)	Heidi Leatherwood	Consent
	Intro & 1st Rdg Ord - Boomerang PUD	Brian McBroom	Consent
	Intro & 1st Rdg Ord - Code amendment to retention period - Administrative Hearing Officer Records	Tasha Reynolds/ Heidi Leatherwood	Consent
	PH & 2nd Rdg Ord - Collective Bargaining for Sergeants	Halle Kemp	Regular
	Safe Streets for All City of Greeley Vision Zero Action Plan	Steven Younkin/Paul Trombino	Regular (Informational)
	Economic Development Strategic Plan Update	John Hall	Regular (Informational)
January 14, 2025 Council Work Session	Amendments to Landscaping Codes Artificial Turf	Don Threewitt/Brian McBroom	WS
	Downtown Zoning Phase 1	Don Threewitt/Brian McBroom	WS
	Five Year Housing for All Strategic Plan Update	Deb Callies	WS
	Firearms in Sensitive Spaces	Adam Turk	WS
January 21, 2025 Council Meeting	Minutes	Heidi Leatherwood	Consent
	Resolution - 3 Mile Annexation Boundary	Doug May/Brian McBroom	Consent
	Resolution - Approval of Safe Streets for All COG Vision Zero Action Plan	Steven Younkin/Paul Trombino	Consent
	Intro & 1st Rdg Ord - Amending Liquor Code Regarding Alcohol Beverages	Jennifer Middleton	Consent
	Intro & 1st Rdg Ord - Amendments to Landscape Code - Artificial Turf	Don Threewitt/Brian McBroom	Consent
	PH & 2nd Rdg Ord - Boomerang PUD	Brian McBroom	Regualr

City Council Meeting Scheduling 2024

	12/3/2024		
	This schedule is subject to change		
Date/Type	**Description**	**Sponsor** **Presenter/Director or Project Manager**	**Placement/Time**
	PH & 2nd Rdg Ord - Code amendment to change the retention period for Administrative Hearing Records	Tasha Reynolds/ Heidi Leatherwood	Regular
	B&C Appointments	Heidi Leatherwood	Regular

Greeley City Council

Status Report of Council Initiatives

Initiative No.	Council Member Initiating	Council Request	Council Meeting or Work Session Date Requested	Next Steps & Schedule	**Anticipated Deliverable & Date** (Report, Council Presentation, etc.)	Assigned to:
04-2023	Hall	**Pumpkin Ridge - Bridge**	March 7, 2023 Council Meeting	•PW report provided to Council on March 24, 2023. Neighborhood meeting planned on June 29, 2023. •Included Raymond's 9/1/2023 Council Update	Bid solicitation, October 3rd, Bids due by October 24th	PW
11-2023	Clark/Butler	**Artificial turf and landscape standards**	August 1, 2023 Council Meeting	•Come back to Council with a draft ordinance	Scheduled for the January 14, 2025 Work Session	Brian McBroom
1-2020	Hall	**Follow-up on the Poudre River Trail- Narrows Project**	August 1, 2023 Council Meeting	•The grant application, which will be submitted in October, will complete baseline river modeling in addition to an alternative alignment analysis which will also look at the existing alignment, with high level cost estimates for each alternative. The scope will also include a 30% design of the preferred alignment. Working with existing consultants, we've established an estimated cost for the design process to get to a 30% of roughly $150,000. •Unless a new alignment comes out of the design process, utilizing the existing alignment or an alternative on the north side of the river identified by past studies will likely exceed $2 million to completed design/permitting and construction for this section.	Monitoring Program: Working with Otak to finalize protocols and the scope of work for a monitoring program that will be active during the design phase and continue until construction begins. This program will track any movement in the existing trail elevations and riverbank to ensure stability and inform design adjustments. Next Phase of Design: Preparing the scope of work for the next phase of design to be executed as soon as 2025 funding is secured. The project will advance toward 100% design in 2025, with the process expected to take most of the year to complete. Public Engagement Plan: Natural Areas and Trails will collaborate with Communication and Engagement and project partners to develop a public engagement strategy. Since the design methods have already been determined as the only feasible approach, engagement efforts will focus on community involvement and celebrating the new trail section's development. Staff will sharing information in the Friday memo to council soon	Diana Frick

4-2024	Butler	**Requested Work Session for information on the Lincoln Park Redesign- to include status of project, timeline of project and overview of the coming outreach Work Session**	April 2, 2024 City Council Meeting	Requested Work Session for information on the Lincoln Park Redesign- to include status of project, timeline of project and overview of the coming outreach Work Session	Revised site concepts were shared with stakeholders and city staff in October. Discussions centered on projected costs, the potential to phase the project in alignment with the city's growth, and integration with other ongoing initiatives, including the Civic Campus, the 8th and 9th Street redesign, and potential private development opportunities.	CPRD
5-2024	Hall	**Impact Fee Study Structure**	May 7, 2024 Council Meeting	Requested staff bring a report to a future work session explaining more in depth the Impact Fee Study Structure - how the ratio is calculated, review process, timeline of review, and development fees	Staff will come back to a future work session to discuss the Development Code	Allena Portis/Robert Miller/Brian McBroom
6-2024	Butler	**Sidewalk Funding Projects**	May 21, 2024 Council Meeting	Requested staff to come to a work session to report on sidewalk work and plans being done	Presentation at the December 17 Council Meeting as an informational item	Paul Trombino
7-2024	Butler	**Building Permit Fees**	September 17, 2024 Council Meeting	Would like staff to provide information to a work session relating to building permit fees for the last few years and what they are currently	Staff will be preparing a memo for Council	Brian McBroom
8-2024	Olson	**Code Compliance**	Oct 1, 2024 Council Meeting	Requested staff to present at a future work session on code compliance- what is compliant and what is not and to develop a plan to assist with low-income residents specifically relating to yards and vegetation	Tentatively scheduled for a work session on January 14, 2025	Brian McBroom/Juliana
10 - 2024	Hall	**Legal Research**	Oct 15, 2024 Council Meeting	Asked staff to produce a report on Legal research for Home Rule Cities in response to the State Law regarding Occupancy, ADU's and Parking Minimums. Also would like included what the cost of challenging state law is.	Staff will create a report for Council and have a presentation at a future work session	Legal
11 - 2024	Butler	**HP Rezone Parking**	Oct 15, 2024 Council Meeting	There was a request for staff to provide a report to council on the HP Rezone area parking, traffic problems, and what has been done in the area. It was also requested that the design standards be included.	Staff will create a report and include the schematics of the area and send to council	Public Works
12-2024	Butler	**Consulting Service**	Nov. 19, 2024 Council Meeting	Report on consulting services and the key departments depending on consulting services. He would like to have in the report what catergories are used for consulting services and a way that the budget can decipher what is a consulting service and what is in house service.	Staff is working on the report and will provide an update at a later time	Allena Portis

Work Session Agenda Summary

Item: 8.

Title
Adjournment